Coupling in the Canopy

Manuscript (Work in Progress)

Will McWhinney

March 21, 2007, Assembled by Jim Webber

Table of Contents

COUPLING IN THE CANOPY 3/23/07

Book Outline Jim/Will 3/19/07

Referencing the Jim and Will Outline of 12/15/06 and discussions on 3/18/07

Chapter 1 Introduction

We have evolved beyond thinking about relations best characterized by models of *force*

Realities in Emergy 29 PAGES
BIG REVISION NEEDED

Chapter 2 Coupling

The emergence of coupling as a general explanatory variable.
An illumination of coupling, what it is.

2/21/07 34 PAGES
REWRITE ACCORDING TO 3/16/07
NEW OUTLINE DATED

Section Break: Constructing Alternative Realities

Chapter 3 Construction of Reality CONSTRUCTING REALITY

A ontogenic model based the imperfections of coupling of humans with their environment
Mirroring and the hypothetic

3/20/07 18 PAGES

Chapter 4 Multiple Realities: Complexity arises from within the mind

The four-part mind

OLD CHAPTER 32 PAGES
CONSTRUCTING REALITY [MIGHT BE ANOTHER VERSION] TO

Chapter 5 Platforms of Discourse: Complexity arises from within a Culture
Fields of Discourse –Platforms of Conflict – Space for creativity
Conflict, creativity

2/4/2005 4K AAOD

Section Break: .....

Chapter 6. System Metaphors as the core metaphor for Western Societies
An inevitably conflictful society

METAPHORIC FORMATIONS OF CULTURES

3/22/05 91 AAOD

Chapter 7 Explorations and Implications
Organizational coupling, networks vs. Dynamic Systems, origins of language
Empathic vs. Network View of society (Note: not empathetic)

NETWORK PARK

Section Break .....

Chapter 8 Living in the Canopy

Chapter 9 Growing into the Canopy

WILLS GROTT PAPER

23 PAGES

COUPLING IN THE CANOPY 12/15/06

The Book: The Emergence of Coupling
Revision of: Notes from Conversations on 11/30/06 held between Will McWhinney and Jim Webber

Table of Contents

[None of this is complete – though long pieces have been roughly constructed of much of it – following what we talked about. Trying to keep it somewhat readable for a larger audience than accepted Paths of Change. That is hard for me to do.]

List of key concepts and distinctions

Naming the Book Exercise

Tuning-up the Canopy Diagram

12/15/06 with Will's revisions of 12/15/06

12/15/06

Chapter 1 Introduction

This book exists in an attempt to understand how reality is constructed based on the fact we can detect differences.

Critical Features

1. Coupling

2. A difference ontology

3. Coupling supercedes FORCE

4. Field thinking vs. Network thinking

5. A 4 Grooved Brain

6. Application to communication, conflict resolution, and organization

7. A book "of" not "about"

8. Being empathic with people and their worldviews across the canopy

Chapter 2 Coupling

XXXX Jim – I am not sure what to do wit h this chapter. I have finished it and you're asking for a very different rewrite ?? Some sections make sense for additions/rewrite (these marked with a side line) but many do not for me.

An illumination of coupling, what it is
Coupling as fundamental; an underlying mechanism that allows us to see more and allows us to see how we are coupled to the universe. The human job: to find out how we are coupled to the universe, to know about it, but can't know it.

The emergence of coupling

Coupling of groups, coupling of individuals

An amoeba is in contact with the whole world but can only articulate small number yet subject to all conditions in the universe. Its world is limited.
As organism gets more complex gets to the point we know what we have encountered and can distinguish. We couple to notice a difference.

Empathy
Coupling is essential to forging an identity. Coupling forms a personal identity

A history of FORCE ??

Human, social, individual power
Led to Force in Scientific, physics notions
Which to Psychological field in 1900

Coupling creates an entity/Force destroys an entity ??
A history of Coupling
Personal
Physics
Non social fields
This book

The coupling paradox (Quality) ??

But the tendency to repeat, repeat over and over again.

metaphoric extension How is what we encounter the same and different via metaphoric extension, .. uses differences to go beyond what we already know so we can continue to see the new.

Chaining, - a tool for finding the next metaphor, the new thing. A wonderful chaining tool in the mechanical sense is the Periodic Table. In math N+1 is another example. Chaining rules: What going to couple with, e.g., could be for social or mythic stories. Poetic metaphors do not seem to have roots.??

Systematics 1 thru 12 term diagrams, numbers as a great chaining device (Maybe – I'll look at .]

Chapter 3 Constructing Reality

Ontogen, metaphoric extension and chaining as elements in creating reality

The way we notice differences helps establish identity for ourselves and other things and people.
To know how we are coupled.
Constructing images of the world

The Four Dimensions of Empathy
CAN'T PUT HERE AS 4 REALITIES HAS NOT BEEN INTRODUCED YET Moved

For instance, the social reality, when I act I find his way so I can couple with him. So when I say something new I know where you are coming from.

Describe ways humans chose route to brain (which part of the brain used) by type of message. Message 1 goes to ---, whereas Message 2 is processed this way. ---

Chapter 4 The Origins of Conflict: the Four-Part Brain

How the brain actually works. The physiology of the brain when performing different tasks e.g., conflict, problem solving, creativity (remember the mighty Tryptich)
Note: Maybe put 4 Personalities in an appendix

Empathy in 4 (or 3)

Integrity of number system I know God The 10 Commandments	SE ?
MY Excitement one gets when conceiving, say, a "Walkman" Or "I know this book, I have a Gestalt of the book. Discovery of the central theme, core idea or archetype	SO Empathy as emotional arises from the Social Reality

6 Platforms, Difficult to relate?? Difficult for any individual/culture to modify the dominance it gives to one or another all of which leads to conflict. For examples, these students same % can change easily – others are very unlikely to Torbert 2%, Maturana 25%, Weber 10% changeability

Conflict hard to manage because people hard to change
Most get stuck in worldview

So can't solve conflicts with nice conversations ala Bohm, Senge, Isaacs. The nice conversation will not hold when it comes to action. The down side of Juanita Brown's World Café. Nice talk, no action.

Using P of C, moving from one platform to another, is one way to deal with differences n the quest for action.

ChapterXX Qualities, Quantities, Values and Gestalts (Understanding Differences)

Note: This is likely to be omitted chapter — too technical for this book.

Chapter 5 Systems Metaphors in Western Socieities

Note: Simplified, shorthand, from 60 pages to 30 pages

The ways Western societies have built strong paradigms
This is a model of society equivalent to Stephen Pepper's and Ken Wilber's
(Reference to Mind & Society as a way book can be organized)

More on metaphors - to help understand social power of metaphor
This chapter is a major example of metaphoric extension

These System Theories are expression theories representing a way Westerners have come to processes stuff

Three core tree trunks have grown strong and one core generator (Narrative), is a metaphor generator, it suggests metaphors. Resides at the bottom of the woods generating new shoots—species that seldom shoots make it. Canopy blocks light and nourishment.

How the tree trunks grew:

Classical model by grammar, administrative law, stayed close to the trunk. But then meta-fluctuations (Jantsch 1980) led to branching into a variety of flowerings with different logics – Reformation, Other religions, richer mathematics.

Dynamic: Energy, Mass and acceleration

Exchange metaphors accepting intentionality (free-will)

Complex adaptive systems now appear everywhere. Incredible manifestations, blossoms, rich proliferation of differences

Conclusion
Which leads us to talk about things in quit a different way. No longer talk about forces but creating conditions. Coupling replaces forces for social/human behavior level.

Chapter XX A Model of Society Using Systems Language
(I DON'T KNOW WHAT YOU WANT IN THIS CHAPTER/

Fundamental way present society comes to operate in systems language

This model follows from the 4 realities – I thin k it recognizes the 4 but has to transcend them

Chapter 8 Empathic vs. Network Description of Society

How society operates from organizations to society as a whole

Networks vs Empaths

Communication: empathy, communication, process and structure

Network vs. Empathetic thinking
Organizations – general
government operation & structure

Note: Forget Grammars Chapter

Chapter 9 Life in the Canopy

Reference Will's chapter in Montouri – living in the canopy

List of key concepts and distinctions

Holistic/Atomistic distinction
Analogue/Digital
Fine Grain/Coarse Grain
Scaling (ordering by levels) from the very smallest strong/weak force to electromagnetic to gravity to emergence of simple molecules H2O to organic molecules (long chains0 to the emergence of life

Coupling replaces **force**

Ontogene

Empathy/Sympathy distinction

Separation/Collection ETC

Metaphoric extension and Chaining

Embodied Mind

Dynamic system

A book "of" not "about" – role of prepositions

AND MANY MORE
Naming the Book Exercise (See page 138 in CPOC)

General Comments

1. Books titles with sales appeal: The Turning Point, Chaos, Complex Adaptive Systems, Breaking Point, Sync (/Strogratz)
2. Books with conceptual titles: Concilience (E. O. Wilson), Synchronicity (Javorsky)

Stakeholder Pseudo Quotes in NAMING EXERCISE

OD Consultant: " Opens a totally new approach."

Manager: "Tough going but I have to read it"

General Reader: "Gives me new hope that we can deal with chaos and complexity"

Academic, Management Faculty: " I can use this to rethink my teachng."

HR Faculty: " Brings me back to the center of management."

Philosophy Oriented Faculty: A contribution to the panoply of thought!"

Fielding Faculty: "We are proud of you!!" "This a breakthrough!"

Social Change Practitioners: " Hope. This speaks to me. This I can use."

Bonnie the Greatest: "Amen"

Dean of a Graduate Program: "In what department should this be taught?"

Military Man: " Make love not war!" Beyond FORCE. Forget the word FORCE."

Next step is to look for themes and classify them according to Realities

Coupling takes us beyond Force at every level from big bang onwards. A book about peace, about not having to use the word force.

Then array classified themes in the 4 reality matrix like so ----

Territory, State a Claim A new model of society The truth about differences ↓	**Description in place and time, features** Dimensions of empathy 4 Realities Systems language The Canopy
Evocative, Tied to a story AHA!	**Values, purpose , intent** Hope Agreeable process replaces disagreeable Coupling not force Coupling forms identity Resolving/dissolving conflict

To Be Revised 3/22/07

CHAPTER 1: REALITIES IN EXCHANGE

If no one asks me, I know what it is.
If I wish to explain it to someone who asks,
I don't know.

St. Augustine on 'time'

COMPLETELY REDO AFTER THE REST OF BOOK IS DRAFTED.RESTART TO GET IDEAS OF BEYOND WHOLE PART

St Augustine's dilemma impacts most of us. Images and ideas appear that we do not know how to articulate. Jens Brockmeier commenting on the occurrence of this problem wrote, "There are undeniable experiential realities that language cannot capture, not even touch." Mostly we let them go. But some stay with us and return again and again until we begin to image how we would talk about the image. We set it up as though someone asks what is in our mind or in fact begin a dialogue. There will be answer to St Augustine's dilemma. However, as Brockmeier continues

> "there can be no doubt that as soon as these [images] are pointed at and referred to … they *do* take on a discursive form. They speak to others, … Or perhaps more precisely they are spoken about with others, they are narrated and communicated;" (2002 p. 88)

[EXPAND] He avoids St Augustine's dilemma, indicating that one can only speak *about* time; we can't know time itself. We never know of those things we observe the thing-in-itself, but we can avoid that dilemma by accepting knowledge *about* time and about the other concepts and perception that we insert into our dialogue.

Brockmeier implies, narration and communication are concurrent aspects of meaning-making.

[[Possible material for intro] [
They are intertwined processes essential to articulating *the differences that make differences*.[1]

COULD BEADDED IN HERE SOME WHERE.I start by proposing that *coupling* is the elemental process on which we reify our universe, that is by which humans create their images of the world. In spiral of the development each 'loops' extends the model to explore how it elaborates an existential model of individual behavior, generates language and social behavior with the hope of contributing some insights to navigating the complexity we are experiencing.

MORE MATERIAL TO BE ADDED

FOUNDATIONAL CONCEPT:

System Order—a configuration of conditions operating over a limited range of critical variables—time, space, energy with a stable base of the prior order. The new order uses the stable elements of the prior order as building blocks. The ideas of system orders were formulated by K. Boulding in a 1956 paper.

I would like to reformulate it as a series of DSs. There are more orders than he listed at quantum and sub-atomic levels. The commonly identified orders are: [get Boulding list]

Mechanical:	Molecular (physical, chemical, organic)
	Mass bodies (physical, solar systems, galaxies…)
Organic:	Living systems (5 orders)
Human:	Individual humans, families, tribes, nations

Social: Cultures and an ultimate unity

The Embodied Mind:

Body without Mind.

Generally, a body is composed of elements of one or more lower orders that can be described as metastablized DSs—nearly stable and operating near equilibrium with a few transients arising from minor Δx in lower orders. In living systems, the metastable DSs are describing molecular interactions—our body chemistries and mechanical properties that can be modified by changes in the environmental conditions e.g. drugs, nutrition, physical constructions. Acts of will operate on the conditions (i.e., the shape of the space identified by the *DS*.

In living beings these are the structures of which Maturana writes so extensively: the autopoietic structurally coupled entity. The coupling as Maturana/Varela describe it is the adaptive synchronizing of the system to its environment either as onto or phylogenetic processes. The adaption can be directed by random variations at the body level order of the system or by intent at the psychological order. (*Footnote: a different aspect of the story in the survival intent, which if there is one, it's the miraculous property of living organisms.) As organisms' means of adapting is to act on the environment and observe changes in the environment that follow from the act. Without acting there is no sense of reality to the environment or awareness of self. The action is embodied in the lower orders. And humans can develop simulations of embodied acts through experience and training.

The simulation/cognitive operations set up protomuscular programs, which can be explored hypothetically as through the organism has acted on the environment,

but the person inhibits its firing. Thus embodied phenomena do not necessarily required engagement with its environment via physicological acts. The critical feature that has experience of coupling and memories of such.

2 *Emerging directions*

Algebra and calculus, fundamentally different modes of thinking have led to different research studies [EXPAND to express this idea relevantly]
The first scientific models used in the Western world to understand and explain developed out of atomistic approaches designed to examine by separating and collecting data. Only when these approaches failed to comprehensively explain phenomena such as electricity and light, did the scientific community accept this radically different and more comprehensive way of thinking. Although these emergent dynamical systems provided pervasive explanations, they were frequently rejected by the more atomistic thinkers. Even in the field of mathematics, for example, Newton's algebraic calculus functions calls for infinitesimal parts to approximate the sense of continuous flow rather than in a field interpretation. The algebraic version had more immediate applicability and is easier to understand than Liebnitz's approach to calculus which assumes the continuity of the field.
[ADD a brief introduction to the research tracks in the sciences and the different emphases in different cultures, building on the following fragment.] The mathematics of non-linear systems have developed unevenly with more in Europe than in the U.S; empirical studies in biochemistry, and neurophysiology, more in the US. The leading work in the mathematics of non-linear and dynamic systems as well as of coupling are still developing more extensively in Europe than in the U.S, continuing a bias that has prevailed since the founding of modern sciences. [[Compare the work of Pikovsky and XXX (2002), Singer XXX and the Fingelkurts brothers in Europe with Strogatz (2003), Kelso (199X) and Arbib (200?) in the U.S. using respectively field models versus neural network models. The bias continues today but there are counter examples e.g.,, Abraham (1980s) and examples of concurrent work in both cultures—the 50 years of interest in empathy in humanistic psychology and the current neurophysical studies of 'mirror neurons' as a vehicle for empathy. ADD REFERENCES, e.g., McFadden 2002,

This chapter informally introduces the science of coupling to enable us to discourse on some psychological, social and cultural phenomena that I believe can be better understood from this foundation. The next chapters introduce vocabulary and models that extend current cultures and language structures toward ways of thinking that will have to evolve. First I introduce dynamics systems modeling using a variety of examples of coupling from everyday life using graphics to give the sense of flow. I hope the basic image of a torus—a donut shape that has suggests motion but no beginning or end—will initiate the reader to a way of perceiving that does not depend on our deep habits of seeing and conceiving "things." The simplicity of images betrays the deep shifts in our worldviews required to grasp field images. Clarity comes only with by making many applications. I build and expand on these coupling processes in the remainder of the book to open routes to the giant topics of the embodied mind, languages origins and social structures.

Difference

Being and meaning begin with the identification of differences. So, it is with differences that I begin my search for ideas of how to talk and write about images and ideas that pop into my head. Or going back to the beginning, with the question of how the simplest living thing notices that its environment is different now than it was in a prior moment.

Beginning with that vague tension one feels when holding an inchoate intuition, I searched for paths that arise from a first 'difference that made a difference' to find the processes and provide bases for dialogue with others. [THE FOLLOWING BELONGS MUCH FURTHER ALONG [I chose as a guide conceptual tools that I had developed over years of diverse explorations: systems theories, metaphoric processes, and most fundamentally, a difference ontology that organizes modes of realization commonly designated as 'materializing,' 'substantiation,' 'reifying' and so on.]] The difference ontology provides a foundation on which stages of *separation* and *collection*—articulation and dialogue—effect shared meaning.

On this base I began to explore the features of language—written, played, graphic, gestural.... I asked how the differentiations were made that start a chain of articulation and what (who) is the actor that observes the world and reflects on itself. And ultimately I explore the function of a language's structure. Most people say, it is to facilitate communication, bringing humans together through increasingly articulatable expressions. Others see it also plays an enigmatic role of separating reflective,[?] in allowing us to operate at a distance from each other. Strangely, the more we know of the world the less we need to maintain contact with it. If

articulation were complete each all-knowing person would live in a shell 0f certainty, knowing about everything and needing no communication with others. The philosopher Leibniz (1646-1716) conceived of such a state in which each entity is a *monad,* totally self-contained. However, we live in a world that is far from either the extremes of Leibniz's world with no questions to be answered or St Augustine's painful awareness of having no tools with which to inability to answer. Rather we live with increasing uncertainty as we come to know more that we that don't know.

My search thus became one working at the boundary of uncertainty; how do we 'talk about' that which we don't know; what are the tools with which we construct descriptions of that which we cannot know. Constructing reality by noting differences and collecting similarities by noting event 'B' is like event 'A' but with a difference. Finding differences extends the scope of our awareness and through *metaphoric extensions,* adds to our vocabularies. Such extensions can be as simple as the artist Miro achieved with a few splashes of color, as familiar as in saying, "The man is (like) a peacock", as evocative as Crick's drawing of the DNA helix, or as enigmatic as Einstein's four papers published in 1905 which produced a new metaphoric vision of the cosmos that on contact with empirical data is becoming the accepted scientific view. These extensions *articulate* our thoughts. START HERE. Forming metaphors draws on the intuition, another

world of expression from not begin in observation,

but in. The clearest

examples are in mathematics, but also in myths and other metaphorical forms that appear to be free of material reference.

it an other therein we misguide our constructions of

knowledge and views of reality.

'Communication' is the common term to identify the second core process, along with articulation, but I struggled to find terms that particularly characterize the insights I bring to this discourse. 'Discourse' is closer but is not distinctive enough. Rather I introduce the term *coupling* to label the process by which all forms of extension and exchange take place. I use coupling in its technical sense as defined in the physical sciences. There it is also called resonance or phase locking. It describes the energetic exchange between bodies, typically driven by electromagnetic forces. In the social, psychological and artistic realms we call it harmony and synchrony. At the micro-level, coupling appears in neurological paths form that gestalts we recognize as images. At an interpersonal level, the loops of exchange are formed using gestures, enunciations, underlying all forms of discourse. At a societal level, they create logics and disciplines that organize our discourses, but at the same time limit us to using dominating structures such as the classic subject-object duality that has proved such a determinant of the Western psyche. As concretized the logics and syntax reinforce the 'silos' of thought resulting in paradoxes and social controls exerted through grammars in language and hierarchical classes in social behavior. Grammars standardize enunciation by such tools as noun-verb and case agreement.[2] The

standardization fixes the rules for the way we form speech, the poetry we recite, and sciences we establish, and the language games we play.

The list of possible questions to answer my basic inquiry is immense. I can only work around the edges of some of them hopefully bringing in new insights with the tools I employ in this quest. My entry into the terrain of linguistics was inducing me to look at just a few of the structural elements of grammar and syntax before I realized that by themselves, these elements seem to function to suppress ideas as much as to express them. Grammars become instruments of social and political domination, class distinctions, restrictors on exchange and inhibitors of creative expression. They structure the diverse beliefs about reality into a dialogue and so produce conflict. Discussants may appear to agree at the content level but subsequent actions show that the participants make interpretations that send them along divergent paths. The resolution of differences often simply hides subtle differences that make all the difference.

In order to encounter the deepest and least visible powers of language, those that expand and those that limit expression, I began the development with three generative processes of engagement: those that build the chains of differences, I label these *metaphoric extensions*; those that organize our thoughts for presentation, which I organize as *articulation*; and those which by *coupling* allow us to engage our environments with increasing discrimination.

Organizing the diverse routes from intuition to explication is a daunting task at the level of structure even before questions of content are considered. They require an author/creator to exercise abilities in each of the three processes. First of metaphoric extension which is the creative act of naming, of binding the qualities into a whole; second is articulation of the idea to take a form designed for some audiences; the third is the exchange process that couples the creator with an audience and thereby establishes a sense of shared meanings. The three are normally studied as separate topics in the various sub-disciplines of creative studies (appropriately undisciplined), linguistics, and communications. However, the approach I take views the three as forming an inseparable trio, providing alternative explanations of phenomena of their respective fields. All are required for exploring the origins of language, the expressions of ideas or image and their adoption by an audience.

METAPHORIC EXTENSION

"A bird is like a fish—they both swim" A parable, the book of Genesis, a mathematical model. All are metaphors, all tells us some more about an object, belief or relation. As I propose here, all expressions—interpretations of a face, a painting, words, and structures such as buildings, even whole cities and nations are metaphoric extensions of a prior source idea. Each is a reified extension of differences, REWRITE of some thing or process placed in a new container, process or

structure. This proposal goes beyond George Lakoff and Mark Johnson's (1999) thesis that our expressions all arise via metaphors from embodied sources to assert that all linguistic expressions are produced by cascading metaphoric extensions from the elemental differences. We create vocabulary by extending metaphors. We create rules of grammar through diverse forms of metaphoric extensions.[3] We chose metaphors using diverse instruments and arguments, forms of causality, duality, temporality, adjectival descriptors, and the little parts of speech.

Words and phrases, whole ideas, and models may enter a language with the freshness and novelty that we associate with metaphor. They originate as aesthetic acts. On repeated use, they lose their power to surprise, become trite[4], and subside into the body of the language. We become unconscious of these origins even when those that are most transparent. Sometimes the metaphoric origins of even the most mundane ideas remain visible: 'Ago' and 'always' are time words that are extension of a metaphor of space—time is about what it takes to go a distance and more basically, 'time' describes an awareness of a repeated movement. The processes of extension are contained by the logics of a language and culture. I explore these limitations as the *rules of chaining* in Chapter 6 [OR IS IT 7.].

ARTICULATION

When we do *articulate* our thoughts and images, we form them according to the rules of the relevant media. Some of these grammatic elements may have originated 50,000 years ago and are now buried in our unconscious. The complex articulation of civilized life requires systemic efforts more structured than simply selecting words and phrases from a vocabulary and stringing them into messages for an audience. Humans and other creatures form rules of enunciation that delimit

almost every choice an author makes in conveying complex messages that couple sender and receiver, rules that synchronize the generation of the messages with the target audiences' expectations. It is not in what one says (writes, paints, gestures, etc.) but how those enunciations come to make sense in the media being used. Structuring by grammars facilitates communication by mechanisms that couple neurological structures, allows conversations, and maintains group identity within a culture.

'Articulate' is an unusual word. It is one of a few English verbs that embody a dialectic of opposing actions. Articulating ideas or images *collects* elements into unities and *separates* them so that they can be aligned in strings of symbols organized via various linguistic tools. Collecting is the general process for binding, categorization, and vocabulary selection. Separating provides definition, closure, and rhythm to a flow of ideas. Grammar provides the rules of connection; linguistics describes the means by which we form separate elements.

With increasing complexity animals carry out sequences of actions in response to complex change in the environment. The action sequences are programmed through neuro-muscular habituations that are variously labeled motor patterns, action plans and, particularly relevant, grammars and rules for selecting vocabulary. Articulation appears as distinctions—sounds, gestures, and symbols. Typically we think of these as disrupting silence or distinguishing a message from the surrounding noise. We also gain an insight by viewing a distinction as a break in encompassing harmony in one's environment. As I propose later in the book, we can consider that language emerged as systemized breaks in the prevailing rhythms. We think about the dancing, chanting or ritual performance of ancient peoples, but all behaviors, organic and inorganic can be characterized by harmonic

properties. Grammars can be viewed as a means of reharmonizing our engagements with the environment. There is various discussions of articulations in Chapter 5 and 7.

COUPLING

At every stage from the internal 'mental' processes to public dialogue, communication is a *dance;* enunciations and responses are paired in rhythmic couplings. The process of coupling, also referred to as entrainment and phase locking, reflects the harmonic connection that underlie all physical, chemical, and biological processes. Coupling is the essential glue that creates a whole out of atomic parts. It relates and connects all entities, whether between atoms to form a molecule or cultures to aggregate a society. All contacts occur through couplings, momentary as between electrons in an electric current or as a modern reader connects over eons with a Greek classic. They produce harmony among systems, exchange energy, and establish synchronous movements, emotions, and shared ideation. An organism couples with its environment in coordination of action. The loops become the physical foundation of meaning. At every level among living things, from the simplest simulations of organic life to the grandest exchanges between civilizations communication is achieved through coupling between the source and the audience.

Coupling seems to assume distinct entities yet it transcends the duality of this atomistic definition in producing wholistic feed forward loops.[5] The connection is paradoxical. When viewed carefully it becomes clear that if the parts are truly separate to begin with they will not exchange. You cannot connect that which is separate or separate that which is connected. It must be seen then that all linguistic systems based on part-whole relations presume one side of the paradox; those based

on wholistic or field thinking properly describes only the other side. Communication occurs only between separate systems but the systems must be coupled in a common environment. Communication, as with articulation, always has an 'and/or' relationship which separates and connects simultaneously. Coupling transcends the apparent separation and resulting collection that are essential to achieve communication. In a romantic image, communication is a struggle to return to a state of harmony in which a source and an audience are joined in hermeneutic circles. It is an amalgamation attempting to recover after the diaspora from Babel. But we never are successful for the continuing emergence of differences keeps from the heaven the tower's builders sought—simplicity never wipes away chaos.

These intertwined processes—*articulating* and *coupling*—form an essential dual.[6] Only with dual acts of articulating ideas and coupling with receivers can meaning be established—both are required for communication. The need for their dual use is obvious but the two are typically handled as distinct topics. The separation between the arts of narration and sciences of communication persists in academia from grade school to the University. Works on grammar seldom treat interpersonal communication; those on communication seldom deal with the construction of a sentence.[7] Attempting to build on one or the other foundation alone frustrates convergence: grammars have evolved Byzantine elaborations to compensate for the absence of coupling; communication models that focus on harmony produce either insipid agreements or acceptance of dominations. The intent in this work is to demonstrate that they are involved dually at every step on the path from inarticulate image to meaning shared across cultures..

GRAMMARS AND ENGAGEMENT

One way or another, we convey intent, exchange data, and establish shared meaning. We come to an agreeable harmony, acquiesce to the other's demand, or just leave issues unresolved. We do so through spoken and gestural languages, using the rules of grammar to articulate our thoughts beyond the imagery of the idea in its nascent form and resonate with the recipients, those immediate in a dialogue or distant in writing. All languages depend on standardize rules for articulating intentions and knowledge into a communicable form. The rules are procedures for hanging ideas on the 'clotheslines' as Susanne Langer (1948) characterized discursive action:

> As it is, all language has a form which requires us to string out our ideas even though their objects rest with the other, as pieces of clothing that are actually worn one over the other have to be strung side-by side on the clothesline. This property of verbal symbolism is known as discursiveness; by reason of it, only thoughts which can be arranged in this particular order can be spoken at all; any idea which does not lend itself to this "projection" is ineffable, incommunicable by means of word. (Langer, 1948, p 81)

We may pick the 'clothes' but the 'clothesline' is given to us by our genetic inheritance and cultures. Grammars linearize feelings, gestalts, ideas, and images into streams of symbols to form images in the minds of the listeners. Our ideas are not directly translated into words; they may not even be articulatable through rules established in a culture. Words are not one-to-one codings of thoughts transforming a 'mentalese' symbology into a voicable form, as proposed by Jerry Fodor (1975). Ideas and images are of a different order than words organized grammatically—language is of society, not of a body/mind alone. Language expresses culture, normalizing and regularizing as an instrument of a functioning society.

Using the current grammars and vocabulary of our established languages constrains our expressions of intuition through logics, intentions, and implications. Most elements of the grammars and syntax were formulated in earlier eras, in different circumstances, and with differing assumptions about the mind set, e.g., the

beliefs about reality, of the parties in a communication. Grammars are by definition conservative; they limit what can be expressed. Their use in constructing speech isolates us through the very processes we use to describe—capture—objects, events and other people. Grammars inhibit interpersonal engagement, intimacy, and social evolution even as they make possible the enunciation of increasingly complex ideation..

To express our feelings and intuitions we often need metaphoric extensions that violate expected provided by their logics and block emergent ideas. Those who would be artists and creators "have to speak against the flow, not with it." (Abbs, 2003 p. 111), finding association through new logics and distant 'bi-sociations' as Arthur Koestler (1949) labeled juxtapositions from different forms of discourse. While the constraining rules enable our discursive exchanges, we obey them at the cost of our freedom to 'speak' of many images that dwell in our inner worlds.

Messages do not transmit meaning. Rather they present an audience with the direction of the author's intent, initiating a spiral of exchange that may converge through exchanges that establish meaning. It is the exchange-as-process, as much as the words themselves, that ultimately provide the sense of mutual understanding—it's the 'music,' as well as the words. My explorations lead me to assert that meaning is only conveyed in dialectic engagement; that is, grammars need be chosen for engagement just as we chose the vocabulary for evocation. Language is about exchange, not just form, thus all discussions of how it is generated require a dual process of enunciation of content and coupling of the participants, directly or through diverse media. Without coupling all statements about meaning are hypothetical – all understanding, within a person or between them is achieved through hermeneutic loops. .

The exposition here does not concern formal aspects of grammars in current use; it certainly does not reflect a concern with the *technically proper* use of grammars. Rather, it is about facilitating the expression and communication of ideas and images, My interpretation of 'grammar' is in spirit what George Steiner said in *Grammar of Creation* (2001):

> " [Grammar is] the articulate organization of perception, reflection and experience, the nerve structure of consciousness when it communicates with itself and with others."

My exploration is about the choice of grammars, and more fundamentally, about using metaphors and the constructions of grammar (and syntax etc.) that make our ideas communicable and the constraints visible. We recognize some variety in the sub-grammars of any language for their capacity to express diverse images. Mark Twain found he could tell us far more about life in the heart of America using the vernacular grammar of Huck Finn and Jim than he could with the structured English he used in articles he wrote for the *Atlantic Monthly*. We can go to the language of another culture to pick up the emotional tone of Italian that is missing in Germanic speech. And there are artificial grammars designed for mathematics and computers, such as Polish notation that give a precision not found in natural languages. We need a fundamentally different model by which to generate the requisite range of grammars needed to engage the audience. Rather than focus on locating a single grand grammatical structure that is appropriate and argue over its definitions and limitations, we need to recognize a range of grammars "that mark out a dispersion of choice, [...] a field of strategic possibilities." (Foucault, 1972, p.37) It is precisely the purpose of this book to present *strategic possibilities* and argue for an exploration into grammars as *vehicles of change.*

To direct my search I start with some ideas about the construction of dialogue:

- Languages, as well as consciousness originates in a process of establishing differences and collections, i.e., on a difference ontology
- All language is metaphoric, that is, it is generated by metaphoric extension.
- Grammars operate through the chaining rules used in forming enunciations. Their construction varies with reality assumptions of the designers and users.
- Expressions are formed into chains of symbols and ideas most often following the forms of metaphoric extension used within a culture.

These constructions enable articulation and concurrently limit creative thought, progressively disengage the speakers and writers from their worlds. All grammars express the conventionalizing power of their traditions. Ivan Illich illustrates the

formalization that occurred with the spread of literacy with the printed word: "Only when I have gotten used to thinking as the silent tracing of words on the parchment of my memory can I detach thought from speech and contra-dict it. … Only as memory is perceived as a text can thought become a material to be shaped, reshaped, and transformed." (Illich and Sanders, p.84, 1988)§ The disembodied quality of European languages follows the classic grammars of Greek and Latin introduced through the religious orientation of the scholastics of the Middle Ages. Grammars became concretized as people came to read, to reflect on, what they had written. That model began to be replaced through a differentiating phase beginning in the sixteenth century. The rise of geographic exploration, the emergence of empirical sciences, and the increased attention to measurement was accompanied with changes in the central features of English grammar. The renewed acceptance of the sensory world resulted in adjectives being given the full status of parts of speech. What had been called 'unsubstantiated objects,' then 'substantial adjectives' became descriptors that take on the properties we now call *qualities, characteristic* and *valuatives.* These roles for adjectives came to be formalized just as writing gained centrality with the appearance of printing presses. The spread of books and the efficacy of linear rationality called for consistency of speech. The grammar of Port Royal published in the late seventeenth century delimited European languages with formalisms appropriate to the Era of Rationality, codifying general rules and taxonomies that have controlled writing and speech of the educated classes ever since. Grammars are instruments of the state as well as of educators.

With rapid change in the scientific worldview beginning in the late nineteenth century, the new metaphoric thought freed grammar from the taxonomic logics. Those logics are insufficient to convey the sense and moods of the emerging era. Languages needed new strategies of engagement to take us beyond the rationalistic grammar of Port Royal as well as logics of the Aristotelians. Since Noam Chomsky's work first appeared in 1957, the study of grammar has focused on deep structure and generative processes to build a universal base for all languages. Chomsky's work set conditions for moving from conceiving grammar as structuring the acceptable rules of discourse to exploring human abilities to create meaning. Almost concurrently investigators such as Eleanor Rosch (1978) began to challenge the empirical validity of the classification theories that support the universality of grammatical structures. The

empirical challenge greatly enriched our awareness of variety of grammars used in the world's cultures. The emergence of electronic information and the Internet seem certain to call for further changes in grammatical structure but also they confront us with a more stringent regime of rules established in the service of consistency of form required by computational linguistics and digital communication.

For all the development of alternative models of grammar—classic, general, evolutionary, universal empirical, and generative—their proponents have kept close to the structural models that have long been used for western languages. However, with such diversity of competing theories, it is unlikely that any will ultimately be adequate for expression of new intuitions. This is understandable. Grammars have not been created for social engagement rather for sustaining social status and distance. The functionality of grammatical instruments has become more visible as language comes to have increasing technical and legalistic functions, not just scriptable modes for enriching relations.

It is also increasingly evident that our present grammars with their rules for categorization and whole-part relationships constrain our enunciations to a logic of thought and ontological beliefs that scientific advances have disposed. For the most part, European languages have presumed an individualistic bias and operate by noticing differences. This atomistic metaphysics favors analytic foundations and growth through additive extensions and collection of elements into sets. Atomism is but one premise for enunciation and not even the most common. Alternative bases are found in the Chinese and other oriental languages that presume a holistic logic through which they establish identities.[8] These atomistic and holistic ontological biases have domains in which each excels; they serve complementary roles in communication. The western atomistic mode sees the whole in a summation of parts; the holistic finds the part by differencing; both are required to express fully our thoughts.

The dialectical imperative suggests an integrating third position that relates metaphors and polarities. A good candidate for this role is the gestalt that binds together the objects of our senses and our cognitions into concepts. Rosch's ideas (1978) of the *prototype*, extended by George Lakoff (1987) and Lakoff and Robert Johnson (1999), ground the prototype in embodied core metaphors and provides the synthetic devices that enable the separating and collecting to construct (bind)

awareness of events and organizes them into categories of related images and concepts. With living systems, we can assume objects are the *intention of a network,* the 'central tendency' of related ideas and experiences surrounding a core metaphor. This view calls for new concepts of identity—of 'things' we would now identify as prototypes—and new constructions of knowing.

Evidence of this third ontological schema—beyond the western part-whole and the eastern schema—can be seen in a few discussions of languaging. In one example, the French amodernist Bruno Latour (1993) sees objects as more akin to nodes in networks than to bound atomic entities. Latour argues that the encyclopedists' rationalistic goal to identify objects with unique domains of knowing, objects—nouns—are more usefully considered as *hybrids,* existing uncomfortably in a variety of logical, scientific domains, *and* socio-emotional expressions. Latour notes that over the past three centuries many objects of discourse have acquired a double existence in the scientific (objective) and human (subjective) worlds. Nouns are no longer 'definitive' rather they rare better seen as nodes in a web of vocabularies associated with diverse domains. Latour's idea of hybridization has been realized in the totally participative construction of an encyclopedia, the Wikipedia. a living network created on the World Wide Web. It is a continually self-organizing compendium of knowledge of over half a million entries as of 2005. Where as the French encylopedists aim was to have experts standardize knowledge, the current effort is to involve the population at large in its continual reformation. It exemplifies the steps taken beyond the established path through dictionaries and textbooks to engage.

A second step replaces our habit of thinking that adjectives are descriptors of the world we live in with seeing that they are but reflections of a moment; to call something "green" is the data about history, noticed along a path of color discrimination generated by myriad prior ascriptions. A third step is post-modern explication of multiple causality that Foucault (1972) called the derivation of ideas. Varied causality are expressed in English by different *moods.* Currently we articulate the 'cause' of something as arguments from a particular paradigms and thus of a sub-grammar. Such steps do not form a particular new grammar but a better articulation of the rules for the *games of dialogue,* games that have been in play as long as there have been communities of living being, yet we have not learned all the moves or

developed a theory of 'language games.' This book intends to contribute to its formulation. (Chapter 4)

I began my exploration of the processes of enunciation at the stage in which living things began to articulate the discordance of biological life with structured engagements, prior to the usage that has been concretized with shared vocabularies formal logics and grammars. I enter the exploration at a stage that precedes the traditional disciplines of linguistics and philosophy of language using a combinations of tools not commonly used for approaching communicative processes.[9] Beyond concurring with neuro-physiology models, the tools I use for creating concepts of language and communications have been little used to explore these topics. The domains of these tools are:

- *Ontologies* for identifying beliefs in the source of reality and articulating differences in the domains of discourse.
- *Metaphoric extensions* as the basic instrument of articulation and for generating discourse and, at the macro level, paradigms.
- *System thinking* for elaborating cultural metaphors, and developing ideas of coupling.

To ground my proposal I build models in concordance with contemporary philosophers and grammarians whose cognitive theories reflect current work in neuro-physiology. However, new neuro-cognitive theories and data are being published almost weekly, so the physiological content will certainly be out of date by the time this book is published.[10]

[UNLIKELY NOW With the tools and models in these domains I present a first glimmer of how grammatical forms may be strategically designed to get beyond those limit the ways we dialogue and some thoughts about what is will be like to live with languages designed to engage.

USING AN ATOMISTIC LANGUAGE.

But before going finally to the conclusion of this developmental path I have to pause to bring attention to the language I am using in the prior paragraphs and will in most of the rest of the work arises within the logic of the dominant atomistic paradigm. It refers to defined elements, observer, and phenomena, as though they are objects with independent identities. However, this description leads to different

constructions than does the view of reification that I am presenting here. I need this second manner of exchange based in a field model of coupling to better display this ontogeny as a general model of reification that parallels the models that are dominant in western cultures. In attempts to develop this alternative paradigm I have to use commonplace atomic worlds like 'thing' and 'something,' and the normal grammar and vocabulary that surreptitiously reintroduces 'such things' into the process of better described as reality than of one made of bounded atomic objects, material or immaterial.[?] So expressing this ontogeny in languages such as English or other romance languages is tricky; it makes expression of ideas based in a distinctly different logic as perilous as walking in a minefield. With formulation of this ontogeny that replaces articulation the grammar and vocabulary of every discussion has to be reviewed to look for unnecessary and unintended implications of using a particularistic vocabulary and syntax. But no amount of care will suffice, until we have a new language of describing the universe to complement the present atomistic structure.

ORGANIZATION OF THE BOOK

The next three chapters present a difference ontology and alternative beliefs about the source of reality. These chapters build ways in which metaphoric extension from diverse realities form proto-grammars that guide discourse.

In Chapter 2, I present a model, a difference ontology, for the ways in which we construct reality. It describes the way in which metaphors extend observed differences, following on ideas from Gregory Bateson and the neuro-physiological theory elucidated by biophysicist Rodney Cotterill (2001b). I establish a rationale for considering *alternative beliefs about the source of reality* using as a template the ancient Buddhist *skandha* schema for realization through processes of sensation, emotion, intuition and cognition.

In Chapter 3 I characterize the people who favor each of these four sources of belief about reality that have pervaded Western cultures over three millennia and the way these four belief systems relate to the cultures all over the world. I describe the behavior of people whose beliefs are dominated by one or another source and indicate the logics, attitudes, and ideologies that appear in discourses among people holding these different beliefs. The explication displays the ground for the book's discussion of diverse grammars that facilitate and block us from expressing images and intuitions.

Chapter 4 establishes arenas where we initiate discourses thus realize our images. Realization is achieved by confrontations on any of six platforms of discourse in

which we characterize the 'real' world. The six pairings of reality sources map the types of discourses we typically find in Western cultures: assertive, analytic, evaluative, normative, generative (narrative), and creative. I explore power relations, creative openings, and conflicts that arise in discourses conducted between people and cultures operating from different platforms having distinct causal models. The model provides a structuring of conflicts that arise between the worldviews and some ideas for the management of such worldview disputes.

Chapter 5 explores the modes we employ to describe the events and objects in our lives. I first look at the ways we separate and connect to distinguish *qualities* and *characteristics* of entities. I consider qualities as the descriptors that identify properties of a whole in which an object or event participates. Conversely, characteristics are properties of (atomic) elements that are found in observation among many entities. I extend these distinctions to descriptors of intentionality, defining *valuatives* and *aesthetic events* in a manner that parallels the quality-characteristic distinction. Preferences identify properties of value to individuals and cultures. The aesthetic creates novel images that are the source of prototypes, and as the source of all metaphors, of all concepts. The scheme built in this chapter provides the vocabulary for descriptive functions in a grammar. It also indicates that it is not possible for an enunciation itself to convey a precise meaning to an audience. Every audience will come with both a range of reality assumptions and of biases regarding the way in which it will employ the tools of connection and separation.

Chapter 6 uses a grand metaphoric image of a forest in which three basic types of trees flourish and grow together in the overstory canopy. They are metaphoric extensions that grow into alternative system paradigms requiring distinct grammatical forms for expressing ideas and intuitions.. Their interweaving branches form a *canopy of emergent processes*. The emergent canopy is realized in the processes of *spectral coupling*, a rich articulation of the fundamental coupling process.

Chapter 7 outlines the construction of grammars designed for engagement. I organize various elements and functions developed in the prior chapters to produce a grammar generator and the enunciative forms with which a person (or organization) chooses to communicate with audiences. I present the generator in two stages. The first is proposition forming, akin to the traditional topics of grammar. The structure is similar to that proposed by Michel Foucault in *The Order of Things* (1970). The second is dialogue-matching through which vocabulary is adapted to the context and audience. It organizes the strategic choices that facilitate coupling persons and systems through social languaging processes. This grammatic model treats communications both as a complementary instrument that conveys information between people (and systems) and that couples the systems that make up a society.

Chapter 8 explores the processes of coupling in the meta-system of culture and language, working from the assumption that sending and receiving communications are reflections of each other in a hermeneutical. Here I explore how coupling establishe common grammars, rhythms, flows, and contexts. I describe the richness of exchanges that occurs among living creatures through polyphonic spectral coupling. Inevitably, such engagements among systems bring out issues of mutuality, power, and dominance. The final section characterizes these socio-political aspects of the meta-systems that evolve through engagement. In particular I look anew of the impact of the conscious and unconscious intents that the participants bring to dialogues.The final chapter, 9, is a speculation on life in the metaphoric

canopy that I introduced in Chapter 6 to characterize engagements where the participants are living in a universally 'small world' of great complexity. Life in the canopy transcends the grand paradigmatic dichotomy of atomism and holism to display a model that is incorporates pure system thinking (atomistic) and field (holistic) construction. I use Gregory Bateson's typology of learning to describe the behaviors one would encounter in the canopy.

As an appendix I provide an Articulation of Practices. It extracts from the text tools anyone might use to carry on a discourse and professionals could use to effect problem resolution, conflict management, mediation, and organization design.

I undertook the exploration reported in this book to better understand how I translate ineffable images and ideas that arise within me into understandable text. This path took me on a metaphoric journey to reify the ephemeral and establish vehicles of meaning—the grammars that articulate thought and the couplings through which we share those images. It led me to explore ontological foundations, conflicts that arise within the dialectic, the origins of cultural paradigms, the quality of couplings, and ultimately the emergence of pervasive and continuing third-order change strategies operating in complex environments. The outcome is a patchwork of suggestions how we might function while attempting to build a Tower of Babel out of fractal bricks.

The book is a case study of itself—a recursive effort in which the emerging ideas directed its form and flow. The process exhibited extreme circularity, requiring me to continually return to restate earlier sections and reselect words to more accurately present findings and formulations arrived at earlier. Routes leading out of the inarticulate images had to be retraced, looping back, reflecting recursively on every element of earlier expositions—articulation and coupling are unendingly paired. The spiral looping turns out to be the central feature of my model of the meaning-making process.

SYSTEM ORDERS

TO BE ADDED TO NEW VERSION

[I would like to explore the reasons we maintain our particularistic dogma but it would be considerable diversion here. Could it be that it provides the most convenient form to use for our daily operations. (I compare this issue this to the well used proposition that it would be foolish to use the relativistic equations to measure one's weight—Newton's does just fine. So, before calling on a new foundation for a grammar I must see if a harmonic theory of language can generate rules for daily conversations at least as simply as does the formal rules of a universal hierarchical grammar. (I have read that a full set of the rules of English grammar filled a 2000 page tome.) Or maybe the reason for the hierarchical structure is to support the privileges we claim as separate and superior beings to other creatures and orders of

existences. Or is it to maintain power differentials within our species benefiting the masculine sub-culture, a proposition I suggest in applications of the ontogeme model discuss in a later chapter.]

A description of the Environment's development for the new organism to learn

TO BE ADDED AT APPROPRITATE PLACE

The prevailing image is of a tumultuous chaotic chemical soup, boiling out of fumaroles deep in an ocean, in which a miracle occurred that combined some of these chemicals into a form that was stable enough to persist and replicate itself. This event is so unlikely that some inquirers have called for some external agent to perform the miraculous creation of that organism. I would suggest another route that system thinkers from Kenneth Boulding (1956?) on have proposed, one I think is more plausible, that starts back with the 'big bang' or earlier if you would require.

The prevailing image is of a tumultuous chaotic chemical soup, boiling out of fumaroles deep in an ocean, in which a miracle occurred that combined some of these chemicals into a form that was stable enough to persist and replicate itself. This event is so unlikely that some inquirers have called for some external agent to perform the miraculous creation of that organism. I would suggest another route that system thinkers from Kenneth Boulding (1956?) on have proposed, one I think is more plausible, that starts back with the 'big bang' or earlier if you would require.

This cosmic model hypothesizes that the universe evolves through a series of system orders. The first order (we will consider) is that which evolved from pure energy present at the big bang. That simple environment began as a single energy field with no distinctions, perhaps not even time or distance, certainly no conflicts or

dichotomies. Within less than a second it devolved into a complex field lumpy with the first level of stable the energy sinks we label particles. Energy clustered according to the joint impact of four fundamental forces, the strong, the weak, the electromagnetic and gravity. After much of the pure energy was captured into these micro fields, the energy distribution fostered new orders as each of these organizing forces further chunked the fields to form the next stable distribution. Further along the entropic devolution of system orders, the chunking produced molecules, which in turn led to the chemical order populated by a large but finite number of molecular types. They formed a complex of systems that was over-all stable, but locally dynamic within a small range of energies (zero to a few hundred degrees Kelvin). The universe—full of stars and galaxies and cosmic dust is still a single energy field, though one of infinite complexity. In Einstein's concept it is not only warped by gravity, but also pockmarked and twisted by the other three forces. Nevertheless, it is a single field, characterized by decreasing stability from the earliest orders to the newest. In the parts of the universe we know, this course of devolution through a number of orders took less than a million years.

After a few billion years more, in at least one place in the universe, that rich but stable environment settled into conditions that fostered the emergence of the biological order. It displayed an entirely novel 'force' to manage a new order, biological *life*. TOO ABRUPT Life, is self-constructing, choosing alternatives, noting its effect on the world and, in the process, gaining awareness of an identity that seems to separate the individual organism from the rest of the universe. Self-awareness produces a discontinuity and, seemingly, a degree of decoupling. The separation is slight in the primitive forms, and grows to such a level in *Homo Sapiens* that [QUOTE other authors as well]

NEW FORM OF THE ORDERS SECTION

To find the language of Engagement: To be with another without the separateness imposed by language yet contributing to the development of one's identity and of the cosmos and the beings that inhabit it.

Our languages operate by separation and collecting, using rules which are suited to our embodied minds. To identify they arbitrarily articulate the world we experience. The languages are seriously flawed instruments for the task of knowing the world and ourselves. The arbitrary qualities of separation and collection, that is of articulation precondition us for conflict. N matter how we talk (or write) we set up differences which result in unstable interpersonal relations. I think this can be shown to be a general if not universal proposition. Are we constructed to live with the dialectic the moment we create awareness of self and other? Does forming my identity necessarily set me in opposition to others? I cannot but believe that there is not at least one alternative mode of engagement that has far less propensity to induce conflict as a constant companion on the trip to knowing our universe. This belief has bee the motivator of enumerable searches that began almost as soon as humans became to reflect on the penalties extracted for having the gift of speech before we gained enough understanding to design social processes that lead us toward harmonious community. Most of us are *enfant terrible* wielding tongues of conquest. Some, philosophers, logicians and grammarians are armorers sharpening those tongues to slice the world with precise alignments. Some few are poets searching for a language of the spirit and even fewer retreat into silence to sheath the even the venial tongue.

In this work I am exploring along another path Speech and language are still being viewed as instruments of the individual person engaging with others—Lakoff and Johnson (200?) cap this view by demonstrating that all the core elements of our speech are derived from embodied metaphors originating in bodily actions and intentions. Thus language is a refined physiological tool developed by and for individuals to interact in communities and across generations. I am pursuing another approach, treating speech as an emergence phenomenon of the collectives, of societies and cultures in the same direction as those who are proposing the concept of *languaging*.

I now realize the mistake I made 10 years ago in starting my investigation was building a way in which an individual might construct speech that was most respectful of the potential audience and that would in some way I had not fathomed produce a positive coupling free of conflict. I have scraped that approach in favor of one treating coupling as the fundamental process of communication.

NOTES

[1] . This widely quoted phrase was introduced by Gregory Bateson in a 1970 paper, *Form, Substance, and Difference* that was reprinted in (Bateson, 1972)

[2] . I have avoided the vocabulary of the philosophy of language, as exemplified in works of Paul Grice, Noam Chomsky, and Jerry Fodor as their theorizing is limited to realizations involving the cognitive mindset. I am more in tune with the relevance model in the work of Dan Sperber (1995, 1998) as it includes awareness of the socio-emotional reality. I use 'grammars' as a term encompassing all the structural elements of a language and as George Steiner did, quoted on page §.

[3]. The idea of extension is similar to that introduced by [ ] Faconnier (199X) but is much closer to the work of Lakoff and Johnson §.

[4]. I originally used the word 'hack' instead of trite. But I was warned that since the word his now used as a metaphor for improper entry in the Internet world I must not use it here. In the 16th century hack was introduced as a metaphor for trite. Four centuries later it is itself trite and no longer useable in that metaphoric sense.

[5] . Bruce Katz's (2004) argues, "the intrinsic reward of the stimulus [is in] the synchrony associated with it." (p.32). Katz evidence is from examining the sequence of feedback (forward) loops that reinforce the translation of the intuition through the various neuro-motor elements. Edward Hall (1976) saw the synchrony applies as well to the communication among people using evidence of micro-motion studies that indicate that within moments of the beginning of a conversation between two individuals, their body movements become synchronized. So distant communications, say over millennia, never develop shared meanings, rather only hypotheses of what had been meant at the source.

[6] . Roger Wagner developed this duality in his *The Invention of Culture.* (1975). It is fundamental to the four-realities model that is central to the present work. It is elaborated in Chapter 2 of McWhinney's *Paths of Change* (1992/7).

[7]. A rare counter-example is Steven Pinker's work (1994) beginning with grammar. Barnett Pearce's work is but one of hundreds of books that could be cited as ignoring the grammatical/syntaxical side on his communication model (1999 and 200§)

[8] . For example, I note that the Chinese author, Sunny Auyang [Auyang, 2000 #197] shows a strong preference for synthetic analysis which presumes the whole as antecedent to the part. See deCharms (1998) for discussion of a wholistic bias in Buddhism. Another instance is visible in the difference in the two great board games of the West and China: Chess and Go. Chess begins with a board loaded with individual pieces with the diverse moves; it ends with one side decimating the other until there is no escape for one side's king, the identity symbol. Go begins with an empty unitive space, and ends with a partitioned space; the winner is decided by the ratio of black and white territories. Chess operates by eliminating difference, eliminating the other; only one Kingdom survives. Go operates by attributing territory, by differentiation of the whole into two parts. Both nations survive in Go—the winner is the player holding the larger domain.

[9] . Explicitly, I step aside of the grammatical work that began in the 19th Century with Saussure, and continued in the work of Sapir and Bloomfield, The logical forms promoted by H. Paul Grice (1959), the procreative Noam Chomsky and the parameterization done by his student Mark Baker (2001). I eschew the philosophy of language, starting with the semiotics of Charles Pierce and radically transformed by Wittgenstein, though I am in sympathy with his metaphor of word games. I find undue restriction with Jerry Fodor's code theory of communication and proposal for a mentalese language (1975).

[10]. An example of such work is *The Neuroscience of Social Interaction:* by Christopher D. Firth and Daniel M. Wolpert (ed.), 2004 Oxford University Press.

NOTE FOR CHAP 1

1.1 FOUR MINDS (TO BE ADDED INTO CHAPTER 1)

1 INTRO

A NOTE FOR CONTENTS OF THE INTRODUCTORY CHAPTER.

[This is but a piece of introductory material which I put together to discuss with others some central organizing elements of the work.]

My search has been for a 'language' for engaging with in complex world I later describe with the metaphor of the forest 'canopy.' that has emerged over the last few decades. I first (attempt) to describe the fundamental process of *coupling* as the basis for all forms of engagement and then from this base develop and ontogeny to explain how the human embodied mind operates in constructing its view of the environment and explore how these ideas will help us operate in that canopy.

The current research approaches to understanding the embodied mind are based in four grand paradigms currently used widely to describe the world as well as human phenomena. One is ancient; the other three are mainstream methods used in current scientific explorations. Each makes significant contributions to our growing knowledge of how humans operate:

- *Mythic* — For the first, I'll use a label given by Jean Gebser (1985) who used it to identify modes of thinking an early stage of human consciousness that is characterized by holding cultural identities in the form of myths of origin, epic tales, and archetypal characters. As Gebser's thesis asserts, a portion of contemporary cultures and every individual still operates in the mythic mode we recognize in Jungian. Its prime element is an *event*, its mode is *storying*. This approach is also called the 'narrative'.

- *Empirical*—Is based in the presumption of an atomistic universe of bound discrete particles connected by laws of forces operating over time and connected into *networks of nodes and linkages.* Its prime elements are *atoms,* indecomposable material units; its operating modes are understood through empirical investigation—today especially brain scanning technologies. [Add tools and references, primarily of those using neural networks explored empirically.]
- *Field*—The paradigm assumes a universe that is an infinitely contorted force field including micro-systems represented by dynamical equations. The systems of dynamical equations account for phenomena of material objects, without relying on properties of solid, bounded, stable entities. While it shares some aspects of analytic thinking as used in the empirical paradigm it assumes an undivided world described by the mathematical vocabulary of complexity theory (and ultimately of quantum fields), particularly *systems of non-linear differential equations* .
- *Symbolic*—Is based in abstract constructions related by systems of logic and mathematics. Using it to explain the functioning of the embodied mind arose from modeling Hebbian learning theory with computer programs (e.g., Simon c. 1960). Its processes are not concerned with the reality of material objects or physical energies or give any role to the body or muscles. The facilitation of symbolic operations with computing radically changed the modeling of the embodied mind, in part due to its speed and graphic representations but more, by the incorporation of the comparison and choice processes—having the machine make choices shifted our concept of mental operations from a passive receptor of

environmental stimuli to an active manipulator of *symbols* to form outputs.

Notice that neither the symbolic nor any of the other modelings provide for the self-reflective, self-aware faculty of the embodied mind. In these four there has been no self, no agent, no explanation of consciousness and none have been able to account for the creation of concepts, much less life.

Note there is a difficulty in describing for the different methods use without recognition two major system orders and the indistinct inter-order of psychology(of the psyche). The mythic is probably of the social order yet it seems the more primitive. The empirical uses the biological ad psychical and the field is social. I will make these clear in the Introduction.

This major weakness is now being overcome by introducing concepts of engagement from the emerging paradigm I call *Empathetic,* which explicitly assumes agents with differing intentions. This post-system paradigm was fertilized by the revolution of the '60s. Its early expressions were in symbolic terms, as in marketing and games theories (von Neumann & Morganstern, 1942), the human relation movement (Wilford Bion at the Tavistock Institute in London and NTL and humanistic psychology in the US); and, more recently, in Second-Order Cybernetics (von Glasersfeld, 1984), Maturana's autopoiesis and Complex Adaptive Systems. All of these had as a central feature relations among agents whose self-awarenesses is greatly dependent on the relations with others through consciousness. It is a paradigm of *social* behavior, whereas the other four are based on internal functioning of individuals. Its primary operation is *languaging,* including gestural and other media of exchange. It differs from the others as it explicitly draws on values and emotions as critical elements in

decision-making. To date, the empathetic paradigm has not developed a shared definition of a prime element or rules of exchange; perhaps the closest is the notion of an 'agent,' While that image does include intentionality, it still limited by being expressed in atomistic linguistic terms, so further developments are needed to transcend this condition of its birth.

In the last 15 years or so, an increasing number of researchers, including ones working with neurophysiological constructions and tools (e.g., brain scanners) have introduced field models that complement the network representations. With these we are now much closer to understanding the role of intentionality and empathy in enabling consciousness. In this period a number of investigators including Michael Arbib, Marco Iacoboni, and others working on 'mirror neurons' and Fingelkurts (2006) on 'operational modules' that combine neurophysiological and non-linear equations (field) models using *coupling* to explaining consciousness and the generation of the self. Their explorations are forming a bridge between the empirical and empathetic modelings. Empirical findings indicate that reflection, that is, mirroring, produces empathy, both the enzymes and the emotions associated with awareness when there is successful coupling. There is also the insightful behavioral base in the work of Daniel Goleman on the empathetic connections. I believe this thrust will be particularly powerful as it merges with the language of engagement and the neurophysiological studies to form a new basic paradigm evolving in the "canopy.'

Together these paths of exploration have followed four distinct approaches to the functioning of the embodied mind: the empirical tools have been most useful in understanding the sensory functions; the symbolic that illuminates the

cognitive operations; the mythic, intuitive and binding processes; and now, work combining ideas from the field and empirical approaches are exploring operations that lead to consciousness, self-awareness, identity and meaning. *As in other human sciences, no one approach can be efficiently explain all embodied mind phenomena.*

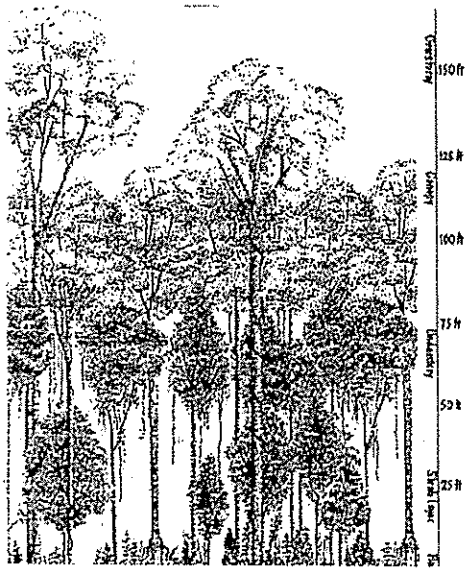
The languages used by the advocates of each method are so distinct that forming an integrating model will be difficult - and not assuredly useful. At this point in my thinking I have not found sufficient reason to argue that one approach can fully encompass four models that differ so deeply on such dimensions as the construction of reality, the mode of connecting with the environment and attributing meaning. Perhaps it will take an entirely different mentality to operate with the incompatibility.

A major source of 'insights' has been cross-correlating the approaches taken in the five paradigms expressed in:

- the descriptions (mappings) of the embodied structure and functions
- the 'sciences' used for these descriptions.
- the 'languages' in which these are formulated.
- the distinct concepts of reality and causality used.

Taken together the views may be comprehensive, yet incompatible. We lack an integrating over-all model or rules for operating amongst them, and it is unlikely that we will find a satisfactory one in the near future. So the search must be for a mode of operation not just for understanding the embodied mind, but for living with the complexity of the 21st century. I have framed this problem with an analogy with living in the canopy of treetops over a tropical rainforest.

The Canopy



[Expand this description of life in the forest and particularly in the canopy that forms a fabric of greenery which captures light and rain water for the trees the roots of which are far below.]

The species of trees are analogous to the paradigms of the forest (society). Each species of tree and vine has its own logic, strengths and weaknesses. They grow together rampantly, competing for sunlight and rain, into a *canopy* a hundred feet above the dark earth from which they arise. The canopy becomes the ecology for new species of living things that have evolved there in response to diverse metabolism of the trees, vines, insects and animals that interact in this aerie. These new organisms have distinct forms and processes that respond to the 'complexity' they encounter, analogous to that we must develop to live in the 21st century. A study of the issues of 'life in the Canopy' is by analogy exploring the issues we encounter in the study of the embodied mind.

[The following paragraph is a first elaboration presented simply to begin my exposition.]

So just as we need multiple paradigms to understand the operation of embodied minds, we need a parallel range of the understanding of reality and languages in which to formulate and develop their operations. The current Western languages are so dominantly formed in the symbolic, classic mode that formulation of the other paradigms must use the grammar and syntax of this 'foreign' language. [Introduce material from Ivan Illich's *ABC* and other sources e.g., quantum physics, re the politics of grammar.] There are recurrent efforts to 'legitimize' street talk in which we express the empirical mode; to notice the role of mythic ritual dancing and choral singing that *re-members* more integrated cultures (refer to Gebser's *Ever Present Origins)*; and the explosion of interest in dialogue (as participative democracy). All are evidence of the effort to develop modes of exchange that articulate without alienating. These efforts are inhibited by the necessity of discussing them using the syntax and vocabulary of the abstractive symbolic forms of modern universalist languages. Ultimately, we need a *language of languaging* that allows each paradigm its expression in its native mode. Metaphorically, awareness of and use of these tools are necessary for operating in the Canopy that has emerged over the forest of paradigms.

I began this exploration by assuming there would be a covering language of engagement to replace the hierarchical grammar of the Western languages and thus avoid the kind of detours we must take to express all the paradigms on an equal footing. I posited a single construct, *coupling*, and the related ideas of synchronization, entrainment, phase/frequency locking, etc, as the bridging

concept across the disparate issues used in the different paradigms that currently contribute to understanding and operating in the forest. I found that overly ambitious; any practical approach will require a diversity of 'languages.' Nevertheless, the search has proved valuable in contributing to a new understanding of the social power issues that correlate with the diversity of languages. Clearly, the exploration has many open routes to be followed out.

Began with an Effort

1) To understand grammar and syntax enough to free us from conflict by designing speech in a way that engages with an audience, thus setting the stage for coupling.

   From my understanding to non-combative exchange—> convergence. The effort only developed a sensitivity to a hypothesized conversant, but no base for empathic relation. A deeply mistaken approach as it presupposed the identity of an individual equipped with a complex linguistic armament such as Chomsky proposed for a universal grammar.

2) Start with the assumption that the universe is totally coupled but is best understood as organized in a hierarchy of system orders beginning both historically and in terms of the level of complexity with the origin of the universe as we now hypothesize—that is with the 'big bang' when there was no particulation—no granulation beyond photons. Since then we can posit a number of orders of explanation that are characterized by:

   - *Some measure of size* from photonic scale of 10^{-27} meters up to present societies spanning the earth's circumference 10^{7} meters
   - *Over which its descriptions are well XXX*—that is give us a most workable vocabulary and units
   - *Type of interaction*—any of the 'causes' that can be used to explain events at that level.

3) Start from position of knowing differences are viewed as deviations which can be variously treated as:

a. Noise, Errors

b. A 'descriptor' or other core association

c. New core or gestalt image

- The difference treatment arises from the person (or discipline)—not a 'reality.' The difference 'is,' only the treatment varies. So differences come in context, XXX have some meaning on first awareness. The coupling hypothesis chosen determines what kind of difference will appear and thus into what class they will be assigned—an almost certain source of conflict even within a discipline. But the more nearly similar the chaining processes are the less difference in the difference interpretation and less likely to be conflictful.
- This solves major issues in a difference ontology, re: how is a difference identified and does it get *meaning*.

OLD THOUGHTS ON #2 ABOVE:

- Start with assumption of coupled relations and learning how (yes, but how?) not to violate that condition. Don't think *force* but change of conditions. We are coupled to the universe but in choosing actions we are almost certain to violate the coupling and involve some aspect of the world inharmoniously. Thus, we need processes for dealing with *differences* that allow the development of increasingly pervasively engaged scopes of action. [Proposed method is metaphoric extension (ME) following ontogenic realization.]
- [Somehow] The present ME process using *force* as the core chaining rule has proved to be an effective relation but generates conflict. I propose replacing it with *coupling* at all levels (or system orders) as it avoids conflictful structures. [Not a clear argument.]

Choice of Representation

This is a question of method, of what research language can be best used to explore the subject. Current research strategies led to three approaches: empirical explorations, symbolic programs, and dynamic systems. [I've left out the narrative mostly because I don't have enough background to discuss it.)

The most general of these is a representation as a dynamics system of field equations, but they are the most coarse grained. To attain an image of immediate events or to get better resolution one needs to reduce the scope of the modeling to obtain a finer grain. That is, the researcher needs to move toward the more empirical, atomistic models. That move requires the researcher to make separations that are arbitrary, reference the phenomena. [NEED TO MAKE THIS POINT STRONGER] The choice is also based on the values held by the

Deleted:

Formatted: Font:12 pt, Not Italic

Formatted: Heading 4, Indent: First line: 0", Line spacing: single

Deleted: ?????

researchers, although they are often hidden in the precepts of the discipline. [Are there other dimensions to this choice? Extend this point. Ref. A. Ryan 2006 p.7, and Shalizi corpus.]The choices also often serve the needs of political power.

Different conceptions of the relation with the environment follow from the way they are represented. They depend, in part on the mode of representation; e.g., dynamic modeling removes the notion of sequential causation except as a developmental flow. Neurological and narrative models emphasize sequence of use/effect.

High resolution and narrow scope as used in describing via narrative, chemical transformations and neural circuits; narrows the scope of simultaneous activities, greatly eases empirical investigation.

Using lower resolution and high scope, as in dynamic systems, achieves better matches to the available resolution in environment, and models concurrent operations of many of the faculties.

REVISED OUTLINE CHAP 2. 3/1/07

Coupling Chapter 2 Outline, Jim/Will 3/1/8/07

Starting Story: To hook the reader on the idea of coupling and its usefulness.

Purpose of the Chapter

To define, describe and explain the coupling model that answers some questions unanswerable in other paradigms, in particular, the Force paradigm, which is our model in the west.

To draw together explanations of coupling found elsewhere

Pairs

Introduction to Pairs

Coupling and all other descriptions are models of how things are, not what is true. Coupling and Force are grand paradigms. The contrasting pairs below are aspects of the two models that pervade Western thought and maybe all thinking

Separating and Collecting

Atomistic and Holistic (Field)

Network and Dynamic Systems

Masculine and Feminine

Quantitative and Qualitative

Graininess and Dimensionality

Force and Coupling

Determinism and Freewill

Embodied Metaphor and Social Metaphor

Lakoff and Varela (Languaging has little to do with individuals, individuals can't learn to talk by themselves)

Proposals

Coupling as a foundational organizing process

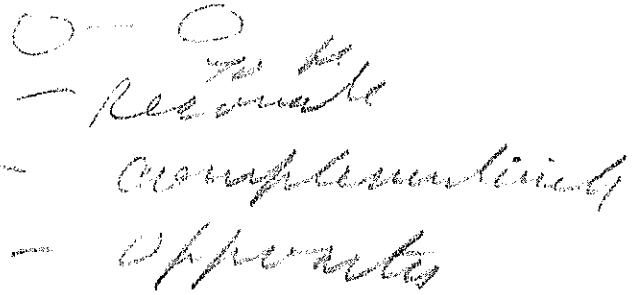
Coupling is a new integral worldview

Coupling helps us understand behavior in all system orders

Fantasies

Reformulation of scientific thinking

Summary
Coupling is ....
Coupling has a language, models, processes, worldviews

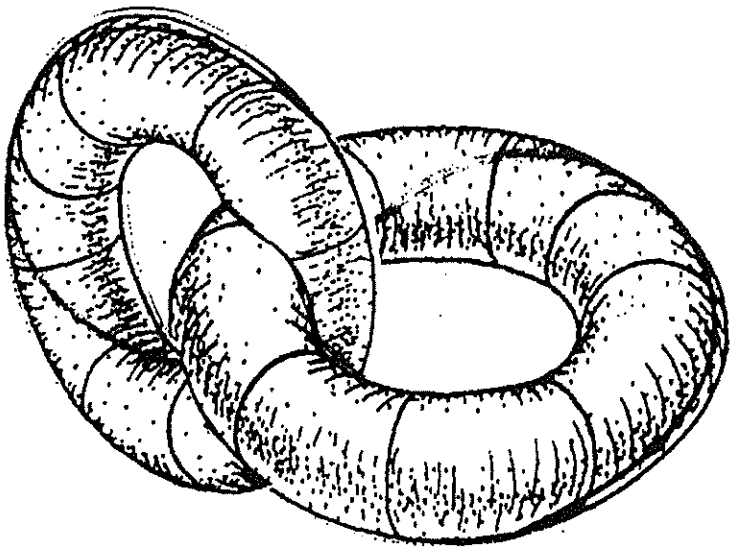


2/21/07

COUPLING

Will McWhinney, PhD
Fielding Graduate University

With appreciation to Marc Tassoul and
James B. Webber , PhD for their contributions and editorial comments.

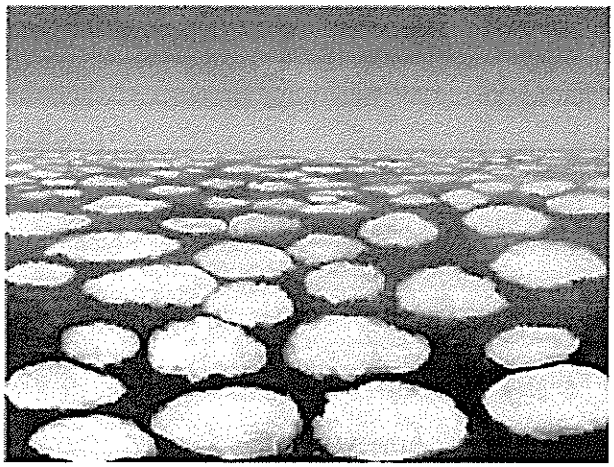


5 S

COUPLING

"There is only the dance" [1]
T.S. Elliot

INTRODUCTION



THE GEORGIA O'KEEFFE MUSEUM

Flying a cross the open prairie of Nebraska and South Dakota on a summer afternoon, I was attracted to the sight of a perfect tiling of small clouds in the sky, rows and columns of square clouds with rounded corners, mostly of the same size and separated by narrow troughs of clear air. The pattern extended for perhaps fifty miles in each direction. Nothing on the ground below could account for the patterning, nor currents generated by regional weather.

[Looking for photo better depicing the tile clouds]

It's not mysterious. The atmospheric conditions produce these clouds regularly by a simple process. The expansive sun-warmed air collects into columns, following paths of least resistance in its convection cell. After rising a few thousand feet, the air has cooled to the temperature at which its moisture condenses into the pillowy clouds of cool moist air. The air, now dense and heavier, is pushed aside by continuing thermal updrafts and sinks in thin sheets at the sides of the adjacent pillow cloud.

It is easy to account for the formation of clouds with the physics one learns in high school. But that explanation does not account for the level of organization expressed in the regularity of row and column and the ephemeral white puffs each so like the next. ,ut the symmetry is explained by the process that accounts for the way water comes to

a boil and fish swim in great schools.[2] These observed phenomena may be understood through *coupling*—the fundamental organizing process that accounts for both highly visible phenomena such as these tile cloud formations and more subtle ones appearing at every level from the subatomic to the intercultural.

Coupling enters into every form of interaction and exchange. It unites molecules, the stars of a galaxy, and the lives of those in human communities. Coupling transfers energy and information from one system to another, from one electron to another, from one person to another, from one culture to another and from one galaxy to another across the universe. Start a conversation with a friend and your breathing begins to harmonize. Pursing your lips will turn your feet slightly inward.[3] You resonate listening to music, you become one with the flow of freeway traffic and blend into the 'wave' at a football game as 60,000 people rise, shout and sit. Coupling produces the empathy one person feels for another's suffering and the joys of being/seeing yourself in tune with your environment. Ultimately it is through coupling that we know ourselves and form our views of reality.

Coupling phenomena are far more significant than their status in the scientific cultures has acknowledged. Until the last half of the 20th century they were curiosities: Christiaan Huygens in the 17th century accounting for the coupled behavior of the pendulums of two clocks hanging on a wall; and Engelburt Kaempfer (1680) reporting thousands of fireflies in a tree flashing simultaneously. In the early 20th century coupling entered the vocabulary of the 'hams' who *locked* into a distant signal with the newly invented regenerative (oscillating) radio sets. In the thirty years following the Second World War the exploding capabilities of computers and their displays providing

evocative and aesthetic representation of nonlinear mathematics disclosed an unanticipated variety of coupling phenomena occurring in physical, biological and human engagements. However, the scientific world was slow to develop applications until the basic mathematics of coupling became available in the 1980s.[4]In the following two decades *coupling and its limited forms, synchronicity, entrainment, phase-locking , harmony, resonance, empathy, ...* have become hi-yield topics for physicists, biochemists, mathematicians, system designers, and humanists and reenergized those mystics and metaphysicians who assert the "music of the spheres" underlays all phenomena of the universe.[5] Still there has been scant trans-disciplinary recognition of the pervasive coupling that T.S. Elliot asserted in saying there is only the dance.

It is time to investigate coupling as a foundational process of a new integral worldview. Going back more than six millennia to the origin of Western Civilization our human relations, our sciences, our determinants of rights and the ultimate decider has been *force*. Often in the raw dominance of armies. police and parents, sometimes in indefinitely small amounts as in a subtle gesture by a refined lady exercising her social prerogative, but the concept appears blatantly as in Newton's **F=MA** or pervasively in the syntax of daily speech. Its use has been refined as a primary measure of empirical sciences generalized as a descriptor of human relations at every level of exchange from the play of infants to world politics. It's the fluid, indefinitely transmutable to decide outcomes of every conflict. It is so firmly rooted in our culture that we ignore its most basic role in human society: to justify the pervasive domination by males.

This chapter introduces the science of coupling to enable us to both recognize it to be an alternative to force-based systems and to better discourse on some psychological, social and cultural phenomena that I believe are poorly treated in the service of

maintaining human culture as support that male agenda. This is not a call to void force but to frame an alternative that is both workable for understanding phenomena at all levels but one free of the bias that force introduces into human affairs. [6]

Coupling—and all its related phenomena—is not new; it is part of our daily exchange, often casually as a conjunction, usually as something desirable. However, it is a prisoner trapped in the foreign language of atomism. It is spoken about as occurring between objects, concepts, people and systems—and most inappropriately between humans and their environment—an injection that sets the stage for conflict and the need for force to resolve the implied power issue. Rather coupling is a phenomenon of whole systems without distinct parts. We cannot write *of* coupling with an atomistic syntax and vocabulary.[7]. Empathic gesture, music and poetry are approximations but further explorations can be done in the wholistic language of dynamic systems expressed with ıe mathematics of differential calculus. Its forms and application to coupling are introduced in the next section. Briefly:

- Presumes a unity of systems using a field model.
- It's convenient for rhythmic phenomena—for the "dance".
- Does not utilize the notion of material or conceptual objects.
- The mathematics is now being taught worldwide at the college level and increasing in earlier stages of education.

In the following section I introduce the language of dynamic systems and examples of dynamics systems of coupling in everyday life to give the sense of flow. I use an image of a torus—a donut shape—that suggests motion without beginning or end to initiate the reader to a way of perceiving a coupling that does not depend on either our normal syntax or our ingrained habits of seeing relations between 'things.'

Casually introducing this shift in representation vastly understates the radical change in worldviews that is called for with field images. Early attempts at shifting

toward the field worldview, such as Henri Bergson's advocacy of *élan vital* in the late 19th Century and Kurt Lewin's social topology in the 1940s, also had little impact and illustrate the deeply embedded nature of the atomistic paradigm. Clarity will come only with recognizing our every day experiences of coupling processes in field terms. I use these coupling processes to initiate reformulating the giant topics of the embodied mind, languages' origins and social structures.

2. *DYNAMIC SYSTEMS (DS)—REPRESENTED AS FIELD MODELS*

I asked my cousin Alex, a musician, to tell me about jazz "improv." He responded, bluntly and instructively, that only a naïf would gain anything by talking about music, then he returned to playing his horn. Alex's answer emphasized the need to find a language for engaging *of* rather than talking *about*, if one wants to couple. So before introducing ideas about coupling I need a suitable vehicle.

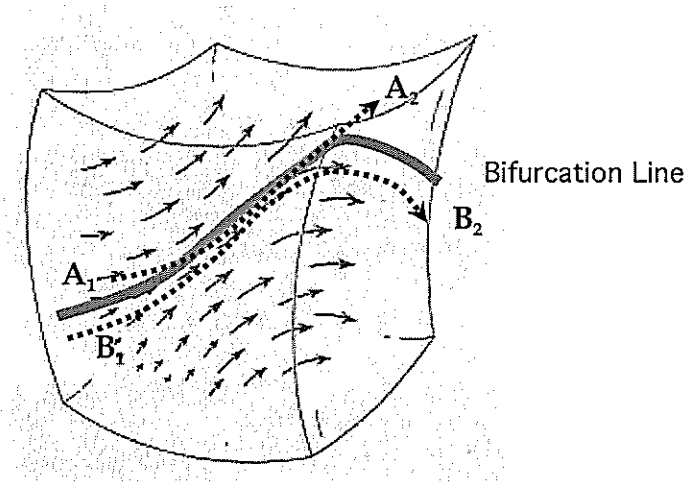
The syntax that languages—at least those of the western cultures—use to describe the world as one based on discrete symbols and objects. The symbols specify the effects of *actions following rules* of logic, temporal sequences that arise from folk experience or scientific causal speculations. However, coupling phenomena characterize states of whole situations. These use field equations (with differential calculus) to map the potential *states of a system* and the immediate *rate of change* expressed as the differential dx/dy, most often the rate and direction of change defined over time as dx/dt.

Ironically, these sets of equations are labeled *dynamic systems*[8] even though they are not only used to describe either temporal or energetic activities. This name implies actions that cause changes whereas dynamic systems describe states that a system will take given the prevailing conditions and the starting point: *Changes are produced by*

modifying the conditions which result in reshaping the space and the paths through it, not by direct impact of one object upon another. System potentials might be more apt than system dynamics. Figure 2.1 presents such a reshaping of a vector space with the arrows indicating the direction and rate of flow in the space as an example of the mapping of a dynamic system. There are no actions, encounters, or decisions, just the flow from every location given the conditions that define this space. (No free will.)

FIGURE 2.1 A VECTOR SPACE

[A next version will show a space prior to reshaping in which the two paths are in the same basin, then this shows the different outcome without a change of behavior from A or B.



The vector space is a graphic presentation of a dynamic system. It shows the direction and rate of flow of an illustrative set of points in the space. Notice that if the starting point is at the upper left region the system will move off to the upper right: A_1—>A_2 Conversely, if it is initially in the lower left, it will also start on a rising course but then more down to the right: B_1—>B_2 The space shows a surface of bifurcation suggesting that the space being depicted contains (at least) two sub-systems.

Naming these systems 'dynamic' is but one of the many paradoxes that arise from using the language of one paradigm to describe the phenomena of another. Nevertheless I chose the graphic exposition of coupling as a dynamic system to loosen

the grip that our syntax has on our visualization of the world. It is still a 'hard-edge' approach toward creating images. Eventually, it should have no edge at all. Music might better express the couplings.[9] However, that too is a linear medium. My work reported elsewhere leads me to think that a *pervasive inarticulate empathy* may be the only mode of engagement free of this paradox caused by the limitations of our present language. Mystics and science fiction writers may have always known this.

2.1 Dynamic Systems (DS): a formal language to describe coupling behaviors

Coupling, as a universal phenomenon, is well characterized by using differential equations and their graphic images. I use them here to introduce readers to a different way of thinking about actions, relations, and the ways that reality comes to mind in every day events. I make little use of the mathematics of dynamic systems (*DS*s) beyond that required to illustrate the transitional paths of such systems, for example of the way guests at a party organize from milling around as dance music starts, to moving onto the floor, selecting partners, synchronizing the movements with its rhythm, and coupling their steps and style as they settle into pairs or into eight-somes to do a quadrille. The field representations of such events aids us to find the conditions under which a system will come into stable patterns of coupled periodic movement, and most importantly, using this representation frees us from concern with those properties of epistemic objects that are created with coupling behavior.

Most simply stated, a *DS* is a vehicle that generates a sequence of states according to the discipline of integrating procedures for differential equations (and some more sophisticated formulations). Strogatz (1994)[1] defines a DS as a vehicle that generates a

sequence of states, continuously and over time. He divides their exposition first into linear and non-linear systems then into chaotic, and other complexities which are not called on in this introduction. [See Strogatz's chart, p. 9]

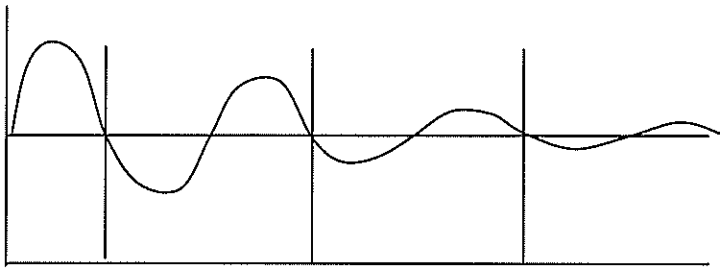
Linear system is one in which the variable qualities are all linear and of unique value.

An example of a linear *DS* is a model of a damped harmonic oscillator:

$$d^2x/dt^2 + b\,dx/dt - kx = 0$$

Its graph is, of course, an oscillation of x decreasing with time.

FIGURE 2.2 A DAMPED OSCILLATION



Non-linear systems: one in which the variables change in a non-linear fashion with x^2 or other exponential or a trigonometric function of x. A simple example is

$$d^2x/dt^2 + g/l \sin x = 0$$

which describes the movement of a pendulum with a length of l meters.

Of course, accurate descriptions of any material systems must be immensely more complex as discussed below in the section on spectral coupling. Nevertheless, I find the simple models provide an adequate introduction to coupling behavior in individuals and social systems, and an alternative base for the network neurological models introduced later.

3.0 COUPLING PHENOMENA

We find coupling anyplace we look. A few years ago I had an unexpected stay in Munich. I, along with hundreds of others who were headed home that morning, was returned to Europe to wait the reopening of the airspace over the U.S. After I revisited familiar sites and museums I passed the warm afternoons watching strollers on the broad Marien Platz as they went about, alone, more often in pairs, lots of threesomes and an occasional larger group. My leisure time gave way, morphed, to observing different expressions of their coupling. A large portion of the single-gender couples walked in step, both in pace and phase—stepping right-left, right-left, together. The mixed couples less often synchronized: their differing heights made it difficult. I followed some of the walkers for a hundred yards or so to get a reading. The more balanced couples would come in and out of synchrony. I was intrigued with the perfect coupling of a trio of schoolgirls, until I noticed they were all captured by music fed from their earphones. In a few more days of systematic recording I could have had a full catalogue of coupling phenomena, but I chose to fly home when the US opened its air space again.

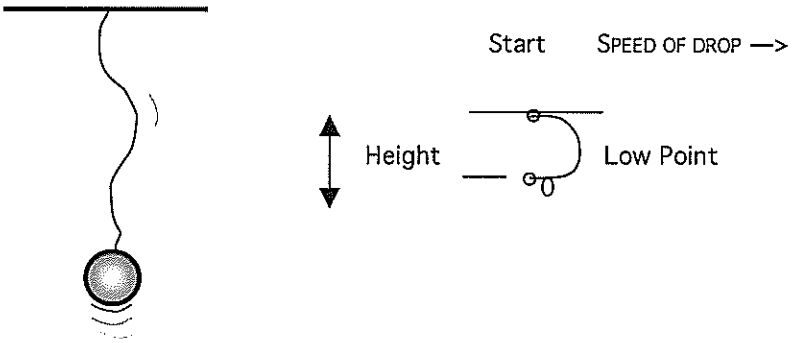
I came back with a new enthusiasm to explore the varieties of behavior that display coupling. Most published examples describe physical systems—pendulums, chemical baths and electrical circuits. There have been few documented studies of living

2.2 GRAPHIC PRESENTATION OF DSS IN INCREASINGLY GENERAL FORMS:

Example: A ball suspended on a rubber band: The ball begins it drops under the influence of gravity – It is slowed to a stop by the stretching of the rubber band and then returns upward coming to a halt in the hand where it began,

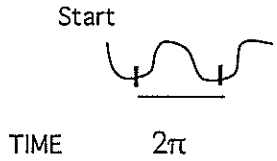
FIGURE 2.4; BALL'S PATH SPEED / HEIGHT

a) a graphic and a charting showing the speed of fall



The ball begins at zero f rate of fall, gains speed under gravity and finally is stopped by the tension in the rubber band. Each bounce follows the same path.

b) DS as a periodic wave: plotting displacement versus time



Same as a. now shown as a repeating cycle of displacement over time.

c) DS as closed cycle, making a complete 360° turn in 2π time units

Redrawn to give the sense of unending repetition and of a complete system, albeit very simple.

systems—fireflies, flocking birds, slime molds, freeway traffic and the role of empathy in the exercise of *social intelligence* (Daniel Goleman, 1996)[10], but there are few studies of coupling phenomena that appear in organizations and communities.

3.1 DEFINING COUPLING

Coupling is a paradoxical notion. It is defined as a relation 'between,' yet there are no 'things' defined on either side of the gap except as the coupling creates them. The big bang had no 'things' to relate to until the earliest form of particles condensed; that primal condensation coupled its energies into the 'things' it creates. There are still no 'things' in the universe—only highly stable *DS*s that we treat as objects or symbols for ease of manipulation. There are no living 'things' without the intent to survive through which they gain identity. The paradox appears most poignant at the human level: I cannot empathize unless there is an "I" that feels. I cannot identify a friend or enemy unless he is configured within me. I can only prove (be aware of) my existence if I presume he or she (to be real). At every level 'things' only exist in the (moments of) awareness of a coupling.

Having noted the paradoxical nature of coupling derives from a sensory fiction, I have to write about coupling as though I accept the reality of the discrete objects and the language and logic of symbols, using the syntax of civilizations to present coupling phenomena as though these are relationships between entities, either material objects functioning according to laws of force, or concepts associated by logic. The exposition then deals with the conditions under which coupling occurs, the paths taken as the system comes into stable patterns, and its affect on the entities it creates.

I include here but a few glimpses of the immensely complicated picture being uncovered in the variety of research done in many disciplines. If coupling is as significant a phenomenon as it appears to me to be, applications of its properties will be found in every domain of human life. Eventually, field language will be accepted for all orders of systems just as electromagnetics came to be in the past century—certainly to Kurt Lewin's delight.

3.2 Characterizations of coupling:

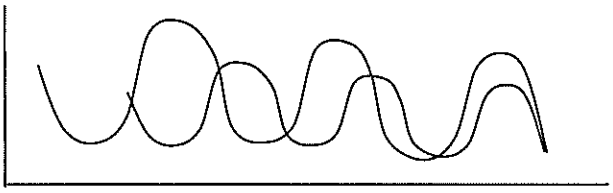
A totally coupled system can be simply described as: A system is coupled if the differentials in all dimensions are systematically and stably related—thus moves everything in harmony. Most if not all coupling phenomena occur in periodic behavior.

The most interesting phenomena are those that describe the evolution of coupling—of coming into harmony. It promises a vast and growing research agenda. What has been uncovered to date is enough to build the case for the fundamental role of coupling in understanding behaviors in all system orders. However few of the behaviors have been analyzed sufficiently to provide quantitative measure of the path, outcomes, and stability.

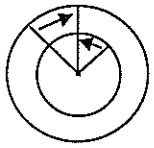
The major parameters of coupling are the *frequency*—measured in cycles per second, or maybe some greater unit if we are concerned with coupling across the universe—and the *phase*—measured in the number of degrees difference in the respective paths, from zero to 360 or in radians (multiples of π). Two systems are coupled completely when these numbers are identical. The effect each other's behavior is measured by a positive *coupling constant* ($0 < K < 1.0$). The constant represents a measure of attraction that varies with the level of system being described.

FIGURE 2.5 COUPLING OF SINE WAVES

Example



The two wave-trains illustrate a rapid convergence onto one frequency (tone) and in-phase (in-step).



Convergence of the phases to complete the coupling.

In this simplified model which only consider sine-waves there are only two features of coupling—frequency and phase—that are recognized with the variations experienced in tuning a musical instrument. The most interesting phenomena are those related to the processes by which the frequency and phase of both (all) are modified by the coupling relation. These are pure coupling. I label those relations where only one changes 'synchrony' or 'entrainment.'

Some of the more interesting areas still to be investigated include questions about:

1) dominance in the coupled relations. So far no effects of power or dominance have been reported in the simple cases examined in physical, chemical or physiological phenomena. That is itself surprising to me, however, the role of relative 'weight' of those involved in coupling has not been generally investigated.

2) coupling phenomena in systems with complex feedback capabilities as found in primates and some bird species.[11]

3) coupling where the behavior does not follow the elegant sine wave, rather is of clipped digital form, or a sharply rising or slow rising 'attack'. The diverse attacks are

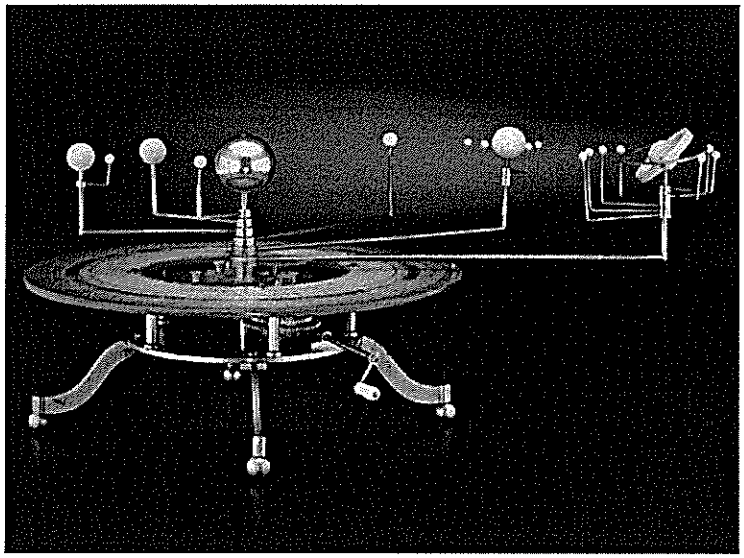
associated with diverse emotional engagements. We are a long way from developing tools to analyze such subtleties of behavior.

3.3 Coupling presented as a Torus

Common representation is of amplitude and or phase overtime as above, however, representation as a torus will be less misleading about the features of coupling and thus of the phenomena of broader interest presented here. In the torus representation of periodic coupling, there will be at least one moment in the cycle of the most slow-moving element in which all the other elements return to a particular configuration. If the system is not cyclical if can be treated as if it were but with an infinite period. In this case perfect coupling implies the elements are always in the same relation to each other, thus these interactions cannot be identified. I would call these systems synchronistic indicating there is a dominant component that sets the flow.

Coupling is vividly and aesthetically displayed in the Orrery, the working model of the circular dance of the planets around the sun and of the moons around their respective planets.[12] The coupled system forms toruses: the earth moving around the sun at the core, 92 million miles away; the moon's path lies along a tube with a radius of 240,000 miles. The perturbations and lack of perfect coupling assure that over the years its path will take it through most every point on or near the surface of the 'donut.' (see figure below)

FIGURE 2.6: AN ORRERY

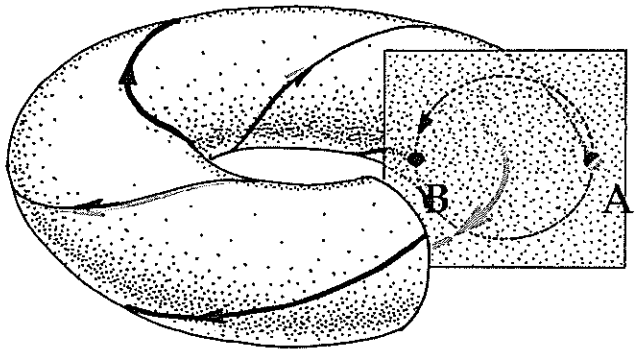


Source: www.zodiacal.com/attic/smithsonian_orrery

Each planet was geared circled the sun. The paths of their moons lies on tubes surrounding the planets' circuit, the earth's moon making about thirteen trips around the earth while it completes one around the sun. Though in overly mechanistic form the model show the results of their couplings. The moon is closely coupled to the earth's path, so strongly that its relation to the sun and the near passage of the other planets only perturbs its path.

Neils Bohr found this model to be so intuitively comprehendible that he chose it to describe the atom depicting it as a giant nucleus encircled by electrons, thus giving the world a very misleading image of the fixed nucleus as a compact collection of parts and electrons as indecomposable objects circling it at a distance thus associating matter with the macro-world image of force operating on objects at a distance. That model still dominates popular imagination. Using the torus model in further developments may help.

FIGURE 2.7: COUPLED PAIR REPRESENTED BY A TORUS



A = A satellite's place of start of circuit going counter clockwise.
B = the satellite has made two turns of the circuit, arriving back at the starting point.

A representation of pure sine waves (e.g., of electromagnetic energy) with a period of 't,' which is generalized as a cycle completed in 2π time units. The inner grey line at the core has the lower frequency; the dark one circling it represents an interacting element. The pair forms a harmonic relation: one a whole number fraction of the other, and in this case, the second dances around the first twice for every cycle (one octave higher.) They are shown as fully coupled, an ideal case that would not occur in nature. It represents of a whole system after the transients generated in its formation have settled out.

So just as the orrery helped generations of astronomers visualize the solar system, the torus can be an intuitively attractive representation of coupling phenomena—easily visualized and generated by the difference equations that map the systems. It displays the regularities, can typify the effects of perturbations, and adapts well to describe the far more complex coupling that follows a person's observations of the world or reflections on the images stored in its embodied mind. It describes paths without images of objects and like the orrery can show approximations of the paths in complex "many-body" systems. These features are all important in understanding the construction of reality presented in the following chapter.

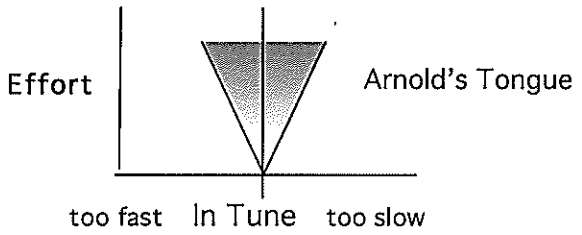
3.4 Examples of couplings organized by analogy with three poplar dance styles

While the orrery/torus provides a formal introduction to coupling, the forms of dance provide a richer feast of analogies with which to investigate phenomena with different degrees of coupling. The dancing analogy also exemplifies coupling created by the feedback circuits that appear in all living organisms. My purpose in presenting the following examples is to stimulate insights into the behavior of coupled systems and to induce a phase space image that illustrates the pervasiveness of coupling that ranges from seeming mechanical conditions depicted here to the most empathic worldview presented in a later chapter.

Dancing by oneself: synchronization with the music

Free-form dancing that became popular with the '60's'music and feminism. Individual dancers step, as they wish, within the space available. They match the body with the rhythm of the music and movements associated with the cultural style of the music's origin. Formally, this dancing is *synchronized* with the music, its cyclic timing and phase is tied to the music coming from an amplifier; it's a one-way influence. The dancer does not affect the music being played or the other dancers on the floor except to avoid them.

FIGURE 2.8: RANGE OF COUPLING – ARNOLD'S TONGUE



Arnold's tongue defines the range of pace in which the dancer can couple. The amount of effort required to come into tune decreases as one approaches harmony. This is an example of Arnold's Tongue widely discussed in the coupling literature (e.g. Rosenblum and Pikovsky, Physical Review. Lett. 76, 1804-1807, 1996)

A dancer uses decreasing energy (and attention) as she synchronizes with the music. The tongue indicates the range within which one may expect to eventually tune into the rhythm of the music, given her energy or persistence in accepting to its dominant pace.

Tuning a musical instrument provides a refined form by which systems come into synchrony.

> Tuning an instrument such as a guitar illustrates coupling processes more fully. As a first step, the player synchronizes the "A" string with a standard 440 Hz tuning fork. Generally, after tuning the A string, one endeavors to tune the four guitar strings in harmonic fifths, by comparing an open string to the 5th fret on the next lower string for a standard EADGBE tuning. The musician adjusts the tension of the string, listening to the two notes and readjusting until a difference can no longer be heard. This elementary method aims at harmonizing the frequencies. A second subtler way detects phase drift. The musician listens for change in amplitude of the tones; when the volume becomes constant the phases are also stably coupled. A third way, which is probably still more subtle, depends on listening for a brilliance that apparently comes from the coupling of harmonic overtones.

With this last refinement the guitar will have a stronger and clearer projection of its sound. However, even with all these refinements 'well tempered tuning' does not aim for a mathematically exact match, for the slight deviation of the harmonics produces a subtle vibrato characteristic of fine wood instruments. (Refer to article in Wikipedia on tuning)

Just as there is enjoyment in playing an instrument or moving one's body in synchrony with music, there are more opportunities to experience one's identity in richer coupling with other dancers on the floor. So on the open dance floor the dancers rapidly organize beyond the basic synchrony to coupling in pairs and larger sets, even to the loosely coupled strings of the conga lines so popular at mid-century. The open dancing illustrates the near chaotic structure and the level of coupling occurring in any many-body environments that is operating in a far-from - equilibrium condition, with a synchronizing undertone. (Many electrical fields have this situation.)

Dancing in couples

Couple dancing that came into style in the romantic flourish of the mid 19th century added a new level of coupling for pairs. The dancers retain the common rhythm and phrasing but select routines independently. Typically the man makes the choices of routine while the woman retains responsibility for the couple staying synchronized with the rhythm. The two take different roles: male entrains his partner to a second *DS,* while she maintains the synchrony with the rhythm and the style of dance determining the degree of flamboyance and cultural expression. Perhaps this is a refinement akin to the final tuning of the guitar.

FIGURE 2.9: COUPLING OF TWO RACING-BOAT ROWERS.

Example: two men rowing a boat – each single oar, without a coxswain.

Free hand drawing of four stages. Random start, two swinging in off directions and fourth coupled.

Various questions about the role of the constants K and A which Strogatz defines identically but might serve to distinguish between synchronization examples, K, and individual's ability to couple with others, A.

Discussion of dominance, of the eventual point of coupling and the limited role of amplitude in setting final coupled phase and frequency.]

Role of feedback in establishing coupling

Relation control made available through feedback loops in all living organisms and feedforward in primates.In general, coupling can only be arrived only in a two-element case without introducing feedback or a *DS* rigged to produce a cooperative solution.

[Find some references to the many studies of gaming strategies that can lead to 'coordination equilibria' for 3 or more rowers without a synchronizing cox.]

Dancers coupling all-to-all.

Line dancing, where everyone is entrained to a common 'step' to the music, is a modern form of ancient social ritual activities. In ritual dancing and ceremonies all participants entrain to forms set by tradition or authority figures performed in religious and military organizations. Today the form is revived as line dancing on social occasions, aimed at creating a spirited bonding among dancers. They synchronize with the music—one-way influence—but may couple all-to-all both in subtler adjustments of the basic step and bodily movements. Their behavior may appear to resonate as do the fireflies or flocking birds, but there are a great variety of processes that emerge with the degree and heterogeneity of coupling among subsets of dancers as we show in the following examples.

Exposition of examples disclose the variety of coupling phenomena that appear under different conditions. Few of these have been analyzed as with multi-body systems such as the solar system, there are no general analytic solutions for behavior with 3 or more entities. But of greater interest are the behaviors that appear in systems composed of sentient organisms that can choicefully adopt their way of engaging.

Increasing variety in all-to-all coupling

There are many more examples the multi-body problem using different models to describe their coupling listed in Figure 2.10.

FIGURES 2.10: VARIETY OF COUPLING PHENOMENA

1. All-to-all coupling where the elements are the same and there are no macro objects. The coupling creates the discrete object configuration. Creation of coupled configurations: "tile clouds"—columns of hot moisture bearing air, and columns of hot water rising as a pot comes to a boil.

2. All individuals are similar with shared behavior and shared response to environmental conditions. E.g. Fireflies—motivated by the same stimulus to fire their lights and attract females (Ermentrout, 1991)—every organism nearly identical and other many bodied situations.

3. All individuals can apply individual decisions rule models but mostly do the same thing. E.g. Flocks of birds (geese?). Similar to firefly behavior but can be just a few individuals.

4. Humans—individuals clearly have own differentiating intention and would like to get ahead of others but are forced to cooperate. E.g. In freeway traffic (competitive) intent begins to decouple the drivers from an another in the traffic.
5. Humans—individual choosing to participate in cooperative group behavior. E.g. in line dancing, musical performances, audiences, and political action
6. Love relations, in couples and communities.
7. Humans—with intent to work together as homogeneous unit but self organizing behaviors break leaving pairs or small group with local coupling. Momentary coupling attempts on the dance floor. There is also the coupling in organizations where leaders assert themselves and in communities that form empathetic sub-groups.

Possibly redo when examples above are better defined and illustrated. Mention ideas about local synchronization areas of instability—do a phase map and comment on how it could describe communities and organizations—refer to network discussion in a later chapter (also in Sect 7 below)

Some more examples to consider introducing
- the formation of ice crystals and the inherent symmetry has to do with fields

- positioning objects in an exhibition - each statue needing its own space
- the growth of structures, e.g. cities with a bottom up emergence of a structure
- fractal constructions and self-same networks Are these couplings or contagions ?

5. Structural Coupling

STILL NEEDS DEVELOPMENT – IMPORTANT TO BOTH SHOW RELATION TO MONTURANA/VARELA IDEA AND CONNECT TO THE SYSTEM ORDER IDEA AS INTRODUCED IN THE INTRODUCTORY CHAPTER.

The Introduction of 'coupling' in the context of viewing living systems as *autopoetic* (by Maturana and Varela, Autopoiesis and Cognition: The Realization of the Living, 1980) greatly forwarded the use of systems concepts in understanding living systems. Their idea of **structural coupling** [get a quote from Wikipedia] seems to be a quality of the organism in terms of stability and adaptability in relation to an environment in the service of survival.

Rather I believe it is not simply connected to the basic notion of coupling They view the living system as coupled with the environment to reliably obtain resources necessary for self-sustaining biological system level. This I different from what I am saying. Later they extended the notion to Second Order SC (i.e., at the psychological system) to its own body and to Third Order SC (i.e., social system) to the environment.

Bifurcation as description of organism's failure to couple: "Tipping point" indicator that two systems have uncoupled both at a common prime frequency and at sub-harmonic. Outside of any 'Arnold's Tongue'.

6. Spectral Coupling

The natural phenomena of coupling are responses to one's environment that is complex at every level. Even the engagements of the simple atoms of hydrogen are characterized with innumerable resonances of greatly varying intensity, across the electromagnetic spectrum. Any relation will display a similar variety of coupling and dissonances. One of the defining faculties of living organisms is the ability to focus on a manageable portion of the spectrum. Thus organisms can amplify select portions of the spectra to notice (be aware of) what are relevant to their well being. Complex organisms differentially filter for the senses—the skin notices heat waves, the eyes see the light

spectrum, the ears hear sound—all are presented to the central nervous system in various configurations of electromagnetic energy. All participate in coupling with the environment. Parts of this total sensory/somatic excitement arrive in the sensory cortexes. There they form a complex stimulus that has to be interpreted to form a coherent image. [More on this later.]

The mapping of this energy, and the various stored traces of the whole of an individual's history and the separation and collection of all these elements are of central concern of neurophysiologists, ethnographers and philosophers of the mind who have radically different approaches to interpreting the sensed spectrum. Approaches also differ radically between those using the empirical atomistic vocabulary to describe operations in terms of neural networks and those using the mathematics of continuous fields.

In the rest of the book I continue to deal with these approaches assuming the complexity of the spectrum involved in the coupling. And all the time I am aware that I am using a language and logic of one of the paradigms held widely by human cultures, ignoring or denying the language of the others.

7. Coupling, communication, and meaning

THE MATERIAL HERE BEGAN TO GROW INTO A LARGE ILL-FORMED DISCUSSION. IT WILL BE TREATED IN ONE OF TWO WAYS: AS A COMPONENT WITH SOCIAL NETWORK ANALYSIS LATER AND/OR AS A MAJOR ELEMENT OF A JOURNAL ARTICLE or both

Coupling, information, communication, and meaning are among the most important features of human society. Each is related to the others in complex ways that

have been explored in all cultures as long as we have records. However it is difficult to identify functions that make insight-generating associations and those few we do find are mostly non-linear relations that provide qualitative images—but seldom ones that give quantitative estimates about system behaviors.

Information decreases with coupling - never quite goes to zero:
Understanding and meaning increases. Possible connection to Tsalling Entropy. The information conveyed varies with system order and degree of coupling in particular situations.

'Giving without giving up.' In this way related to info theory, but about communication with meaning. (Material from information theory).

In group dynamics it is interesting to note that groups with high trust can easily work separately on issues, and introduce diversity without seeing this as an immediate threat to the group. Whereas groups that have to be maintained by planning and control, a very limited scope of process and outcome variety will be found.

Communication & Coupling—A Paradoxical Pair

According to information theory, in a closely coupled system there is a limited, though critical, role for communication. A message between elements carries the information that the other element is present and unchanged regardless of the complexity. Conversely a system of low coupling can carry hi-information. [I am going to leave this section on varieties of couplings in organization until I sense the best level of formality needed in this article.]

Showing most communities/segments not coupled in significant areas both in narrow and broad bands.

Loosely coupled

Two forms of organizations:

1. Members typically have broad bandwidths: A_i and official K is set in a region easily accessible within the A_i. The loosely coupled of which Karl Weick writes are typified by easy communication, noticeable ambiguity, imprecision of meaning, and alternatively, open boundaries and low entry cost. (Weick, *The Social Psychology of Organizing*, 1979)

2. Members organize into units with relatively narrow bandwidth with little overlap arising out of poorly adapted communication or from new organization doing multi-discipline work. Behaviors are fragmented, departmentalized, though perhaps locally loose in sense 1. Often they are locally tightly entrained to an ideology or subordinated in a power hierarchy for the purpose of gain, but producing persistent inter-group conflict and poor communication, locally closed boundaries. Many corporations.

Tightly Coupled

—Members concur on central topic—widely shared meaning—slow to change (religious orders), typically hierarchical, entrained members (more synchrony than coupling).

—Also "brotherhoods"—coupled tightly on central themes but looser coupling at periphery. Open & Creative—> conservative "men's' clubs." Typically—tight boundaries & entry costs: Masons, "Knights Templar." (Find other examples)

As mentioned above, extreme coupling produces stability we associate with matter and authority. With decreasing coupling conditions, as measured by K, we have less rigidity (stability), greater variety and ultimately increased freedom for humans to decouple (separate) and couple with (collect) ideas—and even matter itself.

[Could develop this story here or later if needed to give richness: Disney demonstrated the whole variety over the corporation and its history, moved from tightly synchronized by Walt himself to develop some brotherhoods among chief designers. Leaders and family to loosely coupled in Imagineering and in "coupling" with Pixar. [Could add Funeral for Walt's Spirit 20th Anniversary.]

8.0 Conclusion: The Role of Coupling

The phenomenon of coupling may be as significant for understanding the cosmos, as is the understanding of forces and energy. It describes the binding conditions that associate forms of matter from fermions and of energy from bosons on up and may give better ways of understanding behavior of living organisms.

Even with the giant steps taken by introducing field theoretical formulations in the century surrounding Einstein's work in thermodynamics and relativity, force is still the dominant zeitgeist in western, and perhaps all, human cultures. It supports a masculine worldview and the drives for innovation and for the power that legitimizes violence and war as major instruments by which we shape the spaces of human life.

I fantasize a reformulation of scientific thinking based on the processes of coupling to reshape descriptions of the universe at all levels from the microscopic to the macroscopic of every day life. Formulating such grand revisions is way beyond my capabilities and success is not on the horizon. At best, the possibility that it can be done encourages me and directs my explorations at less ambitious levels. The reformulation based on fields and coupling has begun in the research activities referenced and in many more applications in biology and engineering. Only recently have efforts begun to formalize the folk knowledge of coupling relationships available to human cultures everywhere: a rare example being Goleman's work on Social Intelligence (1996). I have selected simple examples in this chapter primarily to illustrate the range of interdependences. In the rest of the work I develop models that pertain to the

development of languages and social structures where organisms are able to tune their responses.

The general understanding of coupling in psychological and sociological sciences is still comparable with the sciences of energy at the time of Galileo. My intent is to advance awareness of coupling operations among humans and cultures, focusing on those phenomena that primarily display coupling or where dependent synchronization on one or a few agents (leaders) is treated as a special condition. I presume a decade from now there will be collections of research from a great variety of applications to support this fantastic vision. For now I begin along this radical revisualization by exploring some psycho-cultural phenomena of coupling to encourage others to join this pursuit of the empathic.

SOCCER EXAMPLE:

An image arising in a conversation with my friend, Owen Peters, about how styles of soccer play differ between a young Brazilian team and a World Cup class European team. The European team uses a paced style, moving into strategic positions across the field and depending on their skill and power to move the ball through patterns aimed at freeing specific players to make a goal kick.

The Brazilians seem to use a radically different "game plan." Capitalizing on their speed, the young Brazilians move into close proximity, aiming to move downfield as a cluster of up to eight players until they are in a good position for a goal shot. Sometimes they are blocked, so the cluster either drifts off a bit or it reforms a short distance away. However they mostly stayed in the center acting as through the field was narrower. The tactic seems to throw off the Europeans forcing them to move into a defensive position ıd respond with behaviors as though the field was actually narrowed. The young team thus gained one advantage by forcing the opposition to play at a pace less natural to them. When the European team habituated to the artificially narrowed field, the Brazilian team gained a second advantage by occasionally breaking out into the larger actual field and raced around the ill-defended edges for a goal kick. Using this strategy the Brazilian team has usually won.

Thus this kind of a tactical game provides a wonderful illustration of (human) system dynamics—field warping, coupling, second-order cybernetics, differencing and the stages of ontogenic processes. The detailed parallel will be included in later discussions of the process.

NOTES

---

[1] . Add other statements on the ideas of ultimate release from complexity: mine on "It does not matter." Einstein's on the surface of ignorance expands faster than the volume of knowledge and more as I let the ideas come out.

[2] It is an example of the Rayleigh-Bernard model of convection in fluids that is widely described in the literature of far-from-equilibrium systems; e.g., Kelso (1995) [Add the reference from Gambale and Gllozzi 1978 that mentioned Turing (1952) and coupling.

[3] This is one example of the sympathetic, coupled response of the many sphincters or ring muscles that animate most animal forms. (Garbourg, 1994)

[4] Ralph Abraham has an excellent chronicle of the emergence of the idea of complexity in an article on his website: *The Genesis of Complexity (2002)* http://ralph-abraham.org/articles/full-list.html

[5] In spite of increased interest, it is still ignored in the hard sciences and engineering. Strogatz's engineering text (1994) on non-linear dynamics has less than three percent on phenomena related to coupling, phase and synchrony. He entirely ignores Leibniz's approach, which draws on the field view, to calculus, as do many American texts. [P the extension of L view.]

[6] . This is far too ambitious at the moment. I know of no way to replace force in basic physics. Yet I anticipate that many of the force models can be restated without resorting to the force notion. It is worth a try to explore the deeper sense of our approaches to understanding our universe.

[7] The oneness of individual and the environment is fundamental in the work of system theorists in the U.S. such as von Glaserfeld on second order cybernetics to brain researchers such as Rodney Cotterill (2001) in England and in the work of numerous neurophysiological researchers in Europe (e.g. Jarvilehto, 200?, in Finland.)

[8] Beginning with Helmholtz etc in the mid-19th century. Also see Abraham article in above note #4.

[9] I am working on the idea that much of the articulation and epistemology used by humans evolves by methods akin to the theme-and-variation mode of generating music. So far I have not found enough to build the material into this text.

[9] For an introduction to nonlinear differential equations, see Strogatz (1994).

[10] See Daniel Goleman's article on Emotional Intelligence.

[11] Rodney Cotterill (2002) discusses the critical role of feedback in creating consciousness and languaging in humans.

[12] A central issue for physicists until? resolved the issue in 1890 was ascertaining whether the orbits were stable a task that occupied astronomers for nearly three centuries after Newton first tackled it empirically Recently, astronomer have found that none are completely stable but close enough to keep their distance for billions of years more before falling into the sun.

BIBLIOGRAPHY

Abraham, R. (2002) The Genesis of Complexity. http://ralph-abraham.org/articles/full-list.html

Cotterill, R. (2001) Cooperation of the basal ganglia, cerebellum, sensory cerebrum and hippocampus: possible implications for cognition, consciousness, intelligence and creativity. Progress in Neurobiology 64, 1-33.

(Ermentrout, B. (1991) *An adaptive model for synchrony in the firefly Pteroptyx malaccae,* Journal of Mathematical Biology.

Garbourg, P. (1994) The Secret of the Ring Muscles. Fort Lauderdale, FL: Peleg Publishers.

Goleman, D. (1996) Emotional Intelligence: Why it Can Matter More than IQ. Learning, May-June, 49-50.

Jarvilehto, T. (200?)

Kelso, J. A. S. (1995) Dynamic Patterns: The Self-Organization of Brain and Behavior. Cambridge, MA: The MIT Press.

Strogatz, S. (2001) Nonlinear Dynamics and Chaos: With Applications to Physics, Biology, Chemistry, and Engineering. Cambridge, MA: Addison-Wesley Publishing.

Von Glaserfeld

Jim Webber's Comments on Will's Coupling Chapter of 1/12/07

2/17/07 7:01 PM

General Comments

- *Will, I need one page more on society being driven by Force based systems. It is a novel idea. I am intrigues by it and I want to understand it better.*
- *Not sure what Chapter 1 looks like , but based on the very positive reception of "Growing into the Canopy" at Winter session, you should consider it as a very accessible introduction to Coupling and the history leading up to it.*
- *Will, this chapter is profound and, as such, is difficult to grasp, but worth it once an effort has been put forth. There is no way the 80% or so managers/executives in Torbert's mid-level developmental scale will make the effort to grapple with it. So it, like P of C, will require a field-book. It is informative to note that after 15 years, great institutional support and huge promotional activity, Senge's work is still being discovered by firms such as Microsoft.*
- *Will, I yearn for a reference side-bar that is a concise summary of field theory, field language and field worldview.*
- *Will, structure of the chapter: Dynamic systems as the formal language of coupling is the hardest section to understand and is off-putting at the beginning of the chapter. Could it be placed as the last part of "Coupling Phenomena?" I sure like starting out by defining and characterizing and presenting and illustrating with the variety of coupling phenomena. I do not find a section 4.0 following Phenomena and preceding Structural Coupling.*

Page 3 – *I love:* Coupling as the fundamental organizing process … Enters into every form of interaction and change … transfers energy … produces the empathy … through coupling we know ourselves and form our views of reality.

Page 4 Coupling and its limited forms, synchronicity, entrainment, phase-locking, resonance. Empathy … *Note I would love to see an expansion of these terms. It would help me to understand the different forms of coupling.*

I wasn't sure what the "music of the spheres" meant so I looked it up … is an ancient philosophical concept that regards proportions in the movements of celestial bodies. I thought it might refer to Jamie James book on the subject.

Page 4 - *I love*:… coupling as a foundational process of a new integral worldview

Page 5- *I love* : Coupling as a phenomena of whole systems without distinct parts.

Force based systems vs. Coupling (page 5 primarily)

Maintaining human culture as support for male agenda Power that legitimizes violence and war (p 33) Syntax of daily speech (p 5)	An alternative to force-based systems (not to void them) p. 5 Allows a better discourse on some psycho, social and cultural phenomena
To operate under conditions, determinism	To set conditions
The gap between atomistic and the whole sets the stage for conflict and the need for force to resolve an issue. Especially inappropriately true between humans and their environment	Coupling is not new but is a prisoner trapped in the foreign language of atomism. E.g., coupling spoken as between objects, persons, concepts
Discrete symbols and objects	The whole without distinct parts, deals with the states of whole. Need wholistic language of dynamic systems
Talking about (p.7)	Engaging with

Page 5 and 6, *I get and like:* wholistic language of dynamic systems – field model, dance, no objects, math of differential calculus … states of whole situations, mapping states of a system and the immediate rate of change. *The label of "Dynamic Systems" is confusing to me and you explain why this is so- to get out of the Force based trap.*

Page 6 – Presumes unity of systems using a field model. *I hope to hear more about this as text unfolds.*

Page 6 – *Will you answer the question, how do I shift to the field worldview?*

Page 6- *I want to recognize* "our every day experiences of coupling processes," *but I need tips on how to do this. Can you give an example?*

Page 6 – Coupling has a language (DS), processes, model(s), parameters, a worldview, certain utilities, certain characteristic behaviors, representations *... by the end of the chapter I hope to understand these aspects. In fact it might be a good way to summarize the chapter.*

end Chap

Page 6 – "reformulating the giant topics of the embodied mind , languages' origins and social structures." *A huge and worthy aspiration!*

Page 7 *I love ...* "Changes are produced by modifying the conditions which result in reshaping the space and paths through it, not by direct impact."

Page 8 Vector Space Diagram .. *I don't get it, maybe I will when the next version arrives.*

Page 8 –I like the limits of syntax in our visualization of the world. I find "pervasive inarticulate empathy" *intriguing.*

Page 9- *I found the need to look for a definition of "differential equation" in Wikipedia, but the entry did not help me much.*

Page 9- Dynamic System (DS) as a formal language to describe coupling behavior, a vehicle that generates a sequence of states, continuously and over time. *This helps.*

Page 10- *I don't get it.*

Page 11- *I don't understand relevance of Fig. 2.3 or what it is supposed to show. Non-linear I guess. I understand Strogatz text, however.*

Page 12- *Don't get it or its relevance.*

Page 13- The simple models did not provide me with an adequate introduction to coupling behavior

Page 14 – "to explore the varieties of behavior that display coupling" "uncovering the variety of research done in many disciplines." (p 15) *These seems to be the prime objectives of the chapter. As you note it has not been done before.*

Page 14/15 – Defining coupling 3.1 – *wonderful!*

Page 15 – When you say: "the fundamental role of coupling in understanding the behaviors in all system orders," *I think of coupling as the key to life in the Canopy.*

Page 15 – " Most if not all coupling phenomena occur in periodic behavior." *Thus the major parameters of frequency and phase.*

Page 16 and 17– *I follow these pages about the characterizations of coupling.*

Page 17 and 18 – "pure coupling labeled as synchrony or of entrainment' But in Torus paragraph "call these systems synchronistic" – *My dictionary defines the latter as the adjective form of synchrony. So are the Sine wave and Torus representations the same?*

Page 18 -20 – Presented as a Torus - *I like the Orrery as an example f the Torus. Figure 2.7 is intriguing and I will take your word for how useful it will be in understanding the construction of reality , but I do not understand the figure.*

Page 21 – 26 Dancing analogy. *Overall very helpful. I love Arnold's tongue. Page 21 what is a* "phase space image?"

Page 27 – Variety of Coupling Phenomena – *great list*

Page 32 *I love the claim*: "coupling may be as significant for understanding the cosmos as is the understanding of forces and energy." May give better ways of understanding behavior of living organisms.

I like all of page 33 and 34

- Claim on page 33: "I fantasize a reformulation of scientific thinking … reformulation based on fields and coupling
- Linking to Goleman's work
- Lag in understanding of coupling in psych and socio
- *But I do not understand on p.34 "where dependent synchronization on one or few agents is … condition*

2006 ?

COUPLING

STRUCTURE of the Chapter

1. INTRODUCTION

2. DYNAMIC SYSTEMS (LANGTON
   Represented as field models
   Formal Language to describe
   Coupling behavior

3. COUPLING PHENOMENA
   DEFINING
   CHARACTERIZATION
   3.3 Presented as Tone
   3.4 Analogy down Styles
   [Variety of Coupling Phenomena] FIGURE

?.4 [redacted]

5. STRUCTURE COUPLING

6. SPECTRAL COUPLING

7. Coupling, communicat + meaning

8. Conclusion: The role of coupling

3. CONSTRUCTING REALITY

INTRODUCTION

LANDSCAPE

[ADD COMMENT ON WHY THIS DEFINITION IS A GOOD ONE .]

Point of View Landscape cartoon—Task is to create a path [and necessary support] coming from the blooming chaotic world suggested in the cartoon and terminating in the image on the artist canvas.

What does the artist come to the scene with: and intent to paint and many hypotheses about what he will see: images of stereotypical grass, sun, light, the horizon a melange of sensations that he can organize progressively by proposing—sketching—a few compositions that reduce the mismatch of the sensed image and the hypothetic construction. . He redraws and paints and repaints the image in his mind until at some point the differences are minor—he experiences an emotional surge—"I've got it." , sensing his intention is fulfilled. At that moment he has constructed *reality*. It is his alone and is "real" only for an instant. He creates a new *reality* that is a construction of the mind reflecting a portion of the scene.

Is this scene any less or more real than the landscape he has depicted? Less material weight, but perhaps more economic value; but more accurately it to has but a fleeting reality, to be recreated when he looks again at his work, or some admirer sees it hanging on a wall.

Each observer of the environment records a personally formed image created by a realizing process in which I propose has five interwoven elements: projection, identifying, noticing differences, metaphoric extending and chaining. Each of these

elements have been researched using the tools and data of diverse disciplines, among them—cognitive sciences, philosophy, system dynamics, and arts and literature..... but none have yet encompassed a full ontogenic cycle.

Constructing reality is an active process. Each observer of the environment creates the image by a realizing process that I propose has five interwoven elements: projection, identifying, noticing differences, metaphoric extension and chaining.

STOP HERE AS THE FLOW GETS CONFUSING.

It begins with a person choosing an action that reaches out to gain some objective. In order to select an appropriate action he needs to have some image of the world on which we are acting. The landscape artist has a hypothesis that configuring a tree on his canvas will be attractive. So he sketches a prototypical tree and horizon and notices the differences between his projected image and one that his senses pick out of the environment. These evoke hypotheses about the particular shape, texture and colors needed

Part of the path was constructed in earlier genetic stages of development so some features are structurally organized (e.g. some degree of line, boundary and color (see E. Roach). But the cartoon is close to what the artist has available to bring into his painting: defined areas of color. A few particular shapes are apparently "inborn" (e.g. a human face, along with clues from other senses such as warmth and the scent of breast milk.) But the senses mean nothing without intention that can lead to actions and the various feedback loops that enable an organism to associate (couple) action programs with changes in the perception of the environment—the body is itself the immediate and most persistent "vocal" part of its environment.

In the simplest living organism acts set up the condition. For what we call intentions even if psychological explanations argues for the reverse. So the painter envisionment is prepared for eons ago when an action encountered a "hard place" and progressively was remembered as a piece of wood, a vertical stand, ultimately as 'tree.' The actions that detect a tree take place in a space 'warped' by intention and is brought into awareness as a proto-motor program for encountering a tree—and the boundary separating earth from sky and (see cartoon)

Thus the ancestor of the painter took the first steps toward realizing the landscape that a contemporary human may use to construct reality

A foundational concern of this work is to find ways to work across the difficulties that arise from working with individuals and cultures that attribute reality to diverse

sources and thus set the terrain for the great and small conflicts that have disrupted civilizations throughout time: the perpetual disputes between those beliefs that arise from the sacred and the secular, between the sciences and humanities, and between moral truth and creative expression. The differences play a continuing role in the daily efforts we make to understand the behaviors and intents of all those whom we encounter. It becomes even more critical to deal with the differences as we recognize that they are deeply fixed in individual psyches as well as their cultures, and that their cultures have become so densely interrelated that we must evolve strategies for living with the enduring complexity, for maneuvering across the Canopy that is forming over the vast forests of diverse species of belief.

INTRODUCTION My approach is to create an ontogenic process that can account for the emergence of divergent belief systems, one that is consistent with current understanding of how the embodied mind of humans (and a few animal and bird species) create their images of the world and the relevant phenomena in human cultures, ancient and current. The proposed ontogenic process introduced above is a general device. Here I tie it to the structure of the human embodied mind to suggest how its operation leads to the specific richness we experience between individuals and cultures.

CONSTRUCTION FOR Engaging the Environment [ONTOGENY]

[OUTDATED!]All animals as species or individuals can learn: the higher forms through the processes of *feedback* mentioned earlier (Marc: didn't see it mentioned earlier). They learn by observing differences. The most advanced forms including human, have neurological circuitry to anticipate the response of the environment over increasing complex outcomes, over more space and time and over increasingly complex series of actions. They develop *proto-motor programs* stored in the embodied mind. In the neurological models these action programs function between the spinal cord and the components of the muscle called the "spindle" [Ref. Cotterill, Lethin] readying a series of actions that are executed when released by signals from the central nervous system. The programs are, in effect, forecasts of how the environment will respond to the action; the neuro-circuitry readies a series of muscle movements that move the muscles (and for instance, and a secondary program that sequentially inhibits the firing on one leg while firing the other leg, then reverses rhythmically, leading to walking.] These action programs can be represent in the neurons or equivalently in metastable DS's which I call feedforward program (*ffp*)(footnote). They enable us to do "what if" thinking and to anticipate what it will feel like if one we carried out one or another of the proposed actions, as will be discussed later, to empathize with another person (or animal or aspect of the environment).

(Marc: which hypothesis ?) YES, GREMLIN WORKThe hypothesis is but a representation developed by the science of the observer and the culture (e.g. one person attributes the change in the wealth to an annoyed fairy, another to a storm in the North Atlantic.)

(Marc: again jumping all over the place !!!!!!)

So, in deciding on our actions, we use, what one may call feed forward programs (*ffp*): a sequence of events that will follow up on some action we may take. As such we have a great many explanations or models— or stories—that relate to the involved assertive *ffp*s. The stories are about the black boxes (per Ashby, 195?) that we hypothesize contain the substance and functioning of the phenomenal universe. We cannot open these boxes to validate our explanatory hypotheses, we cannot ever access the work without the observer. If we chose to accordingly we 'fire' (release) the associated program and relax those others that we have inhibited awaiting a decision

The reality of that which is observed is born and lives only in the moment of awareness. There is no standing reality. No attics full of memorabilia, no library stacks, no grand cities full of human artifacts, just energies organized in structures awaiting a future engagement with a conscious creature. Once we let go of the active awareness we call an observation, we are left only with processes for regenerating awareness of prior events and a structure representing it. We recapture the reality by reapplying the process, by reading in the library, viewing the old photo album, playing a composition.

Miscellaneous note toward understanding differences

1. The entire universe is coupled (or synchronized) but this is a meaningless proposition unless there are existing sub-systems. If there are sub-systems that are not coupled they would be undetectable.

2. So all observable aspects of the universe are coupled to some degree. **C>0** for at least some wave lengths.

3. However, when subsystems are (artificially) defined over a limited range of wave lengths they may appear as uncoupled with some portions of the universe and so slightly coupled with others that they are (can be) ignored.

4. The humans can only be aware of sub-systems with which they are coupled—most ever so faintly.

Fractionization
Articulation
(Arbib)
{ Separation } Collection
{ Segmentation } Coomposition

1. Human embodied minds have feedback systems which enable it to: (See list of pairs in prior version of chapter)

Remember (time-bind) — Compare (see Arbib, 2002; Cotterill, 1995)

2. Actions are taken with intent to have a particular outcome. An act is associated with a hypothetic—an hypothetic of that portion of the world that is involved in producing the outcome. The image as available to the mind. (need to discuss image forming.)

3. When the coupling with an image is sufficient, humans recognize it as a version of their hypothetical and notice it because it is not identical and is less or more emotionally disturbing.

4. The difference is:

   a. Ignored as noise

   b. Recognized—coupling with an available hypothetic

   c. Conceptualized—forming a new gestalt (hypothetic) or a unsubstantial object

— d. Metaphor

The difference thereby is given meaning. It is defined in party by what it is not—i.e. not like a part of the initial hypothetic or the new image—hypothetic plus difference—is taken as a new hypothetic replacing+including the existing with an awareness of the differences as a lacking feature "recognized" but how—it arrives as an irritant, otherwise ignored. Does not appear to have been dealt with by researchers such as Lakoff, Arbib, Mithen. There are some clues in the evolution of language. Using Mithen (200X), language seemed to evolve following two routes. One starts with exclaimations, alarms, quick instructions, emotionally based with

immediate reference. Two originate with what Mithen calls "Hmmmm" (get definition), multi-syllable expressions for a local memorable event. (relate to music) The devolution of these were formed into the full language with syntax and articulate vocabulary.

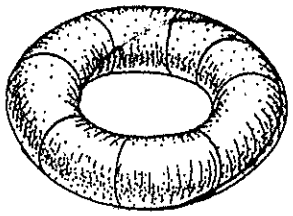
I've read no text ,which explains or even proposes methods for composition—that is, no methods for collecting differences to form categories or characteristics—could be related to forming conjunctions and prepositions. One source (?) suggests that early segmentations split off wholes. A prime example: hot water segmented into water and calories—insubstantial objects which when joined (find reference to "unsubstantiated" objects without materiality) with water made hot water. It was not until the 20th century that these attributions were fully converted into adjectives in Western Language. They are retained in Japanese in adjectives such as long-a stick or round-a ball (or like words), which are still used. (Look up Japanese terms.)

I have not yet examined how the term "concept formation" might be used in the discussion of composition/collection. (maybe email Arbib for ideas/info.)

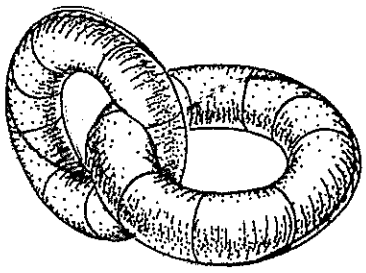
Question of stability

FIGURE 3.: THE ONTOGENE THE PROCESS FOR CREATING "REALITY."

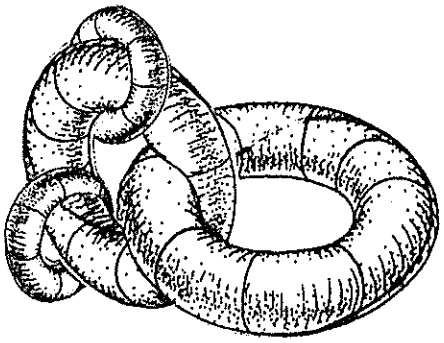
a. First Torus—Indication of coupling between hypothesis and its environment



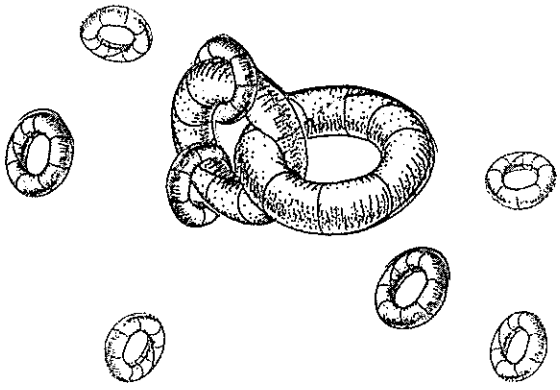
b. Second Torus—Indication of coupling with variations: noise (differences) are ignored



c. The basic ONTOGENE—Separate Torii show coupling with hypotheses brought out by additional intentions and hypotheses



d. Cascade of Couplings with stored proto-model programs , beneath consciousness.



Descriptions of the ontogene:

[introductory heading—Initial Coupling: Awareness of a coupling between a hypothesis and some aspect in the environment, which is present to the senses or evoked from memory

Ideally it is a coupling with any dynamic system in the environment—the universe or in this example "anything visible in the room at this instant"—with the projected hypothesis accomplished by an act or program of actions, eg. "avoid the black cat on my path." This particular coupling may have been selected from all the immense number of couplings that readied for awareness because of the intentionality expressed in the proto-motor programs, *ffps*

a. .
b. Coupling with a variation.

   No coupling is perfect. The environment shows at most a near match, a dynamic system close enough to couple, that is, to match the hypothesis. The difference is recognized as a variation, ignored as noise, or retained as a new stereotype with the original being viewed as a variation on a theme. E.g., the theme is 'cat,' and the variation now is 'black cat.'
c. Secondary couplings.

   The variations may provoke the observer to propose new hypotheses as to what a variation represents, e.g. the swatch on the cat is stripping. These couplings are observed and form a new ontogene with its proto-motor program and outcomes. They occur simultaneously with the primary observation, though there may be delay before the variant elements is incorporated in the memory.
d. Cascade of couplings.

   Every awareness of phenomena, even of abstract symbols, produces a cascade of couplings. Some make an imprint in the embodied mind that may come to consciousness with a matching at some future time. Most fade without recognition.

Awareness, not search

The switch from the symbolic and neurological modeling to a dynamic system view (*DS)* radically changes how we envision the engagement with our environments, both internal and external. Whereas most neurological and symbolic models assume that an action *searches* for a response from the environment, the *DS* modeling shown above assumes that an organism is already *in contact with* (knows) the totality. Whereas the *DS* model only displays the immediate set of energies, its operation is based on the conditions of the entire universe as it bears on the moment. Of course, the energies emanating from the vast majority of the universe are far too faint to have any distinguishable effect, but cumulatively they set the conditions for local realizations. Nothing is separate. The organism's task is to focus its limited attention span on the aspects with which it is concerned. It attends by delimiting the available energy in its sensory faculties and imagination to the topic at hand, inhibiting matches that divert energy, and channels its awareness to the couplings that are of concern.

This sequence initiated by the organism and found to couple with energy located in the environment, is opposite to the widely accepted classical idea that asserts that a stimulus received by an organism produces a response. The familiar 'SR – stimulus-response' model that operationalizes John Locke's *tablua raza* was enshrined in the Pavlovian conditional learning models so popular in the mid 20th century.

The coupling DS model replaces the image of the passive organism with one in which the organism initiates an action based on the presumption that the world is constructed as it expects it to be; the coupling noted in the environment tests the

assumption. This reversal in thinking came with studies of homeostasis in biological systems (e.g., Cannon 1928) picked-up in early cybernetic work to design systems such as artillery fire and heart rhythms and most prominently to computer programming. The impact of this switch was slow to be taken up by epistemologists and philosophers (in spite of earlier proposal such as that of Kant (ref.). It was often rejected along with other vehicles of constructivist thinking (von Glaserfeld 1984). Now it is asserted, e.g., "perceptual consciousness always involves imagining what would happen if we were to do something actively." (Ellis 2000) and more generally that ??????[GET QUOTE FROM e.g., Lethin (2002), Cotterill (2001).] **Gremlins**

The reality of that which is observed is born and lives only in the moment of awareness. There is no standing reality. No attics full of memorabilia, no library stacks, no grand cities full of human artifacts, just energies organized in structures awaiting a future engagement with a conscious creature. Once we let go of the active awareness we call an observation, we are left only with processes for regenerating awareness of prior events and a structure representing it. We recapture the reality by reapplying the process, by reading in the library, viewing the old photo album, playing a composition.

In the DS model we engage with the environment with "twenty assertions." In developing and learning, living organisms act on the environment to assert intentions and continue to refine these assertions continuously adapting these to closely match *DS* elements in the environment. To shorten the number of tries to sort out a coupling in a vast array of possibilities, humans have developed an array of problem-solving tools including logical organization and inquiry (questions) which take advantages of our ability to couple with other people via language. [The coupling model suggests the possibility of developing alternatives using parallel processing instead of serial in the problem-solving approach. OMIT OR DELAY UNTIL SPECULATION IN FINAL CHAPTER]

METAPHORIC EXTENSION

Metaphoric extension is a universal tool for creating our view of the universe from the simplest observation to the grand images of the cosmos. It is the major device through which we chose actions that produce outcomes and elaborate our worldview. The couplings we observe work like *metaphors,* 'A is like B.' which is a fundamental instrument for realizing our world. The target 'B' is seen to be like a source 'A' in some way. It produces an awareness of similarity; eg. in 'Man is like a lion': we may come to see the bravery of a man, exemplified by our image of the lion, at the same time realizing dimensions in which man differs from the animal.

Every metaphor extends (or reinforces) our understanding of the target and the source and the ways in which their elements are alike. Every metaphor extends our descriptions of the universe by further differentiation of what is already individuated, and occasionally by forming new gestalts, new constructions for which we assign a new label.

An action-response-hypothesis constructed as a new *ffp* is coupled to an existing *ffp* and is observed as producing a difference in the environment and to some degree re-enforces existing *ffp's*. The outcome of this action sequence is a metaphoric extension.

The similarities between existing *ffps* and new *ffps* reinforce existing action patterns; the differences can be collected and viewed as *descriptors* of the sources (See Chapter .

Metaphoric extensions occur when an observer, questioner, casual conversant, or idling mind decides on some hypothesis that should be inserted into a dialogue. How one makes such choice is a central topic in this inquiry, to questions of social control, education, and creativity, as it determines the construction of *meaning*: What rule guides the person, what background suggests the possibilities to the questioner; what is culturally acceptable and what may be a taboo choice? What will produce a creative imaginative metaphor and what will be judged as dumb, irrelevant, or offensive by the initiator or any audience? What will be subservient, what will be challenging? How we respond to such questions determines how our world will appear, for in the act of this choice, we are in fact creating our world.§

The process of metaphoric extension by which an organism progressively differentiates and collects (or binds) might be called *progressive articulation*, however associating it with 'articulation' narrows the reader's view to formulating thoughts in the atomistic paradigm, thus presuming the distinctness of the parts.

Our language is constructed of metaphors that are formed through *embodied* insights, but *languaging, knowing,* and *cultures* are themselves metaphors formed in an order of systems that have emerged beyond the biological human. This is the social order, which transcends (?) individual based orders.

Chaining

Metaphoric extension is guided by the *rules of chaining*, such as logical deductions, story construction, grammars, temporal sequencing, rhyming, and social convention, or by the serendipity of a moment. Chaining is the major process in guiding the development of a living organism, phylogenically as well as ontogenically, and in forming *context* it is essential in establishing meaning. It guides the development of discussions, arguments, and manages the organization of a discipline. It also finds expression in the grammars disciplines, etc.

In the next chapter I describe collecting as an internal cognitive activity and with that elaboration it becomes clear that boundary setting is one of the most powerful tools in social intercourse and the organization of knowledge.

CONCLUSION: [NEED A MORE EVOCATIVE TERM HERE]

Reality comes out of matching, it comes out of finding assertions that are sympathetic with the world around the person.

Next sentence: what's the verb ?

, or an assertion, even a challenge to the world or other parts of our mind, that the world is the way we say it is.

The coupling and its observation in the ontogene affect the match. That is my assertion. The next task is to develop models of how we embed these couplings in complexes of associations to form the limitless panorama of images and concepts including those we have no names for, sense but do not define, and are only expressed emotionally or aesthetically.

THEME AND VARIATION MATERIAL

[MOVE AND DEVELOP THIS PARAGRAPH—-Theme and (rule of) variations (*Th&V)* to make sense of and be aware of engagement. Briefly stated, when an organism becomes aware of a coupling 'between' itself and the environment it concurrently registers an identity of itself and with the environment, sees differences which are organized as variations, and establishes a context that gives *meaning*. The 'themes' become the objects and many of the variations become the qualities or descriptions. In practice almost every use of a theme as an object or idea will produce a variation that will either broaden the theme itself, or narrow it by treating the original theme as variation on a new reduced theme. The rules of variation become the grammar of the language. There is no act of separation thus any need to later 'bind' the elements together. It creates processes that seem to transcend the dichotomies of whole and part, of separation and connection. [My intent is to develop more detail on *Th&V* process and add it as a technical appendix to this chapter (2.1)]

RE DO WHEN I SETTLE ON HOW TO HANDLE LANGUAGE (My expectation is that this model will also contribute to understanding the origin and present form of languages. However, I have yet to develop the dynamics language connections. My speculation is that the theme-and-variation process (*Th&V*) can produce many of the features of the separation-and-connection model of articulation that underlies conventional syntax and grammar and can do it with less arbitrary association of meaning and symbols.)

Marc: On the subject of theme & variation: symmetry is an interesting Th&V, in a good design (my subjective use of the adjective 'good'), any part of the design will be recognisable as being part of one same 'object'. The same in a painting, the same in classical or other music. So, Th&V is really a fascinating subject to explore ! Next to symmetry there are many other aesthetic principles that may help to realize an 'integrated' design.

A third approach that may provide new insights arises from the little explored hypothesis that language—and thus our formulations of reality—have origins in music, ritual dancing, and chants. STATE THE WAY OF DIFFERENTIATION replacing them with the observation of coupling using a process of *theme-and-variation T&V)*. Briefly stated, when an organism becomes aware of a coupling 'between' itself and the environment it concurrently registers an identity of itself and with the environment, sees differences which are organized as variations, and establishes a context that gives *meaning*. The 'themes' becomes the objects and many of variations become the qualities or descriptions. In practice almost every use of a theme as an object or idea will produce a variation that will either broaden the theme itself, or narrow it by treating the original theme as variation on a new

reduced theme. The rules of variation become the grammar of the language. There is no act of separation thus any need to later 'bind' the elements together. It creates processes that seem to transcend the dichotomies of whole and part, of separation and connection. CONTINUE —

In the extreme mystical state of total awareness, one identifies with the totality, makes all distinctions and all perceptions as *Th&Vs*. Or verbalizing it with the present atomistic syntax, all things are distinguished, all differences identified, and all connections are retained. — [Much more development of this process as a source of language in later chapters.]

ALTERNATIVE MODELS OF REPRESENTATION:

Not sure how much to say of alternatives (e.g. computer models) But show some of the places where they are for the moment required to explore the embodied mind in complex human cultures. Some comparisons of power of each, e.g. serial vs. parallel processing

A. Operational Models
European example (Ref. Fingelkurts 200X)
compare to Ontogene

B. Mirror Neurons
Anglo-American approach, describe
Add example (ref. Arbib, Iacoboni)
Arbib graphic showing mirroring, sensing, comparing (may delay this graphic example until Chapter 4 to tie in with diverse handling of sensory inputs.)

Comparison of Ontogene with neurological networks models
Originally intended to introduce these two models as evidence that my thinking is backed by neurological research. Now two more important reasons:
Tie to articulation vs. coupling as a linguistic issue
Tie to worldviews of symbolic/analytic power vs. wholistic/empathic society
See comparison of method in Fingelkurts (200X)

CHAP 4 (3/07)

2/04/05

CHAPTER 3: MULTIPLE REALITIES

This chapter establishes the basis for a particular diversity of worldviews based on a set of core metaphors that produce systems of thinking, and operate through grammars to enable us to enunciate ideas. I am not claiming them to present a real set – almost by my proposing them, I am denying the possibility that any single definition of reality is either arguable or testable. I have chosen this set for its antiquity, it broad use, and its relation to emerging cognitive science consideration about how the mind-body operates.

In Chapter Two, I introduced a Buddhist model of thinking that leads to viewing four piles of related thought processes that our mind/bodies use to engage with the world. Here, I propose that this set of modes provides a foundation based in four sources of beliefs about reality that appear in cultures throughout the world and throughout historical times. Further, I identify characteristics of systems: persons, groups, or cultures, which tend to work from beliefs in one of these sources over the other three, or at least display a strong bias toward or against such sources.

If these beliefs in the sources of reality have physiological basis, I would expect that they would be found everywhere, in every culture. There is good evidence of their pervasiveness wherever there are written records in cultures around the world and over three or more millennia. It is a persistent articulation. An early appearance of this four-part typology that is still followed is in the New Testament. Its appearance there suggests a deep awareness of the presence of the four beliefs, which give form to the diverse images of Jesus that are provided in the four Gospels of the Bible. Which reality best describes Jesus? (Lai 1998) Is it Matthew's Jesus as the Messiah, the majestic successor of the line of Abraham and David? Or Mark's lowly servant of God, a man of action, proved to be the Christ by his deeds. Or Luke's humanist, the lover of humanity and healer. Or still is it John's, the mystical Christ, the personification of God, "Before Abraham was, I am," and the Christ through the belief in whom we would attain eternal life. The assertion here is that the four sources provide a Jesus for persons holding each belief. It proposes that the compositors of the Bible understood the pervasiveness of the views among those to whom the compositors wished to appeal.

Is it a coincidence that just these four viewpoints, exactly without redundancy, span the reality beliefs of the potential readers of the New Testament Gospels? The match not only was there for those living in the centuries just after Jesus' life but also for those living in the centuries after the Bible was translated into the many languages of the modern world. I think this match is not a coincidence. Rather, compiling these particular gospels into the Bible represents a cultural awareness. In order to capture the faith of a whole people, the Bible provided a diverse set of

views of Jesus to match the diversity of the readers' own proclivity for his image, for the substantiation of God, and desired form for the immediate emotional presence.

These four descriptions of Jesus could also have evolved from the processes developed by the Abhidharma Buddhists as discussed in the prior chapter. The *skandha* images parallel the Gospel descriptions – as do myriad others:

SKANDHA PROCESSES	PROCESS DESCRIPTION	GOSPEL EXAMPLE
Rupa	Processes that connected the mind to the sensory experience of the environment and of the mind itself.	Mark
Vedana	Processes that worked with feelings (emotions) that arise from awareness of sensory and other mental operations.	Luke
Samskara	The creation of language that gives humans the ability to work with concepts—to form propositions, exhort a populous, write poetry, and chat across the back fence.	John
Samjña	The conceptual machine that performs the majority of our logical operations, from simple classification of sensory experience to forming mathematical theorems and holistic images of the cosmos.	Matthew

The modes of description of Jesus also parallel the modes of knowing that Plato wrote of in the *Republic*. They match the psychic functions that Carl Jung attributed to humans who search the Bible for their God; the one that described Christ most like his own ideal self image. The Buddhist model expressed these human commonalties using a process language; the Gospel does it by examples; Jung did it by identifying psychic functions. I developed the four as foundations of cognitive modes.

REDO THIS WHOLE PARA I build on the cognitive processes described in the prior chapter to show how these processes yield a four-fold model of reality

beliefs. I develop descriptions of people who hold to these sources of reality to illustrate different behaviors that are produced by the rules that are adopted by people holding different beliefs about reality. Finally, I enrich the descriptions of the four realities by identifying still more four-part models that arose in a wide variety of ancient and present cultures and disciplines. But first, a diversion to briefly describe how I came to see the relevance of this foursome in the present complex world.

Four constructions of reality

The foundations for the model I introduce here arose as a byproduct of a study undertaken twenty years ago by a faculty group at the Graduate School of Management at UCLA. They met for several months to develop an academic course with which to help students organize their thinking and responses to the exponentially increasing complexity that appeared in the 1970's—complexity that appeared as a result of the Vietnam war, the petroleum-energy crisis, and the social and moral confusion that accompanied the radicalization of the 1960's. Each of the faculty members of this eclectic group brought his own disciplinary bias to the discussion: sociology, Marxism, mathematics, humanistic psychology, law, physics, and a pragmatic, empirical business view. There was no common language in which to express the observed complexity; we did not even see the same factors as pertinent. The absence of a common language persisted so doggedly that we eventually recognized that our inability to find a common mode of speaking was the significant outcome of the effort.

The best we could do was to identify four disjunct modes within which to organize environmental data and express responses. Three of these modes would

be familiar to our students: the empirical mode we use in the sciences; the logical we associate with theory, mathematics, administrative law, and theology; and the socio-emotional mode that pervades every-day living. These three spanned the most common approaches to understanding complexity.

The group did not find an adequate title for the fourth mode. The phenomena clustered under this mode included the appearance of creativity; radical unpredictability; strong assertive leadership in the political, corporate, and spiritual worlds; and a total lack of moral concern. People who operated within this mode feel free of the constraints under which most of us operate. Ultimately, I came to label the mode 'mythic' following Lawrence LeShan's typology of extraordinary characters. (1976) It is suggestive of ways in which people holding this mode of belief characterized and managed complexity. This idiom captured the seeming freedom of formation that was repressed in the more structured modes of action and appeared to be the source for symbols, stories, and 'myths of origin' that give substance to great religions, dynasties, and corporations. The mode was surrounded in mystery around the people and groups that dominantly operate from within this belief system.

These four modes provide a framework of the different premises, processes, and limits to applicability to segment the otherwise unbounded complexity that we all encountered in the upheavals of the 1970's. Even in their primitive forms the four contributed to understanding the sources of incompatibility, conflict, and paradox in the new environment. They provided a language to manage the reappearance of Babel.

In later reviewing this set of four modes, I saw two polarities that powerfully discriminate among the characteristics of the four. These polarities are of *agency* and of *plurality*. In the polarity of agency, individuals and groups are separated on the strength of their beliefs that they can, by acting on their intentions, make a difference in their world. Agency recognizes the degree to which people believe that they can personally and collectively control behavior of people and the environment—that they can express *free will* or *volunteerism*. This polarity correlates with a person's 'location of control' within or outside of themselves, and with their sense of introversion versus extroversion, the degree to which they take guidance from within or outside. It is on this dimension that we differentiate art from science, intuition from reason, and *mythos* from *logos*.

The plurality polarity separates people and groups by whether a person or group sees the universe as a unity without boundaries or parts, or as an infinite collection of elements, each bounded and separate. The polarity is properly a dichotomy: the *one* and the *many*. Oneness appears in classic times with Plato and Neo-Platonists, but lost favor with the rise of the Scientific Revolution, only now to reappear both in the relativistic physics and the resurgence of spirituality. The assertion of manyness was also expressed in the classic Greek times—with Democritus, it becomes *atomism*. In the modern world, atomism has been the underpinning of the empirical sciences and is essential for our cause-and-effect arguments. Atomism has been the accepted public presumption in most Western cultures.

This polarization provided ways to sharpen the definition of the four modes of mental operations and to assign a more distinctive set of names and characteristics. I list these new names with brief descriptions on which I expand

on below. I add a term that suggests an immediate pairing of experience with the core meaning to behavior in each belief mode:

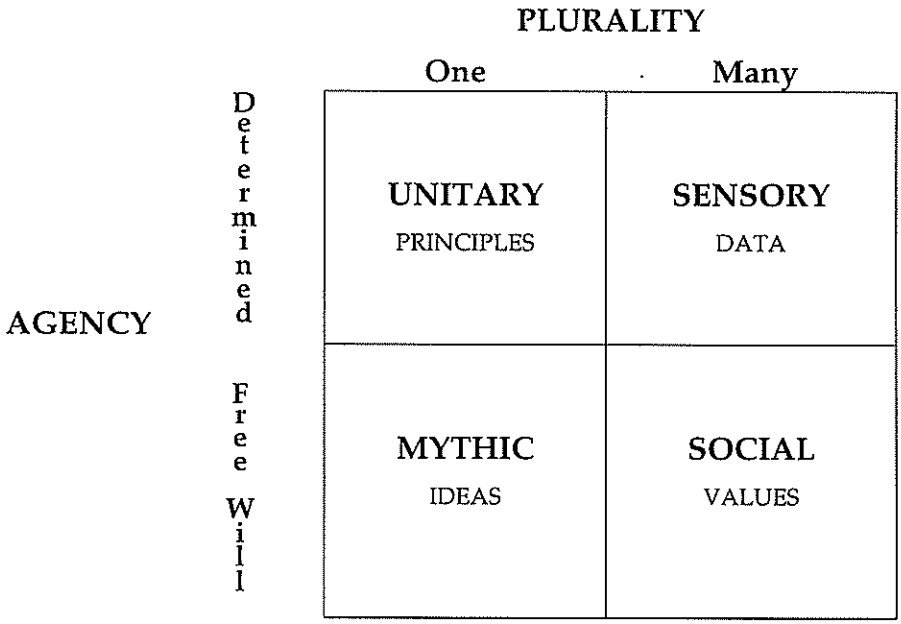
Unitary: PRINCIPLES
Monistic-determined systems of truths, assumptions, and propositions derived from them—Holism and spiritual oneness.

Sensory: DATA
Pluralistic-determined raw qualities and objects derived from the senses—Empiricism.

Social: VALUES
Pluralistic free will environment of personal feelings and group values associated with distinct individuals and groups. It is 'social' as the domain of shared emotion—Ethics and human relations.

Mythic: IDEAS
Monistic-free will is the source of symbols, words, and thus objectness—Creativity, assertiveness, and in the extreme, solipsism.

FIGURE 3.1 THE FOUR SOURCES FOR REIFICATION

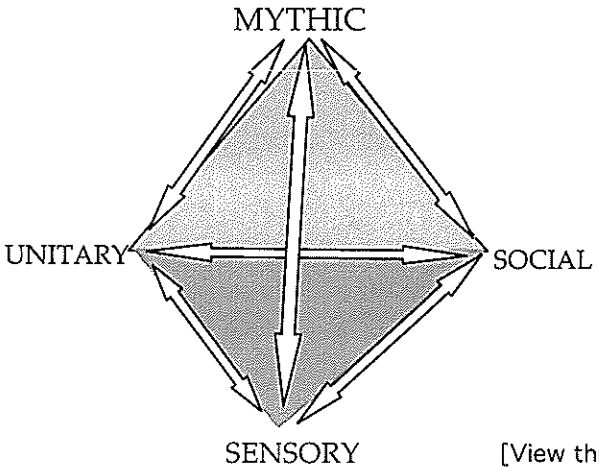


This set of four modes: unitary, sensory, social, and mythic, underlies this entire work. First, in the basic process/structures of reification. Second, to identify prototypical worldviews through which we characterize the mindsets of

individuals, groups, and cultures. And third, to articulate the platforms of discourse upon which we dialogue.

The organization of the four modes into a 2 by 2 matrix is a heuristic scheme that aids understanding and makes its communication to other people easier. Such matrices are a convenient tool for organizing thought. However, it is an arbitrary construction and a limiting representation of the model much less of the phenomena being described. It is an orienting approximation. Step by step, a more general image of the four can be constructed providing further heuristic aids to the reader to see beyond the limitations of the two-dimensional image. A first step, shown in Figure 3.2 extends the image into three dimensions, illustrating equivalent relations between any two of the reality sources. The process of reification and the structured produced by confronting the phenomena of one source of belief with another are described in Chapter 4.

FIGURE 3. 2 Four Sources of Reality Floating in a 3D Space



[View this as a pyramid in 3D]

The stuff of each reality are realized though observation by any of the other three reality bases. Thus there are twelve worldviews for any object or proposition.

The four bases have been used as descriptors of behavior and personalities; of complexes of assumptions, procedures, and criteria; and, as I have used them most often, as the bases on which people construct their beliefs about the source of reality. There are centuries of exploration of how we construct reality out of sensory impressions and out of assertions of transcendent truth, mystical and mathematical. There is a vast literature speculating on creative minds, on how they put forth words, objects, and images. Most explanations begin with the assumption that there are material or transcendental objects in the objective world, though they differ on how these are detected. Other explanations presume the totality and proceed with "a shattering of the infinite relations that connect the object to the world" in order to articulate the whole. (Christine Skarda, 1999) Such divergence of origin is to be expected—one begins with collection, and the other with distinction. However, as is usually the case, we can begin with either and from one construct the other. Here I utilize a difference model, asserting that reality is recognized in the projection of a belief onto a different domain of experience – of ideas onto observations, of desires onto dreams, or values onto objects. Our operations with realities are so created.

The behaviors that accompany these different constructions of reality lead to distinct prototypical patterns that can be seen in individual personalities, group characteristics, and patterns of thinking. While every person and every culture uses all the realities to form their worldviews, they differ in the degree of belief they attribute to each source of reality. A person with a strongly held belief in one source of reality differs from those with other beliefs in the way they use language, socially interact, conduct dialogues, make decisions, find information, and form moral judgements. The grammars they create are realizations of differing balances

among the contributions of the views of reality; their arguments follow different logics. People systematically differ in their religious convictions, spirituality, educational preferences, and typical occupations as a function of their realizations. And, consequently, they see others in differential ways so, just as with an object or presentation, a person is not just a person but a person *observed through specific biases*. Individuals and cultures are not simply characterized by a type, but by the form of that type viewed through the realities of the observer. There are not just four types in this descriptive taxonomy, but twelve types that are differentiated by realization accomplished by different types of observers; that is, a characterization of any one of the four realities can be given by any of the other three. So, a sensory type can be defined from the social view, mythic view, or unitary view. In any particular culture people tend to use but a few of the twelve possible types to characterize people or groups in their acquaintance. (McWhinney 1984, 1997) I display a normalized subset of three types—sensory, social, mythic—but I present the three subtypes of the unitary as the distinction among them is particularly relevant to discussion of grammars.[1]

The types are themselves infected with the biases of the culture and time within which I am writing. Just as there is no object independent of an observer, so there are no images free of the biases of the author or culture in which they are described. My characterizations in the following sections display familiar stereotypes. They are primarily phrased in terms of personal characteristics, however they are more general manifestations of social interaction that can easily extend to social phenomena and modes used in discourse.

53

Sensory Reality

This world is, after all, a certain way.
The contemporary historian, P. Robinson[2]

The sensory reality is the world drawn from raw sensations derived from the environment. It is the reality formed through the sense organs. For persons who behave dominantly out of the sensory reality, the only valid information comes from the senses as qualities detected in space and time. Their observations presume a simple, though not perfect, correlation between what is 'out there' and what is sensed. 'It' *is* out there, and 'it' is the only source of truth. Theories, ideas, and images are all fictions, however convenient. The pure naturalist would receive information only about qualities, rejecting the fiction that there are discrete objects to be sensed in the environment. However, the everyday convenience of accepting the impression that objects do occur in distinct times and places out there, is so much a part of our mental apparatus is that even those strongly favoring sensory thinking assume the reality of trees and sunsets and other such occurrences. That is, they 'see' the world through their projected perceptions.

In the sensory world, all events follow from prior events; nothing is uncaused; nothing is created from nothing. What is not natural is not real. Things happen! There is nothing to be gained by asking 'why?' There is no question of appropriateness, no moral issue. Things happen independently of their observation; they are "after all, a certain way." Theories are but convenient taxonomies and heuristics.

People who are dominantly of a sensory belief are most commonly attracted to occupations close to nature and simple machinations—naturalist, farmers,

mechanics, explorers, and, of course, sensualist pursuits such as cooking, the plastic arts, and erotic love. They vary in how they reify the world. Those sensory people who are attracted to the orderliness of principles and devotion to law found in the unitary mind, those we call empiricists, are likely to be engineers, designers, analysts, physicians, and psychoanalysts. Those sensory people whose secondary belief is social focus on the value of things, of people and of time, and are likely to work in markets of all sorts. They are often managers whose work is the allocation of people and resources to particular economic uses. People whose sensory impulses realize the mythic tend to be inventors, artists, and entrepreneurs. The sensory belief leads one to seek realization through physical activities, to doing things that have material results.

The immediacy and practical power of this reality is respected in American society as a counter to the intellectual constructions of the sophisticated and educated portions of the population. Its simple groundedness and efficacious use in the sciences and technology is so visible and pervasive that a majority of Americans have accepted it as their operating 'policy' about reality. It has become the general policy of American, and many European cultures to assume the sensory reality as basic. However, it is clear from social behavior that a majority of people place their faith in the other sources of reality.

Social Reality

> "Reality is nothing more than a collective hunch."
> *Search for Signs of Intelligent Life in the Universe*
> Jane Wagner

The 'objective world' of the social reality consists of the shared consensus among the feelings of a population. It arises in the individual awareness but is

constructed through interaction and discourse among individuals and groups. The social reality is in the mutual agreements of those who are 'of a culture.' What is held as real is what a community cares about and values, for the valued constructs become the objects of the social world. Nothing exists by itself, because the value of anything arises in a synthesis of the interrelations of a community of feeling. In the extreme, a person who fully takes on this worldview would say: "if it does not matter to me or someone I care about, it does not exist." The key is what 'matters' for the social reality is a feeling or value phenomenon, not a question of physical energy or form. This is not a denial of the sensory reality, it simply holds that the matter is a question of human concern. Those holding the social to be the source of reality know that they have the freedom to make their own choices while recognizing that others in their world have the same option. Whose 'will' should prevail is a question of community preference. Reality is an intentional social product, that is, it is *socially constructed.*[3]

Social reality is a humanistic view of reality, an integration of different viewpoints, histories, and ethical agreements. The beliefs of social reality are centrally concerned with the feelings and values of human beings; there are those of a social mind that hold that feelings and the values derived from them are the only basis for assigning 'reality' to anything. Relationships are of prime concern. Prototypically, the social reality is the worldview of the caring and helping professions, social work and reform, organizational change, and negotiation. It is also an essential view for people management and understanding markets. Its relational view supports the empathy of judges in a family court and pains and pleasure that give insights to writers and composers.

Social reality is also the natural source of action for it combines intentionality—desire and wanting—with the need to hold consensus while attaining functional goals. Those with a social preference both want to make changes and to maintain shared values. There is a deep ambiguity in the social reality, for while the reality is in the shared values, each individual has a power of will to make their own choices. Thus, only in total consciousness of the community can every choice by the individual be in tune with values of the whole. Every act has an ethical implication. There is always a tension created by the feeling that anyone acting or holding values at odds with the community is endangering its existence. This ambiguity, and the failure of pluralistic reification to converge on a single reality, are central qualities of the social reality. Maurice Friedman epitomizes the relations among those with a social reality:

> The mystery of word and answer that moves between beings is not one of union, harmony, or even complementarity, but of tension; for two persons never mean the same thing by the words they use and no answer is ever fully satisfactory. The result is that at each point of the dialogue, understanding and misunderstanding are interwoven. From this tension of understanding and misunderstanding comes the interplay of openness and closedness, expression and reserve, that mark every genuine dialogue between person and person.
> (Friedman 1989, 10) §

This is the view of the social realist, the belief that reality is a property of the present and remembered community. It will remain as ambiguous as are the boundaries of that community and as inarticulate as are its members.

Social reality has a poignant quality the source of which is made visible through this model of reification. Feelings are valued, that is, evaluated, only through sharing with another. This calls for conceptualizing feelings, an act of delimitation that separates the observer from the feeling of the observed person. Thus the very

57

act of communicating feelings separates, even alienates, one from the other. When those involved anticipate the inherent alienation that occurs in talking about pain or joy or loss, they often avoid articulate communication to search for empathy via a relational communication that does not depend on language. They preempt the conceptualizing by offering: "I know what you are feeling." which is often followed by the rebuff: "How could you know?" This, in turn, may lead to feelings of guilt, for one cannot answer. The social guilt is existential.

I have given a prototypical description of a social. Those holding other realities would see the socially based person differently. Those with a strong preferences for either the sensory and unitary reality bases would have trouble with the willfulness of the social assertions. The sensory bias finds the social reality to be empty. Its definition of 'matter' lacks substance, its emotionality is ephemeral. People of a strong unitary bias find the social prescription of value leads to heresy and thus those advocating social reality are a threat to the monistic truth of the unitary community. This source of conflict comes up repeatedly in the following chapters of this work. The mythic person, also committed to belief in a degree of free will imagines the social beliefs to be alignable with theirs.

MYTHIC REALITY

> His mind bloomed in the most far-fetched and beautiful fantasies, and he believed to be fact what was merely beautiful. He believed it with such a lively faith, with the faith that engenders works, that he decided to put into practice what his folly suggested, and by sheer belief in it he made it true.
>
> *Our Lord Don Quixote* (Unamuno 1967, 29)

Calling up Don Quixote as an archetypal mythic personality intimates that the mythic reality provides surprising insights into the diverse ways in which we construct reality. It is the least codified of the four realities and remains the most mystifying. The behaviors of a person with a mythic worldview may seem too bizarre to 'matter.' Yet if we are to understand the evolution of language, the emergence of logical thinking, of creativity, and the behavior of great leaders in almost every field of human endeavor, we need to understand the reality that arises from the monistic presumption joined with that of free-will, volunteerism.

The definition of the category itself is seemingly self-contradictory. First, it holds the primary belief that the world is one, that everything is connected, monistically. According to the psychologist Lawrence LeShan, "there is no difference between perception and symbols; objects and name, and between in here and out there." (1976, 85) Second, there is the belief that reality is a product of one's free choice. The two combine to imply that the mythic person alone makes up the world in which he lives. I use the singular here as the mythic principle does not accept a plurality of agents.

LeShan continues listing characteristics of the mythic mode:

> All events start with a specific act of will. To explain an event is to show the connection to this act of will which, in itself, needs no explanation and is inexplicable.
>
> There is no such thing as accidental. Everything has meaning and is charged with meaning. Since part and whole are one, to understand the smallest part is to understand the whole and visa versa.

The phenomenologist, Edmund Husserl, points to an ideal mythic construction of the ego:

> If I... refrain from doing any believing that takes "the" world straightforwardly as existing—if I direct my regard exclusively to

59

> this life itself, as consciousness of "the" world—I thereby acquire myself as the pure ego, with the pure stream of my cognitions. (1977, 21)

In the extreme, the mythic person creates everything in his world, objects, time, people, the universe itself. The philosopher sees it as solipsistic; a therapist may identify it as schizophrenic; and the world may pay homage to a powerful mythic for his or her artful creativity and charismatic leadership.

If I were to speak from the mythic view, I would say (to myself, of necessity): "All the world is my creation; you, my readers are of me; I people the world, I create its phenomena, and I assign it in time and locate it in space—which concepts themselves are given meaning only by my thought." Bradley expresses this view in writing, "I cannot transcend experience and experience is my experience. From this it follows that nothing beyond myself exists; for what is experienced is the [self's] state." (Bradley 1966, 218) Experience and my creation are indistinguishable, so that which exists does so because I gave it meaning by volition. In the extreme, the mythic person creates and lives within his or her own world. The noted anthropologist and system thinker, Gregory Bateson notes of that aloneness: "In solipsism, you are ultimately isolated and alone, isolated by the premise that *I make it all up*." This contrasts to the sensory belief that one becomes "nothing but a metaphoric feather blown by the winds of external reality. … Somewhere in between these two is a region where we are partly blown by the winds of reality and partly an artist creating a composite out of the inner and outer events." (Bateson 1991, 223) This intermediate place is wherein we experience the mythic's power and creativity.

The mythic mind provides the essential realization, at least for the contemporary Western mind. It is responsible for the naming and symbolizing—that is, it extracts 'stuff' from the void to form the objects and events that the rest of us see constituting the world—these are Alfred North Whitehead's 'prehensions.' In a less philosophical turn of phrase Whitehead's philosophical colleague, Bertrand Russell, labeled the objects and events as 'egocentric particulars,' recognizing the mythic origin. As a by-product of supplying objectness, psychologist Michael Mahoney (1991) suggests objectifying contributes to our sense of personal 'identity.' We naturally reflect on ourselves as having the power to create ideas, objects, and the names by which we project these creations into our communities. At a societal level, persons of a mythic mindset provide symbols and metaphors that become our poetry, the images that become technological invention, the fonts of dogma, for as Bateson notes "the truth lurks in metaphor." The mythic's charisma has led whole populations to grand achievements and into dark abysses. It is no wonder that those of other realities hold them alternatively and simultaneously, in awe and ridicule.

The mythic operates at the edge of chaos by the more or less choiceful freedom from the constraints of the alternative realities. We see a genius as a creator of symbols and ideas, released of the presumptions that hold persons of the other reality beliefs. In a schizophrenic extreme of mythic behavior, we see ideas arising through their 'play' with individual realities, occasioned by their loss of connection with a more complete worldview. (Sass 1998) The moment we think of people who act as though each sees him or her as the only existing being, we sense the presence of madness and/or greatness. In one mythic type, we see a recluse not wishing to deal with the world; in another a figure striving to remake the world. It

is clearly the world of willfulness and often introversion, but also of narcissism and monomania. (Maccoby 2000) Ahab, the hunter of the great white whale in *Moby Dick* epitomizes this extreme of the mythic personality.[4] Yet in spite of their deviancy, the great leaders of the world—the religious charismatics, painters and architects, impresarios, movie moguls, and megalomaniacs—are dominantly of the mythic worldview.

Unamuno speaking through Sancho Panza, the devout squire, summarizes this way of being:

> That's the way, My Lord Don Quixote, that is the way of naked courage, insisting aloud and in the sight of all, defending one's claims with one's life; that is the way of creating any and all truth. The more one believes in a thing, the truer it is believed, and it is not intelligence, but will, which imposes the truth. (1967, 142)

So Sancho Panza, the realist, was intrigued by the unreality of his Knight but he must keep a distance from the enchanter. Other's responses to the mythic personality are similarly divided. Those of a unitary belief may be totally captured by the 'word' of the charismatic, or violated by the heresy of his mystical pronouncements: adore them or burn them at the stake. Those of a social reality find meaning for their own lives in the mythic's image of reality, in his poetry and dramatization. Or, they are insulted by the egotism, by the inference that some one person can speak for the rest.

Unitary Reality

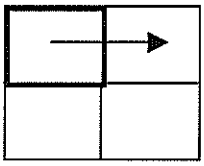
> Our experience justifies us in believing that nature is the realization of the simplest mathematical ideas. ... With them (natural laws) it ought to be possible to arrive at the description, that is to say, the theory, of every natural process, including life, by means of pure deduction...
>
> (Einstein 1934, 3)

For most of recorded history, the unitary belief system, deterministic and monistic, has dominated human societies. Einstein believed in the unity and that all of life could be seen most truthfully through the view of universal law. It is in this reality that we express spirit and ritual, religion and law, morality and mathematics, the theoretical sciences, existential being, and even the high arts of classical music. It is the reality by which humankind regulates itself, articulately by law, holistically by the spirit, and driven by morality. The unitary reality is familiar in daily life as the belief system through which we establish roles, form organizations and political states, authorize and forbid actions, and interpret the eternal universe. Its generalizable characteristics are order, consistency, and conservation. Authorized interpretation of the writ and the machinations of bureaucratic regulations decide moral truths. For its devotees, there is freedom from choice, from time, and from doubt. In the unitary mind, one is never alone.

Of the four types identified by the polarities of agency and plurality, the description of dominantly unitary people is the least homogenous. There are three radically different types within this quadrant; the differences arise according to which reality realizes its substance. The diverse observations of a unitary person or group that are realized within sensory, social, and mythic sources produce remarkably different types: observing from the (pure) sensory produces a holistic mode; observing the social produces a moralistic mode; observing from the mythic produces an assertive authoritative mode. To subsume all these images into composite blurs important differences in the way that the belief in the source of reality held by the observers. Thus, I characterize the sub-types without attempting an over-all image. This procedure does not totally solve the issue of

description for I induce my own mythic-social bias just as each reader will introduce his or her own biases.

- **The Holistic mode:** Unitary realizing in the Sensory



The holistic image arises in a person or culture when they choose to find differences in the sensory world; that is, they use the Buddhist's 'rupa' (Chapter 2) and form from them hypotheses of the existence of a field of qualities. When there is an appearance of 'blue,' one hypothesizes there must be a field of blue. And when one recognizes there is also a quality of red, then one may hypothesize a field of color, and so on to higher levels of generality. Such fields generate, by induction, an image of a whole cosmos, an encompassing, unitary wholeness, rich in quality yet free of boundaries and limitations.

The elemental sensory process that produces an awareness of a difference in what we identify as an indication of a quality, color, pitch, odor...□. The unitary mind hypothesizes that the difference is an indicator that there is a field of color, pitch, or odor that it has detected an aspect of the universe that is present anywhere any time. Obviously, those observed differences to which we assign a quality are those that humans detect regularly enough to assume their hypotheses are affirmed. Support of these hypotheses leads to a sense of a universe of qualities, distinctions among which are as incidental as are their observations. As LeShan asserts in this first principle of the unitary reality, they are "part of the fabric of the total of being and cannot be meaningfully separated from it." There are no essential boundaries in space or time; "events do not occur, they are." (1976, 75) Without boundaries there can be no concept of good and evil for to attribute to

64

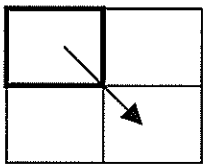
a part means it must be a property of the whole. Similarly, there can be no individual desires as they call for individual existence.

The holistic image is at one with the world of the pure sensory—but not with the *perceived* world that has been objectified by the mythic assertions that separates events and objects from the Oneness.[5] LeShan sees the clairvoyant view of unitary reality as separate from sensory stimuli since it is independent of the constraints of time and space. However, it is more accurately viewed as free of the Kantian categories, for time and space are the tools of perception, not features of the external world.

It is one of the major tasks of meditators or mindful searchers to penetrate the forest of asserted objects and concepts to access the primal universe uncontaminated by the arrogance of the mythic mind. The goal of this pursuit is to find the pre-differentiated fields of the cosmos, variously characterized in Eastern philosophies as *Nirvana* and in Western religions as *oneness with God*. These pursuits we associate with spiritual aims so the holistic becomes a spiritual engagement.

In extreme purity of belief, the unitary world realized through the sensory is the sublime samadhi of Buddhist tradition, the holy ecstasy of John of the Cross, world without time, or the blissful of romantic idylls in which one experiences the transcendence of all dualities. It is the reality of the profoundest simplicity that encompasses the cosmos.

- **The Moralistic Mode:** Unitary realizing in the Social



The moralistic view arises in the dual sense of clarity and safety in *knowing*, knowing what are one's duties, what are the

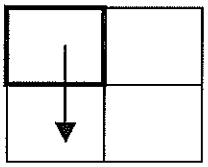
procedures by which one decides what to do, and what are the principles that guide one's life. Rules follow from principle interpreted by authorities. In the belief in the oneness of all, there is no concern with good and evil, nor individual striving or competition for everything is ordered. A unitary person believes the world is well ordered and should be experienced as such. Thus, they envision a world as coherent, free of personal strife, and the pressures of success or failure. There is freedom from stressful emotionality. Their place and movement through life is pre-established, at least in its grand design.

One major source of order is through membership in institutions, government agencies, corporations, schools, and religious organizations wherein the members have defined roles, rights, and obligations. There, one's expected behavior is typically articulated and aims for conformance to the relevant authorities. An observing unitary person will see both those who give orders and those who are subservient and many that do both. The unitary mind frees itself from the stresses of continually shifting responsibilities suffered by those who live within a weakly bounded social community.

This is the ideal image of the world of a unitary person. It might be achieved in a world of "true believers." (Hoffer 1951) It is a place in which there were no sources of doubt or cracks in the Oneness. However, that is unachievable in any contemporary society. As always when a person or group sets up a boundary there is something on the other side of the wall. By definition, what is there will reflect a different cosmos, one that will challenge the sole validity of the espoused version. The social fabric casts doubt on the unity of humankind and challenges the unitary mind to make choices. The monistic principle demands that the doubt and its

carriers be eliminated. The appearance of alternative ideas in the social word leads to ambiguity and suspicion, to efforts retaining a tight hold on the institutions of their established society and vigilance against changes in the rules of society. Conversely, people holding a socially constructed ethic may see the unitary regime mostly as a principled moral rigorism. The social realization of the unitary depends on the boundaries of the society that define the unitary truth system, therefore as the boundaries change the moral code is subject to change, providing occasion for conflicts of the social ethic with the judgments of moral truth, of caring for the individual in conflict with society's laws, and of emotional response to givens of the world. Such conflicts may appear in interactions in Chinese culture between the Confucian and Taoist views.

3. The Logical Mode: Unitary realizing through the Mythic



The unitary reality builds on the ideas, conceptualizations, which it encounters both from its own sources and in communication from other rational minds. Those of a unitary mind sometimes hold the source of the concepts to be transcendental (beyond human origins) such as from religious and mystical texts, or from mathematical ideas. Sometimes the unitary minds believe concepts are generated from human sources, from: charismatic leaders, and religious and political authorities. The unitary beliefs are also realized in the myths that report the founding of a culture and that carry its core values. And in turn, the mythic symbol for the unitary concept may be expressed through further transformations into statues, religious edifices, and urban architecture. The city plan of Washington D.C. is such a socio-sensory realization. Unitary concepts are also created in the mythic

reworking of sensory and emotional experience, organizing and classifying them to systematize their use.[6]

For all the effort to maintain a consistent unified truth source, the logic of the unitary is eventually confronted with its own limits. And beyond those limits, there must be something that is not of this source. The confrontation of the unitary with something that is beyond its boundaries induces a paradox that there must be something beyond the unitary totality. Therefore, in its reification is the seed of the great dichotomy of self and other, light and dark, one and many, and good and evil. The world of 'true believers' never escapes awareness of the 'other.' The belief requires that one establish boundaries that separates one from the non-believer and leads them to label the other as Satan. As is in each of these unitary realizations, the position alerts the believer of its opposite. In this case, the truth of the Believer is always under a self-induced attack by the anti-truth. The evil that the religious leader urges us to expel is essential to the act of belief. The devil is Lucifer, the light bearer. The inescapable quality leads to the emergence of fanaticism, of a drive to deny the awareness of evil from forcing one to make moral choices. Jean Gebser observed that, "only magic [the unitary] knows fanaticism." (1985, 354)

WORLDVIEWS

The descriptions written above appear to presume that an individual or group act entirely out of one or two views of reality. While some people might be devoted to a particular belief, no embodied person could live entirely within a single view of reality. Without the normal awareness of the need for air, water, and food, one would live but a very brief life; and, without some acceptance of conceptual and generative thinking, one could not operate at even an animal level. Everyone

constructs their worldview using all four realities with varying degrees of emphasis. I define *worldview* to be the description of *the image one forms with a particular source of reality.* The relative strength of belief in the sensory, social, mythic, and unitary realities can vary from a balance among the four to an extreme dependence on or near avoidance of one or two. This narrow definition of worldview, while leaving out many useful dimensions, is a useful to provide significant distinctions between behavioral patterns of human beings and their cognitive skills.

There is no way of establishing an absolute measure of balance for individuals or for a particular society. By the very premise of this study, there is no external evidence through which we can establish a norm for any culture or race, gender or individual. The degree of belief is relative to the strength of the other realities or to some socially generated expectation. Thus, balance and deviations must be established from the distribution within the population being observed.

There are some characteristics in the population that we can garner by looking at research done with this and other four-part descriptions. Men, particularly young men, tend to be more unitary and sensory; women tend to be particularly biased toward the socio-relational mode. I find no gender bias in the mythic. Most people have worldviews that use two or three realities easily, and avoid the fourth. Commonly in American society if a person shows is avoidance it is of the mythic or the unitary, although evidence gained in attitude studies and opinion polls suggest that unitary beliefs are basic for more than forty percent of the American population.[7]

An established group of individuals tends to show homogeneity when compared to a randomly assembled sample of individuals. Through the natural processes of group formation and maintenance, members of a group tend to converge over time on a shared worldview. By an intentional selection of its members, by explicit dialogic training within professions and marginalized groups of a society, and by rejecting deviant individuals, most groups converge on a shared worldview. Under pressure from internal or external sources, group members converge on a given reality, often expressed through a set of moral principles, a logic of organization, or in a shared opposition to some alien reality. Such focalizing is a source of power, both to act and to block others' actions. This is a typifying characteristic of fanatical groups, but also of groups creating new enterprises: social, political, or intellectual.

Understanding highly focused individuals and groups is critical to designing change processes and managing conflict. The focused individual and group can be used strategically, but, ultimately the narrowness and rigidity interferes with the full development of the potential in the population. Rather, one looks to work with more diversity in the person or group as so succinctly expressed by Blake's plea for maintaining a diversity of worldviews:

> And a fourfold vision is given me;
> 'Tis fourfold in my supreme delight
> And threefold in soft Beulah's night
> And twofold Always....May God us keep
> From Single vision & Newton's sleep! [8]

Source and stability of the worldviews

For this typology of beliefs to be useful, there needs to be evidence of its ubiquity and persistence over stretches of time, and the relative stability of beliefs in individuals within a culture. To further clarify the appearance and changes in beliefs in a culture, I comment on the interactions of individuals of diverse inbred beliefs to the contrary pressures and traditions of the cultures in which they live.

Reality categories across time and cultures

There is a great deal of historical and contemporary evidence indicating that the typology of four realities and their worldviews is ubiquitous across the world's high cultures. Parallel sets have been described in cultures going back as far as the classic periods of Greece and India and on most continents. Currently, they appear in many settings: in psychological and sociological theories; practices to develop strategies for individual and social change; and, for conflict management.

The earliest four-part model I have identified is the earth-air-fire-water set that appears in Mid-Eastern cultures a millennium before Christ. With imagination, one can correlate these four with the quadrants of the four-reality model. However, as early as the fourth century BC, models were in use that closely match the four realities. The psychological theory created by the Abhidharma Buddhists in India two centuries after the Buddha's life that I introduced in the prior chapter is also a correlate. Plato proposed a sophisticated correlative model following earlier Greek thinking. Aristotle's 'four cause' model maps closely onto three of the realities: formal onto unitary, efficient onto sensory, and final onto social. But, Aristotle's bias toward

an empirical worldview makes it inappropriate to interpret his 'material cause' as a generative source of symbols and ideas, and as equivalent to the mythic reality.

The most compelling of the early models is implicit in the four Gospels of the New Testament, as presented in the opening paragraph for this chapter. Content and word usage in the early English translations indicate a remarkable matching of style in which the Jesus story is told showing a pairing of Matthew with the Unitary, Mark with the Sensory, Luke with the Social, and John with the Mythic. (Lai 1998) The fact that in the four Gospels of the New Testament Jesus' life is characterized in exactly one gospel for each reality is a startling support for the idea that this quadrant map is both deeply held at a subconscious level and is pervasive over time and cultures. Models based on the four points of the compass in traditional cultures also provide a number of potential matches. The interpretation of such compass models within American Indian imagery provides additional insights, although the matches are less sharply established.

There are also innumerable modern examples that show strong correlations. One of the closest fits is to Carl Jung's psychic functions—his, as well as the Buddhist, is a process model. The psychologist Lawrence LeShan (1976) presented a typology in which the description of four extremely creative personality types fit within the types developed here, but more significantly, his 'mythic' is the type from which I derived that type. The French critique, Bruno Latour (1993) wrote of four repertoires that modern and postmodern worldviews recognize as deriving from incompatible ontological positions. Latour notes that in practice, the four repertoires are used together (as are the four realities) to realize the quasi-objects of discourse. Another popular use are the quadrant models that correlate to brain functions and derive

from an empirical bias, claiming that these four correlate empirically with major differences in personalities. Ned Hermann's *Brain Dominance Profile* is a widely used example. (1989)

I organize several of these four-part models into Figure 3.4, illustrating their ubiquitous presence throughout cultures, times, and disciplines. I find support in such additional variations of these typologies such as Mitroff and Kilmann have proposed that use the Jung quadrate (shifted 45°), thus showing characterization of the pairings of four realities. (Mitroff 1978)

Figure 3.4 A Variety of Models that Use Four Similar Modes

THE FOUR MODES

SOURCE	DETERMINED		VOLUNTARISTIC		REFERENCES & COMMENTS
FOUR REALITIES	Unitary	Sensory	Social	Mythic	McWhinney (1984).
BUDDHIST	Samjña	Rupa	Vedana	Samskara	Conze (1951).
PLATO	Reason	Under-standing	Opinion (faith)	Perception of Shadows	Jowett's terms from *The Republic* and Gilbert Ryle (1967)
GOSPELS	Matthew (Lion)	Mark (Ox)	Luke (Man)	John (Eagle)	The parallels were observed and analyzed by John Lai (1996). The metaphors are from *Revelation, 4:7*
LAKOTA INDIAN	North (Buffalo)	South (Mouse)	West (Bear)	East (Eagle)	Storm (1972) writing from a Plains Indian worldview.
JUNG	Thinking	Sensing	Feeling	Intuiting	Jung's *Personality Types,* (1920)
LESHAN	Clairvoyant	Sensory	Transpsychic	Mythic	Lawrence LeShan (1976). Descriptions of exceptional people.
HERMANN	Left Cerebral	Left Limbic	Right Limbic	Right Cerebral	Ned Hermann (1989).
LATOUR	Being	External Reality	Social Bond	Signification and Meaning	Bruno Latour (1991).

There are a number of relevant quadrant models that do not follow this image at all; a prominent example is Stephen Pepper's Root Metaphor Theory (1942), which uses different dimensions to describe a society, all of which are derived from the deterministic worldview. More recently, Ken Wilber devised a grand typology on the dimensions of personal-collective and subjective-objective (1995). While he asserts it to be totally inclusive, it lacks an emotional aspect, so does not present a sufficient alternative.[9] Other investigators, perhaps wary of the convenience of two-by-two tables, use three-part classifications, while others simply see no need for one of the functions, typically excluding the mythic reality, which seems to be the type least understood. For example, the 'organization-structure-process' model of Maturana and Varela maps onto the Principle, Data, and Value quadrants but does not present a need for the separate generation of Ideas. (Varela 1991) Jürgen Habermas identifies a trio of dimensions: power, technical, and social. (1990) There are many models that go beyond our four-part descriptions to present richer tapestries of individual and social variety. For example, the *Myers-Briggs Type Instrument's* displays sixteen types based on the Jung typology, and the ancient Chinese *I Ching* discriminates among sixty-four ideographic types. I take all these models, including that of four reality beliefs, to be heuristics that aid us in understanding personal and social behavior. They are conveniences, not sources of truth about a transcendental reality.

Individual sources of belief

It appears to me that there is little use in asking about the origins of our beliefs about reality. The question respondent's answers are totally convoluted. Every answer expressed is a reflection of the respondent's own worldview, including the

view that I am now expressing. However, I think it useful to consider the empirical evidence about observed biases to provide the reader with a sense of the *stability* of worldviews both within an individual and in social groupings.

There is empirical evidence that the worldviews from which people operate are in part genetic and, in part, patterns learned early in a person's life.[10] For example, extroversion-introversion tendencies observed a few weeks after birth are similar to those observed five years later. Dominant patterns are established early in life and persist for most people at least until mid-life. Of course, some people do change, some gradually, and some sharply due to internal and external events. Traumatic events associated with tragedies or accompanying religious conversations can produce radical reformations of beliefs. I have also seen individual cases and population studies showing changes of belief with important environmental pressures, as we would expect from our understanding of the social psychology of groups. Mid-life physiological changes accompany movement in males toward the social reality and women away from a social bias toward more even worldviews. However, the dominant evidence is that one's worldview is a stable element of one's personality and that we would expect it to stay relatively constant for years at a stretch. Thus, descriptors of worldviews are useful in understanding personality dynamics and usage of language.

Worldviews: Real and assumed

While a person's worldview is deeply constrained by genetic and early childhood training, it may be overlaid by the beliefs of the micro- and macro-cultures in which one lives and works. People are susceptible to group pressures, particularly when working and living in professional groups. Groups which

require considerable training and special education and that have relatively costly conditions for withdrawal, are likely to develop strongly shared worldviews. Prominent groups are the professions of law, medicine, public defenders, and civil engineering; fraternal and veterans organizations; musicians and artists. They all depend on unanimity of response to the outside world. In studies of groups where people form clusters of like-believing groups, people who tend to reinforce each others' beliefs, so what begins as a mild preference can become a strongly dominant persuasion when one lives among people of a similar worldview. Similarly, semi-isolated populations in rural areas, villages, and urban ghettoes draw their populations into homogeneous worldviews that by excluding deviants further reduces the variance. The diversity between and homogeneity within such groups in an organization can both lead to great effectiveness and to intransigency.

There is a second phenomenon—the adoption of a normative sense of reality. A culture may develop a dominant worldview that establishes the reality of commerce, the reality of common discourse, even of political correctness. This societal norm for reality may be accepted for daily conversation, while people maintain their private core worldviews. Michel Foucault describes the occurrence of such pervasive and persistent influence in the larger society:

> Each society has its regime of truth, its "general policies" of truth: that is, the types of discourse which it accepts and makes function as true; the mechanism and instance which enables one to distinguish true and false statements, the means by which each is sanctioned; the techniques and procedure accorded value in the acquisition of truth; the status of those who are charged with saying what counts as true. (Foucault 1980, 1)

77

These qualities are tantamount to producing a worldview regime and support the general use of a uniform grammar. It does not imply that everyone shares one view, but that that worldview establishes the reality for public discourse and eventually for a dominant proportion of an enduring society. In much of the educated West, the paradigm of atomistic cause-and-effect sensory thinking has dominated most public discourse. We stereotype the cultures of such as Spain and Ireland as mythic, attribute a unitary mentality in Russia, and an increasingly social proclivity to portions of American society. The members of these societies may individually and in sub-groups still hold to different sources of reality. Subcultures such as religious orders and business organizations create similar general policies, demanding that a dominant worldview be used in all manners of internal communications. It is more than a set of propositions, but a control on the way its members think and operate. Empiricism (unitary-sensory) is such a general policy in the United States today. In academia, whole social science departments require their members argue only from a social constructionist view (social); economists are out of favor if they argue against a pure market economy (sensory-social). One grammar serves all, but not equally well. Individuals maintain their own deep beliefs about the source of reality. Some ignore the conflicts between the worldviews; others find it painful and chose defiance of or eventual separation from the culture's general policy and dominating constructions of reality.

SUMMARY

I make three major claims in this chapter:

- There are four distinct systems of belief that humans use to understand and operate with reality.
- The beliefs are relatively stable over a person's life and they are resilient characteristics of a culture.
- This specific set of beliefs has appeared in cultures all over the world over all recorded history.

"My feeling is that while we should have the deepest respect for reality, we should not let it control our lives."

The engine of this conjecture is the process by which the mind makes the world *real* for our conscious minds. The model maps approximately on an ancient Buddhist psychology that elaborates the belief systems of individuals into a full model of a four-part process of reification.

It is a generative model, not just descriptive. In work reported to date, it has been used to illuminate leadership behavior, interpersonal dynamics, and creativity; to construct a pluralistic methodology for research; to manage conflict, direct organizational and social change, and to establish a base for discourse. The generative quality arises, I believe, through the essential duality of the model in which coming into awareness of any object produces a new construct as a result of its observation. Thus every time one looks at these ideas, or uses these ideas to look at the world, there is a fresh element, a fresh experience. Every encounter

with its ideas generates contrary conjectures. Every development of complex ideas is accompanied by premonitions of the contrary conjectures. This feature produces ambiguity, but in the act of resolving leads to self-awareness.

In the present work, I have extended this catalog of applications to deepen our use of metaphors and develop new methods of constructing grammar and discourse. The disciplines of linguistics, cognitive psychology, and philosophies of the mind in use today are embedded in the cultures built for simpler times. We need new approaches to engage with the emerging complexity. I believe this viewing of reality will provide a requisite heuristic for exploration.

I began the research that eventually led to this book in an attempt to find ways of expressing ideas and issues of decision-making in complex and frequently chaotic environments. That initially frustrating effort has been procreant far beyond my expectations, opening a variety of unexpected applications and solution methods to a wide range of social and organizational issues and now to the means of communicating complex and intuitive ideas and image.[11]

NOTES

[1]. I haven't presented all the sub-variety for a marketing reason: I don't want the reader to stop and translate this work into personality typology as was done with the Myers-Briggs exercise. While that development may be useful to some purposes, it detracts from my larger intent.

[2].. P. Robinson in *Psychology Today,* February 1980, p. 112.

[3]. It is not my issue to argue which variety of social constructionist ontology should be most acceptable to the readers. Rather, it is instructive to notice that the particular variety favored by any author is correlated with the reality preferences of the authors who are attracted to each of the diverse models.

[4]. Slattery illuminates this personality by quoting Heinz Kohut "...who makes the following observation: Human aggression is most dangerous when it is attached to the two great absolutarian psychological constellations: the grandiose self [Mythic] and the archaic, omnipotent object [Unitary]. Underneath the narcissistic wound is the rage for revenge. ... The one seeking vengeance has no regard for reasonable limitations and feels a boundless wish to redress an injury to obtain revenge. Reasoning faculties sharpen, calculation becomes more acute, and the sense of being wrongly injured is heightened." (Slattery 2000, p. 149)

[5]. There is a form of wishful thinking that leads those with a spiritual bent to see in the sciences, particularly those sciences that are expressed through field phenomena and mathematics, as a route to a spiritual holism. I see this as a self-deception for the sciences follow the organized perceptions not the raw qualities of the environment. The sciences provide a façade that actually blocks the way to deep awareness and spiritual oneness.

[6]. David Rosenthal describes such realizations as higher-order thoughts (HOTs) in a theory of consciousness quite parallel to the model I am presenting. (Rosenthal 1991)

[7]. While the strong appeal of certainty and freedom from choice indicates a belief in the unitary source of reality, it may be that a portion of American society and a much larger one of less developed cultures are more properly viewed as holding a *traditional mindset.* They have not differentiated the ideas beyond what Gebser (1985) calls the 'magical' stage of cultural development. I have not investigated what distinction should be made between traditional and unitary.

[8]. From a letter to Thomas Butts in November, 1802.

[9]. See de Quincey, in *Jour of Consciousness Studies* December 2000 for the sources of this critique.

[10]. Evidence is reported that novelty seeking, associated with the mythic and mythic-unitary behavior, is associated with a particular DNA sequence, D4DR. (LA Times 1/2/96). This is but one of many recent reports of physiological sources of psychological behavior.

[11]. Earlier studies have shown the application of the four realities model in a variety of fields:

- Personality difference, following Lawrence LeShan. (1976)
- Leadership and followership interaction. (McWhinney 1997, Revised ed.)
- Creativity: Maxine Junge (Junge 1992) explored different forms of creativity using the four realities model and McWhinney explored the conditions that support diverse creative styles. (McWhinney 1993)
- Neuro-Linguistic Programming. Peter Young has built a new foundation for NLP based on the four realities. (Young 2001) This is the first application to grammar and communication.

CHAPTER 4: PLATFORMS OF DISCOURSE

> About thirty years ago there was much talk that geologists ought only to observe and not theorize; and I well remember some one saying that at this rate a man might as well go into a gravel pit and count the pebbles and describe the colours. How odd it is that anyone should not see that all observations must be for or against some view if it is to be of any service.
>
> Charles Darwin (1861)

(THIS PARA HAS TO BE REVISED FURTHER)

Years ago I started seminars students in system theory with groups of twenty or so with a lesson in dancing, using the "Arthur Murray" linear method of 'position-step-position.' It was slow going but after half an hour they had learned the basics and a complex sequences of steps that make up a ballroom dance. They were slow to put the steps to the music.

as synchronized movements beginning with simple harmonious movement. Even the most uncoordinated formal adults got 'with the flow' in the two or three hour session. In the afternoon I restarted teaching a different dance withThey had the theory as Darwin required. They had embodied learning of the foundations of system thinking interconnectedness and form. The sessions also brought to their awareness these elements of human engagement—coupling and planning—that operate at the individual neurological level and the parallels in

interpersonal communication. From there the students could develop application in linguistic structure and social processes.

In this chapter I expand the description of the ontogenic process by which systems—persons or groups—reify their worlds and of the structures that evolved in *homo sapiens* through which we build out cultures.

NEW OUTLINE

1) Reflections on Realities & Brain

2) Structure of the mindbody.

3) How do I choose to understand the environment? General Rule. Other parts/realities inside brain.
[Both of these introduced in Chapter 2.]
--Metaphoric
--Chaining, the process by which a choice is made: what *DS* is selected to 'interrogate' the environment. Difficulty in answering this question
--Mirroring (Relationship of Action & Hypothesis that results in observation)

4) Choices depend on reality makeup of individuals. Specific rule applying to individual. How do I listen to the world?

5) Platforms of discourse.

6) Reality Dominance

--
NEW MATERIAL FOR THIS CHAPTER

Begin the chapter with reference to the development in Chapter 2 of the ontogenic base

brain structure,

Arbib's model showing the appearance of a number of gestalts that get bound together, the choice of hypotheses of what is out there to be seen and dealt with

Begin with the question what to listen to?

SOME IF THIS MATERIAL COULD COME BEFORE CHAPTER 3

Paths of Realization in the human mindbody

I propose that people construct what was real for them by observing experiences, images and ideas from the worldview of that source. For example, a sensory experience would be viewed one way from an emotionally based worldview than from cognitive (unitary) source. A human observer might receive an experience in two to or three distinct forms, as a feeling as a new idea, as an example of an idea already established in one's mind. It seems improbable that one could be conscious of any of events within a single source; 'pure thinking' might involve only abstract ideas as when operating with logical rules or mathematics, yet ???

I would now label that observing as the ontogenic process described above.

Ontogening in the human mindbody

The remembered *ffl* is chosen out of that portion of the mindbody that is dominant for the person at the moment. So for example, a person (or other organism) dominated by the emotional view would experience a phenomenon only in terms of the positive or negative emotion it chose to observe[1]. Alternatively, a strongly cognitive people would assert that what was being observed was something already described and labeled. But given our neurophysiological knowledge of the mindbody this is too simple; we would have to have already decided emotionally that we wanted to notice the

phenomena, so the selection must have at least two stages involving three of the realities, the sensory, emotional and cognitive. (Figure 5)

FIGURE 5: PATHS OF REALIZATION

Show paths from source to sensory

a. Social-Sensory

b. Cognitive-Social-Sensory

(this is the place for the Arbib model)

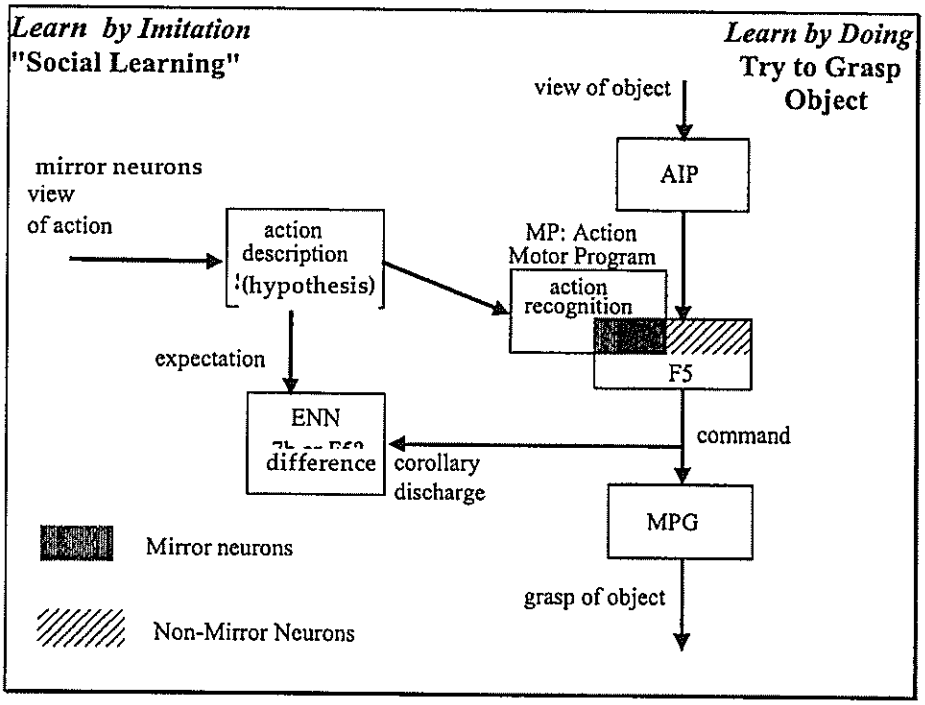


Figure 6. An integrated conceptual framework for analysis of the role of F5 in grasping. The right hand, vertical, path is the **execution system** from "view of object via the motor pattern generator for grasping a (seen) object. The loop on the left of the figure provides mechanisms for imitating observed actions in such a way as to create expectations which enable the visual feedback loop to serve both for "social learning" (i.e., learning an action through imitation of the actions of others) and also for (delayed) error correction during, e.g., reaching towards a target. It combines the **observation matching system** from "view of action" via action description and action recognition (mirror neurons) to a representation of the "command" for such an action, and the **expectation system** via the expectation neural network (ENN) to the motor program for generating a given action. The latter path may mediate a comparison between "expected action" and "observed action." (Arbib, 2002. Note: Description was slightly simplified for the less technical context.)

MATERIAL TO BE INSERTED SOMEWHERE:
I have to have a process for generating verbs as well as nouns and descriptors. (It has to be simple enough to not get shot down by linguists before they get on to other ideas.) I think it is in seeing the choice of hypothesis as the mindbody initiator of action that we come to name the action by grouping a series of actions into a class of actions, e.g., 'to swim' evokes an act that produces motion through the water—the binding problem. I show in the platforms discussion that the reification of a hypothesized idea is done by acting on (from) that idea. Thus nouns are the generative ground for verbs. I will discuss the use of little words to establish boundaries and power relations, thus of grammar and organizational structure (perhaps some ideas about computer programming.)]]

How do we work from diverse views of reality organize ideas for presentation, and reduce conflict among individuals and groups? How do we engage to gain social coherence and shared meaning? How do we find the most useful language for settling disputes when the parties come from diverse beliefs about reality? I argue here that we must negotiate across the realities when entering a dialogue and facing differences, recognizing the role of power, the needs for conflict resolution, and the games that are played among participants to attain goals defined in terms of their diverse realities.

David Bohm, physicist-turned-philosopher, suggested that before a group focuses a discourse on some issue, that the participants have to dialogue about discourse and explore the vehicles that they will use to come to a shared understanding and mutual trust before confrontation of their issues (Bohm 1995) Bohm suggested that a discourse should begin in a dialogic space where the participants are "not going to decide what to do about anything" except how to

"communicate coherently." (Bohm 1995, p. 17) Though such a preparation the participants gain an awareness of how their diverse modes of thinking produce the differences they face; they need to frame their approaches to working the differences. Finding an appropriate communication approach is not easy. Discussing a topic without knowing the source of their difference typically ends in a power struggle that shuts down dialogue. Bohm notes that whenever a discourse has a definite purpose, it is limited by assumptions relative to that purpose and by those who the purpose serves. But given an awareness of that limitation, the participants can search for the basis of disagreement so they can agree on what they disagree about. Exploring the arenas of disagreement will give us a more effective approach to building coherent discourse, than simply communicating coherently.

Bohm's ideal for initiating a dialogue without confronting the overt purpose appears as a useful first step in resolving issues. But viewed more carefully, a pure dialogue is a vacuous exercise. Bohm's dialogue, by definition, denies engagement, even confrontation at the most elementary level. This non-confrontation implies the vacuousness of such a convention. Agreement can be achieved, but it is about nothing, not a thing—it has no matter, no energy. For a dialogue to have substance there needs to be confrontation of worldviews through which ideas, feelings, and observations are realized. If a dialogue's outcome is to have an impact on the world it must work with processes of realization and thus confront different belief systems.

Ideally, a discourse proceeds as negotiations through which shared meaning is established. Bohm considered the first essential step to be establishing trust and a common ground that allows each participant to be heard. Ideally, the

common ground will be the rules that establish what is true or valid, in other words, what is real for the participants. As discussed in the prior chapter, the matter of a discussion is established by the confrontations between beliefs about the sources of reality. What is valid, true, or real in a discourse differs with the fundamental beliefs of the participants. A dialogue aims to develop concurrence on rules of exchange between mindsets that hold different constructions of reality.[2] For example, the theoretician must concur on the rules of measurement in dialogue with the empiricist—as Darwin observed in the above epigraph. So also the mythic writer must establish his logic, and lovers find their own reality. The rules of correspondence form the grammars though which we notice events, ideas, and sensations, and come into consciousness. Through confrontation between realities we both reify and come to know. We establish an *ontology* and the *epistemology* of our discourses.

In the prior two chapters, I presented a general approach to realizing ideas, images, and feelings to enable their enunciations. Here, I consider forming coherent discourses and describe the properties and rules of the arenas wherein discourses are conducted. These steps take place in arenas I label *platforms of discourse*. The platforms serve as the grounding for every type of discourse, those that lead to accommodation of differing views, as well as those that support the emergence of new understandings. The platforms are arenas of engagement, and conflict, for example, between an empirical observer and a theorist, or between a moral position and a social ethic. Discourse begins in disparity; the dialogue conducted on a platform enables resolution. The major focuses of this chapter are on characterizing the platforms and working with conflicts that are at the core of realization and are inherent in the existence of different sources of reality. I

suggest that these conflicts are never fully resolved. Every dialogue ends with a degree of ontological uncertainty.

Engagements between different worldviews not only materialize our reality, they also provide the tools for articulating knowledge, for establishing vehicles for gaining meaning from utterances, and for providing the grounds for exploration beyond those that have already been articulated. I expand the focus on the modes of creating alternative worldviews to show parallel forms of knowing; the scheme supports the idea that there is a common base for ontology and epistemology, an idea that has been promoted on and off ever since Aristotle's time.

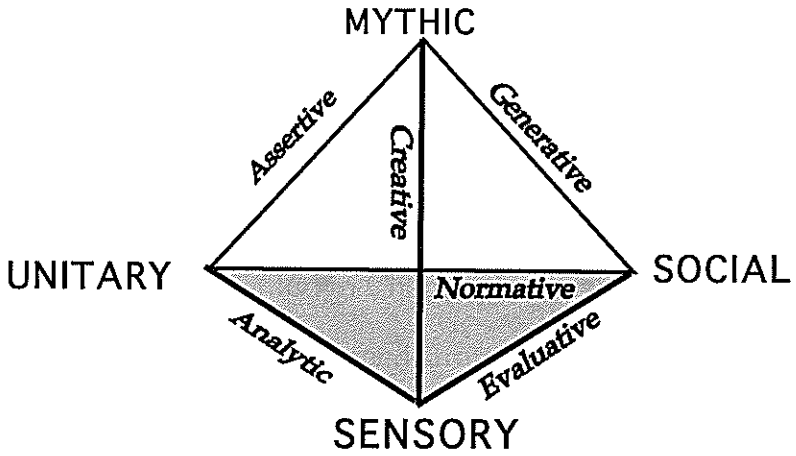
THE APPEARANCE OF REALITY SOURCES

The appearance of reality follows on engagements between aspects of an individual's mind or different people's construct of reality. A full sense of reality is achieved when an actor [prehends]§ the datum of one reality with a second reality, as described in Chapter 2. Without such prehensions, all is ephemeral. Prehensions take place on a platform of discourse where a function of one reality substantiates stuff of another. Initially, realizations may be weak, simple speculations that need to be reinforced by successive confrontations until they become established patterns or rules of engagement on that platform. These rules are the processes through which images and words are selected and a dialogue flows. I make the definitional assumption that rules, and thus grammars, operate on a single platform, thus involving only two sources of reality in well-formed § propositions. Introducing projections from a third source requires a far more complex set of rules than we can typically manage in any single proposition.§ However, in normal discourse we call on more than one platform thus changes in

logic and worldviews that calls on dialogical skills associated with gaming and conflict management. As I commented in Chapter 2, the rules of grammar are not sufficient to convey such ideas. We also need strategies of engagement.

The menu of realities developed in the prior two chapters asserts that we use four sources of reality beliefs and that realization requires the interfacing of pairs of beliefs. There are six pairings and thus six platforms, as illustrated on Figure 4.1.

FIGURE 4.1 SIX PLATFORMS OF DISCOURSE



The figure is in (properly viewed as a 'solid.' Its dimensions are a measure of awareness. So its 'shape' is a description of one person at a moment reflecting his or her capacity to make distinctions.

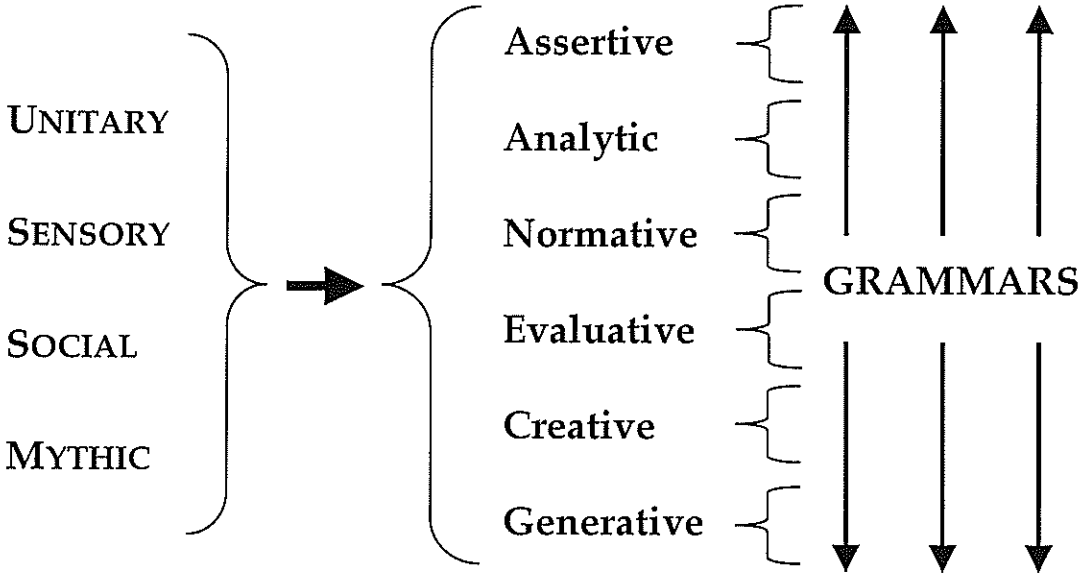
A platform of discourse carries a realizing process based on confrontations among parties with different beliefs in the source of reality: unitary, sensory, social, and mythic. For example, (Get better example for a practical reader) the impact of a gift to a bride is likely to be *assertive,* bringing an emotion about the object not accessible to a wedding guest. § The bride's meaning finds its closest interpretations on the *generative* platform; the guest is more likely to be emotional, having an evaluative interpretation. In a second setting, a conversation between a gardener and a botanist would take place on the *analytic,* platform with the

gardener observing from a sensory view and the botanist drawing on theory based in *unitary* reality, as Charles Darwin required. Other platforms of discourse would appear in dialogues in a church service, procedural battles on the floor of a legislature, the metaphors of a poet, or the internal dialogue between a person's emotions and the concepts used to express it. Meanings are contoured by the views of the participants to the dialogues.

The platforms are the sites for activities that create images of events and objects. The platforms are the arenas where reality is felt, created, organized, and projected, either into a public world or reinforced within our neuro-physiological networks. They provide places that give structure within which to specify meaning. A meaningful exchange presumes a coherent set of rules that I define as a *grammar.* And the grammar, in turn, is expressed in the vocabulary of the particular discourse. Proper grammars conform to the limitations of the reality beliefs on which they formed. A set of rules that does not conform to the reality constructs will produce ill-formed propositions, leading to contradictions and ambiguities in an exchange. There is no limitation to the number of grammars (or sub-grammars) that can operate on a platform so long as each conforms to the operative transformations that relate the constituting pair of reality beliefs.

The logical structuring of the scheme of realities, the platforms of discourse, and their myriad grammars is displayed in Figure 4.2

FIGURE 4.2 THE STRUCTURE OF REALITIES, PLATFORMS AND GRAMMARS



The figure illustrates development of grammars: projecting images into reality creates the platforms of discourse; negotiation between the participants to the discourse specify the rules of discourse to be used thereon, thus producing a more or less stable set of rules we call a grammar. Arthur Koestler, writing in the 1940s, used the term, 'operative fields' to identify the "the permitted type of associations and to inhibit all others." (1949, p. 40.) We can specify innumerable sets of rules on each platform that form grammars, that is, fields of sub-grammars. In familiar conversations, we are likely to move back and forth among a variety of these sub-grammars. In formal discourse, it is likely that we will stay on one platform with few grammatical variations to forward a discussion. For example, in a discourse about history, one should stay on the

analytic platform; emotional elements are formed on the evaluative platform and would bring ambiguity into the historical discussion.

Each platform is an arena for dialogue between parties that hold two distinct views of the source of reality. The exchange between the reality views produces a position, a statement of what is, whether this is a new principle, an observation, feeling, or conceptualization. In a typical discourse, one or the other reality is likely to prevail. For example, in a conversation involving the mythic and unitary realities on the assertive platform, if the participants with mythic views are persuasive, the realization will form an assertion; if the dominant force is unitary, the realization will restate a given position or dogma. The dialogue may proceed as a power play between the *polarities* of assertion and established dogma. It is similar with each of these platforms whereon we engage in dialogues involving a pair of realities. This view of reification posits a fundamental dialogic process present in every attempt to concretize our world. In some arenas, particularly the analytic platforms, reality has been nicely corralled. There is a well-formed theory of measurement that arbitrates between the theory and the data. However, we expect a different experience of dialogues built on the generative platform, one that may produce a "continuous renovation and individualization via stylistically unreproducible utterances. The reality is in its generations."[3] For example, Creole languages emerge as practical responses to the need of a population to conduct the various commerces of life. They operate to a larger degree on the evaluative platform than do the established languages of their cultures. Some uses and characteristics of the six platforms are displayed in Figure 4.3. Note that each of these platforms uses different truth systems and validation processes, thus

extending the range of permissible grammars well beyond the analytic models that are the focus of most grammatical studies.

FIGURE 4.3 CHARACTERISTICS OF THE SIX PLATFORMS OF DISCOURSE

Platforms of Discourse		Polarities	Descriptions	Disciplines
I	ASSERTIVE M-U	Assertion ↕ Dogma	Assertions confront existing structures enforcing a new dominant pattern, or reinforcing and extending the existing rules.	theory construction, theology, mathematics political dogma
II	ANALYTIC U-SE	Theory ↕ Empirical Fact	Actions are defined by logical rules and, conversely, rules are sustained by observation and judgement of correspondence.	empirical sciences, craft practices
III	NORMATIVE U-So	Morality ↕ Ethics	Discussions play between the values and principles of the participants, settling if the two overlap.	political compromise, negotiation & conflict managing ethics & morality,
IV	EVALUATIVE Se-So	Materials ↕ Values	Exchanges and relations between people trading off things and opportunities for receiving and giving value.	human relations, market economy, communications, management
V	CREATIVE M-Se	Pure Images ↕ Pure Sensation	Images give coherence to physical sensation and plans test the feasibility of ideas.	arts, technology, planning, entrepreneurial behavior
VI	GENERATIVE So-M	Community ↕ Ego	Images capture and give coherence to feelings in a cultural context; ultimately forming meaning.	metaphors, poetics, narrative, drama

The above figure displays the polarities of each platform, between which the particular realities are formed. Thus, for example on the assertive platform, the extreme positions are the mythic assertions and the unitary dogma. In practice the prehensions that make any enunciation real are combinations, say, dogmatic limitations on what mythic assertions can be accepted in a discourse. So Copernicus and Galileo limited their planetary theories to "hypotheses," to avoid Catholic sanctions.

Projections shape the platforms

A platform is manifest on any occasion of dialogue. Any expression, public with an audience, or private within one's own thoughts and emotions appears on the surface of a platform. An input is transformed into an enunciation, externally verbalized or internally presented to another mind/body function, by realization (as described in Chapter 2). [[The [prehension appears as the value of the field on that occasion]] Every outcome (occurrence) is a resultant of [projection] of an input according to a particular grammatical rule. I designated this rule, indicating an input from the *i*th reality is reified (transformed) by a function of the *j*th reality §. For example: a sensory observation is transformed by social (emotion) function into a fear response on the evaluative platform; or, a collection of concepts is transformed into a quality by a mythic imposition on the assertive platform. A discourse could equally follow the inverse projection; on the assertive platform, a mythic image can be shaped into a verb or noun or used to posit a new property; on the evaluative platform, the expression of fear can be observed as qualia of the sensory world. In any expression one or the other reality dominates. On the analytic platform the theory dominates the observation or the observation drives

the theory; on the normative platform, the emotions evoke ethical positions, or moral dogmas contain emotions. As in these examples, some dialogues are pervasively dominated by one reality. In elegant work in physics, Einstein and Dirac hypothesized qualities based on mathematical theorizing making no reference to empirical observation; their theories totally dominated observation. In a deeply troubling situation the emotional quality may totally dominate, setting aside other rationality. In other dialogues, negotiations have settled on a preset pattern of reification; in others, the rules for articulating are continually in contention. The negotiations are reflected in the contours of the platforms.

The varying invocation of the rules by the participants shapes (contours) the platform. For examples, a charismatic with devout followers will create a different platform than one used by the participants in a liberal democracy. Generally, the shape of the platform will follow from the enduring forces in a culture such as elementary schooling and the grammars embedded in computer word processing programs.

The platforms support distinct social functions—particularly distinct are discourses in which by their choice of platforms are either *accommodating* or *constituting*. These two modes were noted by the developmental psychologist, Jean Piaget, when observing the early development of children. He labeled them 'accommodating' and 'assimilating.' The first behavior, accommodating, is that which 'works between' to find a common definition, evaluation, or response to a situation to 'get along with.' The second, "assimilation," digests foreign material into one's system to be integrated and understood. For exploring ways of discourse, I replace assimilating with 'constituting' as a more active form of the

mode, to identify creative and constructive approaches in adult repertoires. Each of the six platforms supports discourse in one of these two modes. On three of the platforms, utterances are dominantly *accommodating*:

- The **Analytic** platform is the arena where empirical observations are made to work with theory propositions and the converse. The scientific method is exactly an accommodative process designed to produce a correspondence of theory and data.
- The **Evaluative** platform provides for an accommodation of desire and the sources of satisfaction: a buyer and seller accommodate each other to close a sale, two people agree on how to share a resource and two lovers give each other affection.
- The **Normative** platform is the ground for settling between issues of principles and of social desirability, of the moral and the ethical, and of administrative law and a sense of fairness.

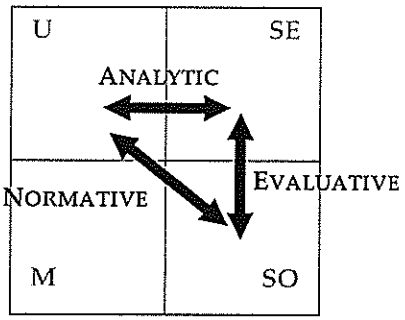
The other three platforms provide a stage for constructive integrations, for creating ideas, material objects, and new understandings. Not unexpectedly, the three constitutive modes involve the mythic reality in which the Abhidharma Buddhists place the function of enunciating ideas and images. The *constitutive* platforms are:

- The **Assertive** platform is the site of asserting and/or maintaining principles, laws, theories, and truth. In a discourse, the participants propose principles and rules to others who will follow the orderly dictums on how on new or existing principles are to be exercised and maintained.
- The **Creative** platform is the engagement between ideation and physical realization, where ideas and materials come together for inventive formation of things and processes, envisionments like plans, and social structures like a team or organization.

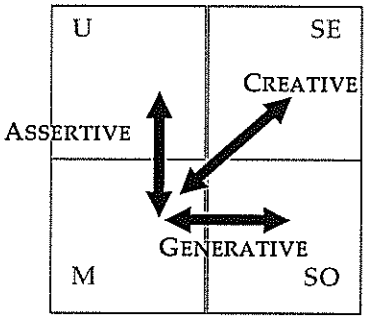
- The **Generative** platform is a meaning-making place, where ideas are valued, chosen, and plotted into the narratives from which a society gains its cultures, languages, myths, and eventually its sciences.

Figure 4.4 displays these two sets of platforms:

FIGURE 4.4 ACCOMMODATING AND CONSTITUTING PLATFORMS



ACCOMMODATING



CONSTITUTING

The accommodating platforms identify the forms of discourse that tend to keep the status quo, perhaps moving it toward some social equilibrium situation or an established scientific paradigm. The constituting discourses add to the culture, they can be both enlivening and disturbing, even threatening the existing society; they are more likely than the accommodating form to introduce novelty. The concurrence on a grammar is generally easier within the familiar ground of the accommodating platforms, than on the constituting platforms.

The model assumes that grammars are formed on single platforms. So long as a discourse is confined to a single platform, the grammar can produce coherent dialogue free of contradictions—although seldom if ever will a grammar approach such a closed logical system of construction. Problems arise when the participants use more than two reality bases by exceeding the defining power of a platform of discourse. The result will be a mix of rules that are likely to introduce ambiguities

and unresolvable statements. Such ambiguities interfere with meaningful exchanges. Multi-platform exchanges tend to be disruptive, argumentative, and unmanageable. Yet for all the disturbance they produce, we typically talk cross platform with grammatical variations. Natural speech will include bits of dialogue from all the platforms. We are told that many disputes between men and women are unresolvable: the women speaking on the evaluative platform and the men on the analytic . In casual discourse, we filter out the discordant noise arising from rogue platforms. But in discourse that is more purposeful, unidentified mixing of platforms is often maintained. To achieve coherence conversants must stay within the logic of a single platform or develop a scheme for consciously and cooperatively shifting the dialogue among platforms.[4] However, since most discussions are not so confined, we have to be concerned with the mixed cases, both to design effective dialogues and to resolve issues that arise when the mix persists.

Structure of a Discourse

Engaging in dialogue presumes that there is an initial fragmentation, small if one assumes a richly harmonized community, but far greater if one assumes that the conversants are individuals and groups from diverse origins and histories, as is to be expected in a modern society. A discourse always involves a trade-off between dialogues that lead to agreement and discussions that increase knowledge of differentiations. There is no discourse at either extreme; it is only in the tension between the expected and the surprising that we communicate. Ideally, we would progressively resolve tensions, by creating agreements from the most fundamental levels, moving progressively toward the communication of information, ideas, or feelings. The sequence:

- The first stage reflects the way the participants deal with reality and the selection of one or more platforms of discourse on which to present their positions.
- The second stage concerns the selection of grammars, which is often accomplished by establishing the discipline within which those involved prefer to work.
- The third task is the selection of the vocabulary of the particular topic of interest. In academic writing this service is performed by referencing other authors' writing; in common conversation it is done by sharing contextual information to get the others 'on board' with relevant meanings for words.

Such a sequence is seldom if ever explicitly followed. More often, a conversation begins with establishing the vocabulary, via the identification of a discipline or context. Conflicts may emerge even with a common context, arising in the style of description and the habits of explanation that participants may use. And even when the contextual dissonance is resolved, new conflicts may arise due to the limitations on expression that are buried in the grammar and the labyrinth-like path to a common rules once this source of dispute is recognized.

Only in the face of enduring conflict will the participants step back to search for a common grammar. In the sciences, the grammars maybe expressed in precise procedures for experimentation. In affairs of the heart, the grammar may be particular to the rules of seduction, trust, or commitment.[5] This search effort will fail if the participants have not settled on a platform of discourse for any particular segment of the dialogue. If the parties adhere strongly to different sources of reality, resolution at this level is not easily achieved. In part, because the participants may not recognize the form of the conflict thus cannot resolve it; and in part, because they have no tools for working at the level of the basic disagreement. To accept and/or give into the other's belief in reality is for some frightening and

for some others, inconceivable. Even when the conflict can be worked its first appearance is likely to produce a power struggle. Thus in important engagements, even where the intent of all the parties is to arrive at a common understanding and compassion, common dialogical practices are likely to induce conflict and end up playing games of power and domination and their description is the essence of stories. (KcKee,) I visit the issues of gaming and power in the following two sections.

Games as an Expression of the Platforms[6]

In Louis Carroll's *Through the Looking Glass,* Alice joined on the Red Queen's croquet court. She found the play most disconcerting. "I don't think they play at all fairly. ...And they don't seem to have any rules in particular, at least, if there are, nobody even attends to them." Alice had assumed the conventions of the games she thought she was playing. Her confusion arose because the game was not croquet, but the game of deciding who will choose the game (and its rules). We all play similar games in dialogue, conversing without knowing the grammar, the rules of this game, that have been chosen for us by convention or manipulation. Dialogue is a game played on at least two levels, the structural level of the grammar and the content. Both have to be chosen and understood to effectively communicate.

We have a common experience of choosing a game board and the particular game we will play. We can chose a checker board, then decide whether to play chess or some form of checkers. With a pack of 52 standard cards, we can play versions of solitaire or poker. So, lawyers chose the laws that will advance their cases; dancers flow among many choreographies; and

scientists play detective games in space and time. All well formed games—even the Red Queen's—are both competitive and cooperative. First, the players must cooperate in choosing the game, then, play by its rules. Dialogues are similar. They need a well-formed set of rules to be used in the exchanges. We often forget that those rules come from a vast range of alternatives.[7]

The platforms of discourse are similar to the game boards. The platforms are like checkerboards or athletic fields in that they delimit a range of possibilities based on some meta-rules. In the case of the platforms, these are the rules of cause, or sequencing of ideas. These delimitations and the opportunities provided by setting rules are made tangible by showing the parallel between games and grammars. So, to ground the 'game' of dialogue in our experience I describe six boards of play that simulate the platforms of discourse:

On the first board (M-U), labeled *assertive,* games and the rules are formulated for games to be played on the other boards, say for playing cards or buying securities. The purpose of first board games is to get one's proposed rules accepted. It proceeds by specifying legal moves and the consequence of each resulting play situation. The games of the first board are the creation of authorities—theories, legal structures, aesthetics, and grammars—all those in which an individual or group presents its orthodoxy. In its pure form, the first board game is like solitaire, an engagement of power for and/or against established principle.

The second board (U-Se), the *analytic,* is the board on which games such as poker, chess, and bridge are played. It is the grassy fields on which athletic contests are held and the laboratory where we test theories and facts. Aspects of war and high finance are also framed as well defined games. Their purpose is to exhibit expertise play within a set of rules and by so define winners. Most of these games are fundamentally competitive yet

are valid only so long as the players conform to the rules. Speech and writing, as we are taught in school, are played upon this board.

The third board (U-So), the *normative,* sets the stage for politics. These games are played in continuing confrontation between the desires (social) of one party and established position (unitary) of the other. The play here is what we often call 'gaming the rules.' The purpose is to gain the right to choose what sort of game is to be played. Jean Piaget, the Swiss child psychologist, observed young boys play the pocketknife game of mumbletypeg, noting that as they matured they spent increasing amounts of playtime trying to enforce changes in the rules to gain an advantage. As they mature they move from mumbletypeg to adolescent testing of their gaming power, then move to adulthood to play political games. On this board, coaches, referees, judges, and team owners argue over what will be the rules of their games. It is the arena of legislators as well as marital partners, market manipulators, and even cardinals of the church. Play on this board is highly visible in the game of establishing new laws and governmental forms following a democratizing revolution. Most games on this board are what James Carse (1986) calls "infinite games" as they have no terminal state in which winners and losers are declared. There is only a continuing sway of power. Each side tries to modify the rules to favor its position, to increase its advantage without driving the opponent or co-player off the field. Driving the other players out of play is cheating, a non-accommodating behavior that abruptly voids play on this board, perhaps with reverting to dominating behavior of first board play.

The fourth board (Se-So), the *evaluative,* is the site of games of *relation* between people in a market place. The players may be lovers carrying out a courtship or merchants haggling over a price, but the game is played wherever there is discourse among the concerns of involved people. The board provides the marketplace in which moves are *evaluations* of opportunities in the service of setting up exchanges where sensory goods are assigned social values. In its

richest form, it is about interpersonal relationships. In its most astringent form, it is pure market economic transactions.

The fifth board (M-Se), the *creative,* is the site for creating sensory images and giving names to these creations. That is, it creates the game board, the pieces and appropriate rules of play. Mythic images give form to the sensory and plans to the mind; the sensory input stimulates the creation of perceptions. In one view, this is the primordial game board, on which engagement itself was created. This is where it all started. The creative board is similar to the first board, but the opposition is nature and its companion, time. It is the domain of entrepreneurs

The sixth board (So-M), the *generative,* is the site for organizing symbols and metaphors to give meaning to a dialogue or to a community through creating stories, poetry, songs, and traditions, for example, by memorializing tragedy and heroic acts. It is a game nevertheless, for the creator is continually constructing and violating conventions to enliven a community of interest and develop a culture, and in turn the community is endorsing and/or rejecting the creations.

The properties of these six game boards are summarized in Figure 4.5. The rules of the games played on each board differ, an accordingly the linguistic grammars that evolve on each board. On each board there may be simple sets of rules, for example, the elegant Japanese game of "Go" is formally specified by about five unambiguous rules, whereas the list of rules for filing US income taxes fill 12, 000 pages and in the fictional 'glass bead' game in Hermann Hesse's *Magister Ludi* is the list is never complete. Rules of a market place (fourth board) may be simple but not well defined and on a creative board (fifth board), the sole rule may be that play may not stop until a novel outcome is found.

Figure 4.5: The Boards of Play

The language-games are set up as *objects of comparison* which are meant to throw light on the facts of our language by way not only of simiarlities but also of dissimilarities. - *Wittgenstein, 1968, p. 50e.*

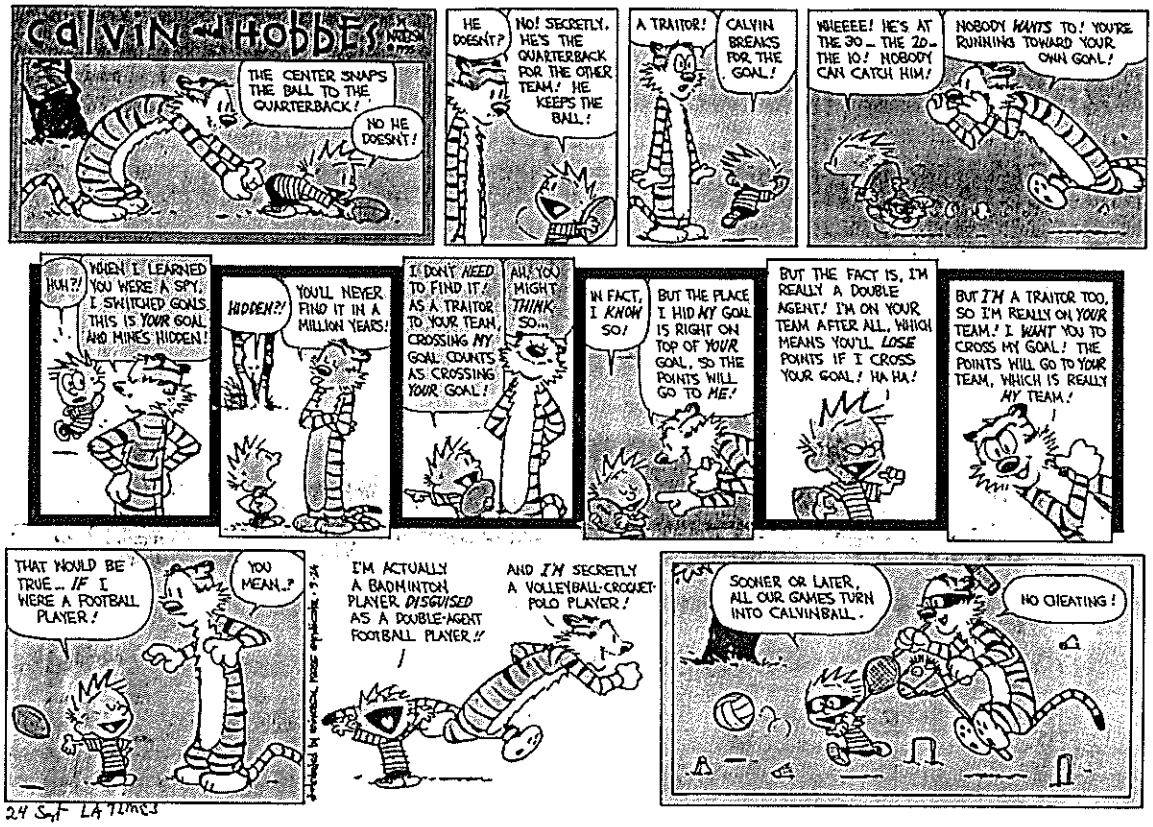
PLATFORM of DISCOURSE	BOARD	GAME	OBJECTIVE
ASSERTIVE* M-U	1st	New Games	Set rules to gain advantage for play. This is a power move through which play on the 1st board designs a game to favor its creator.
ANALYTIC U-Se	2nd	The Game	Play most competently within the rules. Expert action.
NORMATIVE# U-So	3rd	Politics	Work for new agreements on rules is the play in this political-ethical game. In its unending form in social relations and legislation, the objective is to maintain enough advantage to win often but not so often as to discourage other players from continuing the play. A clear win can destroy play on this board.
EVALUATIVE Se-So	4th	Market Place	Assign values and priorities to reallocate resources—to arrange 'wins' by producing a surplus of value for one or both (all) parties.
CREATIVE M-Se	5th	New Opportunities	Explore opportunities in new games. These games are often played against nature, aiming at increasing the resources available for playing any game.
GENERATIVE So-M	6th	New Cultures	Create new meanings; setting metaphors in a culture. A cooperative game, explicitly involving players in the design and maintenance of the culture.

This is a reversal of the first two games from the listing in *Paths of Change* (1997) There the first board is the Analytic, the Assertive is second)

As alluded to in recounting Alice's croquet experience, play on a given board may be dominated by play in a 'bigger' game. In most of gaming we are playing on two boards concurrently. Players of the accommodating games on the second and third boards are dominated by the values and opportunities that are the 'markers' on the evaluative board (fourth board). Accommodations take place in a market. Professional sports clearly illustrate the double play: to win the games to make money. Given that involvement, the focal game can be in conflict with the market. There should be no gambling by players or political manipulation while bargaining for the players. Gambling on soccer is a legitimate game, but not by those on the field. This analysis argues that we should play one game at a time. Games are most effective when they are played strictly within the game's definition and that each game needs to be played consistently within rules designed for a specific platform. These admonitions apply equally to language games of the accommodating platforms.

Games played on the constitutive boards (1st, 5th, and 6th) call for a different awareness. Play is still rule oriented, but often the focus is on novel and unauthorized uses. On these boards, play may go beyond the implicit and established rules of behavior. A fecund strategy is to import rules from other games or boards, a metaphoric route to creating new forms and outcomes. Bill Watterson, Figure 4.6, illustrates the epitome of a constituting game in a *Calvin and Hobbes* cartoon strip. It shows an exquisite use of metaphors in finding the rules and seeing that the players are bound only by one enigmatic rule, "no cheating" that assures the game and their friendship will continue.

FIGURE 4.6 CALVINBALL

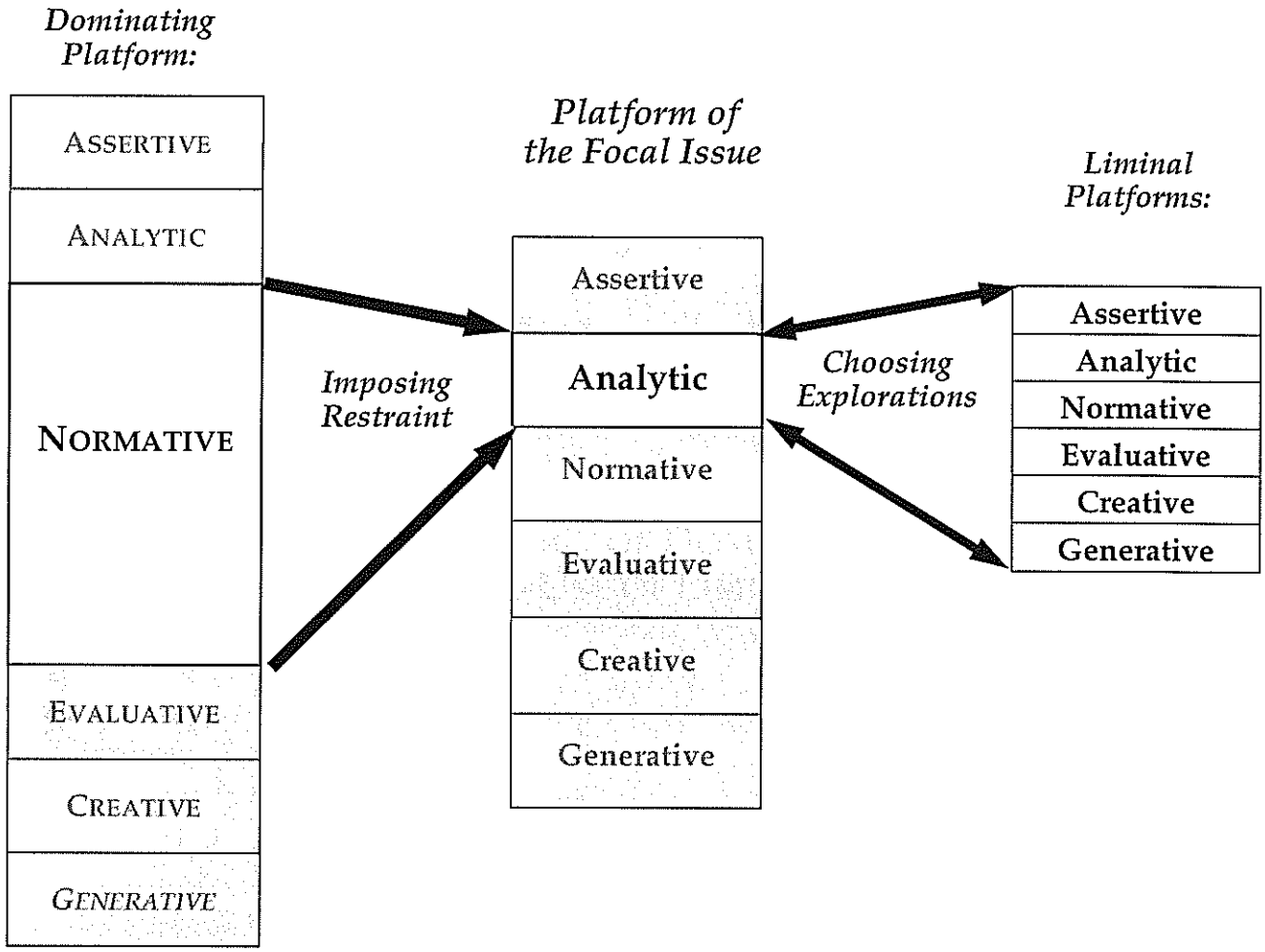


In practice, pure gaming on a distinct board is seldom attained. Motivations drive us to play on multiple boards. We develop skills for identifying the multiple games that are being played out 'in the street' and selecting the game board on which and when each should be used. Selecting the boards on which to play, choosing the appropriate sequences, and deciding which rules to play by is the ultimate game, *the game of games*. This meta-game is a form of diplomacy. There, what we learn as children becomes a critical skill needed for engaging in the meta-game or to be discussed later, third order change.

Dominations and Hierarchies

As mentioned above, discourses and games are often conducted in ways that use two or more platforms, thus different logics and rules of validation. Such mixed sourcing leads to ambiguity and miscommunication unless their use has been structured to establish an aware and intentional interrelation. Structuring the relation among the platforms used in a dialogue allows the conversants to select a given platform for a focal discussion and to introduce discourse on platforms that frame the conversation or tentatively expand the grounds of discourse. Or the structuring may bracket unanticipated and unwanted platforms that would intrude on to the focal discourse. One of the common forms of intrusion is a dominating view of reality manifested in another platform. A conversation might be held on a platform that is subordinated to some unacknowledged but dominating platform of discourse. For example, a dispute over scientific data (on the analytic platform) might bog down repeatedly because it is embedded in a political struggle over the distribution of rights to whatever finding the discourse produces. Thus, there is a shadow dialogue being carried out on the normative platform. By recognizing that the focal conversation is embedded within a second platform the participants can separate them in the conversations and conduct them sequentially and coherently. In this dispute, an initial conversation might take place on the normative platform to resolve the ownership problem, then return to the analytic platform to work out measurement issues. This two-level discourse is illustrated on the left-hand side of Figure 4.7. Here the focal discussion on the analytic platform is dominated by a restrictive background discourse on the normative platform.[8]

FIGURE 4.7: THE IMPACT OF DOMINATING PLATFORMS AND USE OF LIMINAL PLATFORMS



The Dominating Platform limits work on the Focal Platform.

Liminal Explorations bring out alternative solutions for the Focal Platform.

In the same scientific discourse, one person might expand the purview by introducing speculative reinterpretations of the data that appear unjustified or even fantastical. I suggest that this speculative researcher has slipped across a threshold to seek solutions that are beyond the bounds of scientific creditability. He intentionally moves the discourse to a *liminal space* to explore solutions unavailable to analytic thinking. To test the generated creations, he would revert to the focal scientific platform. Exploration in the liminal world is *in the service of* the analytic. So used, the creative platform is properly *subordinate to* the analytic platform, as illustrated on the right-hand side of Figure 4.6. If both parties (or both sides of one's mind) recognize that a subordinate platform is being employed to the main discourse forward, the discussants can join in making this multi-level conversation coherent. This strategy requires both parties recognize that role played by ideas created in the liminal world and what changes are necessary for solutions created to be realized on the focal platform.

Multi-platform discourses are ubiquitous. Almost every focal conversation is a sub-text to issues on a 'larger' platform. Typically some personal, cultural, or legal discourse dominates the problem or issue in the focal platform. In recent years 'socially correct behavior' has come to dominate conversations. All manners of discourse are blocked on under a fear of offending.[9] For example, the use of the male gender with a singular subject has become offensive even though English makes no provision for a neuter subject. More often, when such limitations are shadow constraints on the platform of discourse, the participants self-censor their dialogues. We are often oblivious to the forces that constrain the focal discourse. Many seemingly acceptable dialogues on the focal platform are disallowed due to unspoken dominating rules; they are taboo. Without awareness of the dominating

platforms, the mixed discourses remain unmanageable. Identifying the dominant and liminal conversations is an important step in clearing a discourse of elements that cannot be worked in the service of a resolution. As many people have written following the lead of the German sociologist Jürgen Habermas, every discourse is conducted in the shadow of a power relationship. (Habermas 1984) Every discourse may be embedded in a variety of supra-platforms, often ones that are not apparent to the conversants. By making clear the nature of the power structure, we disclose the confusion and increase the possibilities that a dialogue can be conducted as the participants overtly intend.[10] Most of the arguments here support the need to maintain distinct uses of grammars to assure effective communications. However, there are creative 'misuses' that bring to awareness unseen opportunities. Just as a mix of platforms in the source of words used therein provides the occasion for puns and irony, so images from one platform can evoke new metaphors as the conversants play among the grammars. 'Play' and incoherence have roles just as do logic and linearity.

Formulating platforms provides a space for discourse that goes beyond the common limitation that requires a single logic and the grammars derived from it. The multi-level scheme allows a greater range of exploration without the need to limit the constructions of reality to those of the dominating platform.

Conflict Management on the Platforms

[PROBABLY OMIT THIOSE SECTION – QUESTIONABLE. CONTENT]

The philosopher, Paul Ricoeur writes of a discourse as "the promise, a bond of good faith underlying all communication." (Clark 1992, p. 99) However, given the view that a discourse arises in the exchange between individuals, groups, or

cultures, which are mostly likely to hold different views of reality, it is unlikely that the discourse arises in agreement. Rather the good faith in discourse is developed by establishing rules of exchange, which in turn may be based in a shared belief in what is real. Discourse begins in conflict, but hopefully continues in a hermeneutic cycle of interpretation and reflection that leads toward a base of trust and respect for differences.

My earliest confrontation with complexity in the 1970s suggested we should find conflict at every approach to teaching students about the newly emerging complexities of the business and political worlds. In the study group at UCLA that I mentioned In Chapter 3, § we never resolved those conflicts but we did come to see their source was in the differing beliefs about the sources of reality that we had identified in the world as well as in our planning group. This enlightening finding of the group was that we did not ourselves share a common view of sources of truth, of the laws of science, or the experience of political-economics realities; we also recognized these disagreements are pervasive in Western societies. This was not a new finding, but our work contributed a means of mapping the realities that arose articulated these fundamental differences.

Out of the conclusion that conflict is inevitable in any serious public discourse, I developed an approach to managing if not resolving conflicts. This approach identifies the worldviews of the participants to the conflict and selects the resolution processes that will be most suitable to people or groups coming from the diverse worldviews present in any conflict. This method responds to the conflict assuming it arises from the differences among the parties' views of reality. It assumes that it is difficult for parties to negotiate on platforms they find entirely alien. Each party must have some feeling of working from a

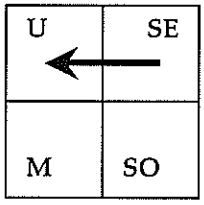
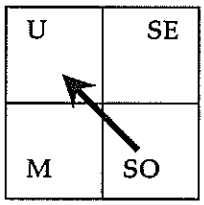
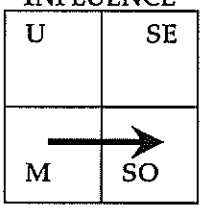
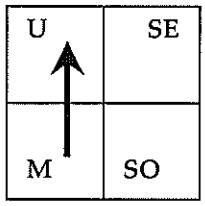
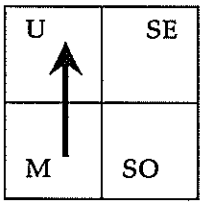
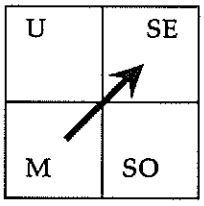
familiar place. The four realities model suggests, for example, that when the parties to the conflict share the normative platform (U-So) the mode of choice for resolution would be different than when they share an analytic (U-Se) or assertive platform (U-M). On the normative platform, the approach would be to negotiate.[11] Alternatively, if the participants are assertive, one would choose a powering model. And if they are analytic, one would chose fact-finding, as these are the familiar places for opponents.

Working from the four reality model produces a different set of resolution strategies than that which is used in current practice and described in the conflict literature. Whereas the four realities model focuses on the reality differences among the parties to a dispute, the typical approach today is to begin with the characteristics of the presenting problem as is that of the Program on Negotiation at the Harvard Law School. It focuses on the resolutionary processes themselves, particularly reconciling interests, establishing rights, and 'powering' a solution.[12] (Ury 1988). Another school focuses on moral argumentation described by Habermas as one in which the "opponents engage in a *competition with arguments* in order to convince one another to reach a consensus." When using the four realities model one considers the reality beliefs to disclose the intrinsic conflicts among the participants before choosing a resolutionary processes. This preliminary consideration leads to a variety of different modes of approaching resolution.

My colleague Tamara Bliss developed the four realities model of resolution two steps further. (Bliss 1996) While investigating how community and non-profit groups attacked positions taken by corporations on issues of environment, human rights, and inequalities, she found that the non-profit groups used greatly differing paths of resolution. The differences could be explained by the group's dominant

worldviews and thus by the choice of platforms on which they preferred to operate. For example, community groups, usually coming from a evaluative base used relational tactics such as boycotts to set public opinion against the corporations. The corporations often had legal resources that led them both by habit and skill to attempt to arbitrate solutions on the normative platform. Clearly in these conflicts, these institutions did not attempt to find a common ground (platform) for resolution. An exception was with environmental groups, often lead by scientists, who tended to appeal to the pragmatists inside the corporations using empirical arguments. This tactic led to mutually attractive solutions as would follow from the disputants' use of a common platform. Some examples of the approaches based in the different platforms are illustrated in Figure 4.8.

FIGURE 4.8 RESOLVING CONFLICTS — ONE PLATFORM

TACTICS TO ENFORCE COMPLIANCE	Mode
Conduct research to produce evidence that existing laws and policies are being violated or are inadequate.	TEST 
Litigate to change laws through judicial reinterpretation of an existing law because it conflicts with core values embodied in the Constitution and Bill of Rights. (E.g., Brown versus Board of Education; Roe versus Wade). This tactic can lead to intense conflict between groups that have conflicting values and systems of truth.	ENCULTURE 
Write emotional articles for the organization's newsletters, magazines, direct mail, and electronic bulletin boards to get members and the public to care about the group's cause.	INFLUENCE  *OR* 
Deliver charismatic speeches that invoke new visions for the future (Martin Luther King, Jr. "I Have a Dream").	ESTABLISH 
Purchase advertisements in newspapers or magazines explaining the group's point of view and urging citizens to take specific actions.	REALIZE 

In addition, Bliss found that the groups often used a dual process to force a resolution. She documented that conflict resolution strategies are often complex, with tactics used serially; e.g., a 'good-guy/bad-guy' pairing that begins with a power play by one group followed by a second group offering reconciliation. The first tactic is threatening in its alienness to the corporate representatives. The second tactic was typically on a platform shared with the corporate opponent.

In a subsequent publication, we proposed that conflicts in which the parties come from two different, but overlapping platforms, are most likely to be resolved by moving the discourse to a third platform, that is, one on which neither party has advantage in orientation or skill. (McWhinney 1997) For example, a conflict between a party that operates on the political normative platform with one that sees the world in evaluative market terms may find that the issue is most fruitfully worked by developing empirical data about the situation and potential outcomes on the analytic platform. This pairing is shown in Figure 4.9A. In a second example, a fight between theorists defending their theory (assertive) and empiricists holding onto a data interpretation (analytic) may be best resolved on the creative platform to evolve a new theory or data interpretation. See Figure 4.9B.

FIGURE 4.9 RESOLVING CONFLICTS: TWO PLATFORMS

Conflicting issues between parties on partially shared platforms are worked on a third platform on which each party has a stake.

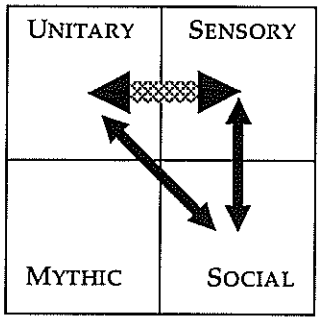


Diagram A:
Politics and Marketing are resolved by empirical factors.

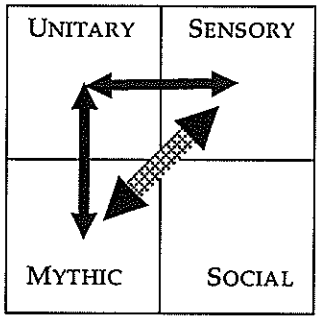
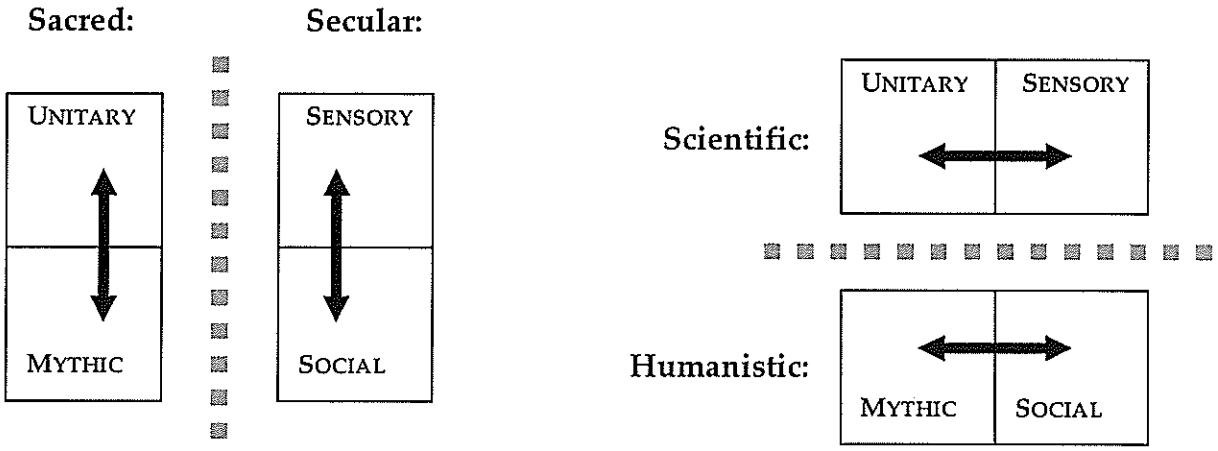


Diagram B:
The conflict between data and theory is resolved by a creative development of theory and/or data interpretation.

The most difficult of cross-platform conflicts to resolve are those in which the contestants share no dominant beliefs about the sources of reality. There are three such inter-platform pairs in which the parties have no arena within which to form grammars of conduct. They might better be called stand-offs rather than conflicts for there are no direct approaches to resolution of the conflict as given. These three are illustrate in Figure 4.10 as:

The Sacred versus Secular.
The Scientific versus Humanistic.
The Artistic versus Moralistic.

Figure 4.10 Conflicts Involving Four Realities

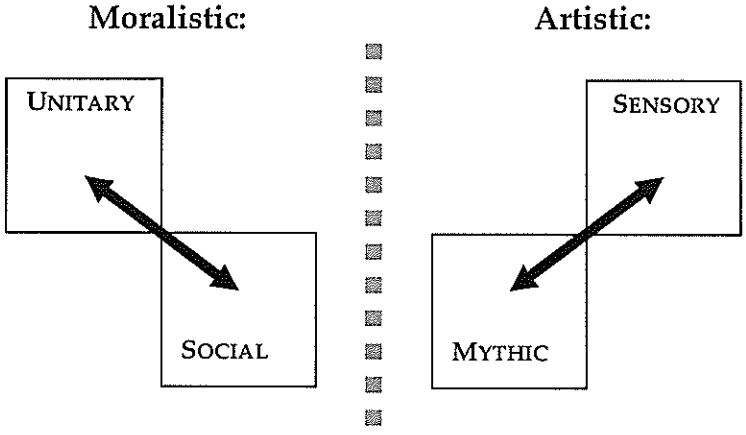


There is rejection between the Assertive (U-M) and the Evaluative (Se-So) platforms.

If separation does not occur, conflict is resolved by annihilating the other.

There is a deep enforced separation of interest between the Analytic (U-Se) and Generative (M-So) platforms.

"We just don't cross each other's paths."



The Normative (U-So) responds by containment and censorship; the Creative (Se-M) by derision and parody.

The four-reality conflicts model the three grand dichotomies that provide deep sources of conflict in the Western cultures. These images represent the void between platforms of discourse. Those working from each platform experience the world in total independence of the other's. There are no common rules for establishing what is real and what is true.

The tensions produced among peoples and institutions by these extreme worldviews have driven the course of Western history. Some times conflict following from these tensions are avoided by keeping the parties separated — keeping "church from state" and the colleges of humanities distant from the technological institutes. In the case of sacred-secular issues, the sole resolution is annihilation of one party and its beliefs as we have seen in innumerable efforts at genocide. These conflicts are currently visible in those nations which are torn apart by the wars between theocratic and social-democratic political forces. There is no platform to which the disputants can retreat from these conflicts. The moralistic/artistic conflicts are characterized by the reigns of Savonarola in fifteenth century Florence, the witch burnings in the sixteen and seventeenth century Europe, and the Talibans in twenty-first century Afghanistan. Each illustrates the violent methods used to eliminate the non-believers. The unresolvable tensions do not always lead to such destruction. For example, the conflicts between artists and establishment in an open society may lead to a vibrant evolution of its institutions as occurred in Europe and the US in the 1960s.[13] However, this analysis of polarized conflicts supports the evidence that the popular approaches to resolution through dialogue are unlikely to be

successful. We need further exploration into dialogic methods to deal with chasms that separate people holding such deeply dividing reality beliefs.

Interestingly, the most terrible conflicts over history appear to have been between ideological groups based on the unitary source of reality. The scheme does not explicitly deal with conflicts on a single platform. However, it does suggest that when groups are attached to a single form of belief they have an insufficient base for reality and subsequently fear their belief may be unsustainable under confrontation with an alternative. It might be that the most threatening condition is to face another culture that also believes it has the Truth.

Approaches to working these polarized conflicts depend on the participants developing awareness and tolerance for the other participants' sources of reality. Through such awareness the participants may progressively reduce their existential anxieties until they can allow themselves to work on whatever platform seems appropriate to reducing the conflictual situation. In practice, this approach moves groups to work the issues in a series of sub-discourses. That is, by agreement, the discourse is transformed onto whatever platforms seem most suited for working the particular issue as described in Figure 4.8. .§ Typically, this strategy uses a sequence of platforms; it sequentially plays on different game boards. The group continues to evolve solutions on sub-platforms as needed, until the disputants become accustomed to working central issues on alien platforms. To work on alien platforms requires both acceptance of and the discipline of the alien logics. The preparatory exercises working on the subordinate platforms provide a sense of security and competence in those arenas. The approach is not easy. Frequently, the antagonisms are entrenched in the culture, but training in the

mindset of the other provides to a continuing opening toward means of resolution, to states no longer sensed to be conflictful. This is the form of this strategy further explored as third order change in the final chapter. §

EPISTEMOLOGY: PLATFORMS OF KNOWING

"thinking and being are one and the same"
Greek: *to gar auto noein estin to kai einai*
Parmenides. 5th Century BC

This framework for an ontogeny is indistinguishable from that used for building knowledge and language. The ontogenic process is also *epistomogenic.*

Platforms of discourse have been described in terms of confrontation that realize events and entities. The descriptions have been general, not specifying the form of the confrontation. The Buddhist Skandha model realized events and objects by using one skandha to process the output of another. In Chapter 3, § the realizing process has been discussed in a social context where it is as more interpersonal than an intrapersonal activity. A person realizes something by taking in an observation, but more accurately by projection. We come to know by the same projective action by which we realize. In English, the phrase, 'I *realize* that' is close to 'I have come to *know* that.' So, a platform of discourse that is the site of realization is equally that of knowing and of conceiving. This cognitive similarity suggests that knowing and its study, epistemology, can be formulated in a way parallel to the structure of realizing and its study, ontology. They are both products of discourse—without language we would not know, or at least not know that we know.

There is a long history of discussion of this parallel, asking whether the epistemology and ontology are identical. Do they cover most of the same territory or serve quite different functions? In the light of viewing this construction of reality

through exchange, many of the discussions appear to have been ill formed. I believe they have taken place between people holding positions based on different platforms. A familiar and irresolvable form of discussion over the past centuries has been between advocates of the assertive and the analytic platforms (of received versus empirical knowledge). More recently, discussions have been between those holding analytic view of knowing and socially constructed reality. Such debates will produce conflicts and non-sequiturs that resolve nothing. Nevertheless, scholars continue to argue for one of another to be the sole source of knowledge.

Karl Popper enunciated the dogma of analytic epistemology: "A scientist constructs hypotheses, or systems of theories, and tests them against experience by observation and experiment. ...it is the task of the logic of knowledge to analyze the method of the empirical sciences."(Popper 1935, p. 27) This was the accepted view of the basis of knowledge in the Western world dominated by the analytic worldview, challenged only by those who believed in transcendental sources beyond human invention. Since the 1950s, a number of other ways of knowing, and of recognizing what is real, have been recognized. Most prominently a variety of social constructionists have made it clear that we come to know by rules and processes that differ from both the empiricist and theoretician, and that the knowledge contained in narrative, myth, tradition, and the great arts is part of what human being *know*. Knowledge is not just located by the search among empirical observations. Observers can find knowledge in every reality, whether in the natural environment or in one's internal awarenesses. Different sources of knowledge arise in every observer. While each observer has idiosyncratic aspects, their observations are made from their constructions of reality and therefore can be grouped into types of knowledge by their reality

sources. When people draw on different constructions of reality, they will find different modes of knowing. As Popper illustrated for the case of empirical knowledge, knowledge is constructed in the interface of realities, that is, on a platform of discourse. In Popper's case, it is the analytic platform of theory and observation that defines knowledge. But for those with other beliefs about the source of reality, knowledge will be viewed differently and they will find different conditions on which to claim knowledge. Just as there is no universally accepted belief in the source of reality, there will be no one source of knowledge or one method of obtaining knowledge.

The appearance of alternative views of knowledge in the second half of the twentieth century does not invalidate scientific knowledge nor undermine the transcendental. It does alert us to the idea that 'truth' is limited in its domain and suggests that the cultural domination by the analytic domain has weakened so that we are no longer blocked from discussing alternative ways of knowing. Similarly the appearance of 'new ways' of knowing does not necessarily signify new understanding. All of the modes of knowing of which we speak today have been recognized across the millennia. However, like the alternative views of reality, their roles are subject to changes in fashion that deflate or inflate their status.

My purpose here is limited to presenting a structure of the ways of knowing without denying particular epistemological views. It is to notice that each comes from a different belief about the source of reality, and thus of knowledge. The four realities model provides a foundation for systemically studying the various epistemologies. This scheme identifies implications of having multiple ways of knowing, of going beyond a single set of rules for what constitutes reliable knowledge. In working with the platforms of discourse, I uncover no essential

differences between the processes of knowing or realizing, although there are important differences in the problems that have surfaced in the two disciplines as well as in the nomenclatures and applications.

Toward a catalogue of the ways of knowing

To know is to establish the veracity of some data or an idea by accepted criteria. These criteria vary just as those of reality vary when viewed from the alternative beliefs. Just as realization creates a *platform of discourse,* so the act of knowing establishes a *platform of knowing*. For example, the validation of an empirical fact is equivalent to the processes by which it is realized on the analytic platform (unitary-sensory); similarly, a person's name is known by declaration on the assertive platform (unitary-mythic). Knowing an empirical fact is identical to establishing its reality using the analytic platform. An idea is not knowable until it is expressed in terms of a theory, a sensory object or a metaphor. Each of these leads to a different way of knowing that is set within the rules of a different platform, the assertive, the creative, and the generative.

This parallel leads to the same six-item structure as that of the platforms of discourse shown earlier in Figure 4.3. Appropriately, the nomenclature is similar as they refer to similar acts though carried out in a different frame of reference; although, I renamed the platforms with terms more common in discussions of knowing. (Figure 4.11 below.)

FIGURE 4.11 PLATFORMS OF KNOWING

PLATFORMS OF DISCOURSE		PLATFORMS OF KNOWING	CHARACTERIZATION
ASSERTIVE	M-U	RECEIVED	Knowing from transcendental sources, directly or through channels: genius, charismatics, mystics. Consistency with existing principles.
ANALYTIC	U-Se	EMPIRICAL	Knowing from observation of the environment tested by rules of science.
NORMATIVE	U-So	POLITICAL	Views held to be valid when they support the purpose, values, and moral codes of the community.
EVALUATIVE	Se-So	CONSTRUCTIVE	Constructed on social criteria, based on shared descriptions of sensory data.
CREATIVE	M-Se	INVENTED	Accepted as a product of the power of the image: an event or physical realization.
GENERATIVE	So-M	NARRATIVE	Stories, myths, symbols held to be valid by a culture, consistent with its values.

While the structure is the same as that in the ontological chart, there are different implications. 'Received' knowledge points to the extra-personal source; whereas, 'constructive' knowledge highlights the post-modern sense of social construction and 'narrative' knowledge suggests the cultural base. The value of representing the chart with terms related to knowledge is to indicate that the source of each form of knowledge is related to the process of realization. It is asserting that the validity of any knowledge is related to the reality beliefs of the knower and that the validity is dependent upon the ontological source. Relevance of the knowledge is another matter.

The separation of platforms into accommodating and constituting applies to the epistemologies as well. The accommodating knowledges (analytic,

normative, and evaluative) are ones that are arrived at by agreement across a culture or a discipline of users. The constituting modes (assertive, creative, and generative) are imposed by fiat, charisma, inventive realization, or a defining of myths. We have such knowledge because we accept of the power of the image or its source.

In communication studies, knowing takes on as a quite different role. (Park, 1999) Here it is an embodied condition, not designed to articulate data. The embodied concept of *relational* knowing is visible in the interpretation of knowing as sexual intercourse or in the familiar usage of 'coupling.' Knowing is thus a condition of relationship, a product of coupling in the technical sense of harmonic response. The discussion of coupling is extended in Chapter 8 on engaging. Also, relational knowing is experienced as *reflective*, self-knowledge achieved second-order cybernetic systems as discussed in Chapter 6.

SUMMARY

This chapter elucidates the idea of the platforms of discourse and illustrates how these arenas provide a setting for different forms of discourse. Of particular focus here, is the distinction between those discourses that are dominantly accommodating and those that are dominantly constituting. The discussion shows how the six platforms created by confrontations among the four realities generate a fecund base of exploration within the development of diverse grammars.

In the later sections, I introduce two extensions of platform thinking which indicate the need for explicit use of diverse grammars in discourse. The analogous language of games provides an immediate and familiar model for how we make choices among grammars in daily conversations. The discussion of conflict

management introduces issues that arise when participants use grammars that are mutually incongruent.

Finally, I outlined the argument that the platform model could alternatively be viewed in any of three different languages: the ontological model with which I began this work; an epistemological language based in the acts of cognition, and a relational language of system thinking. The epistemological view was developed here, and I present the system view in the following Chapter, 6.

Platforms of discourse are constructions arising out of the process by which we construct our worlds. The platforms are themselves constructions that serve as the bases on which the base metaphors are expressed in system thinking as developed in Chapter 6; and in Chapter 5 to differentiate the ways we articulate description; also in Chapter 7, to organize our grammatic choices about where to focus activities, select alternatives vocabularies, and respond to audiences. §

NOTES

[1] . observations that are realized solely by an emotional 'hypothesis' are fully modeled by the SR theory. Physiological modeling (e.g., Arbib 2000) indicates that emergency responses are generated by the more primitive trial-and-error learning.

[2]. If everyone already is in agreement about the source of reality there will be no differentiation and no need for establishing a concurrence, say in a discussion between mathematicians. This is rare, for there would be information to be shared. However as mentioned earlier, no living being holds only one view of reality, so there will always be a degree of differentiation.

[3] . This is a slightly modified quotation from the Russian linguist Voloshinov (1986) who, writing in the 1920s contributed to the idea of language as transpersonal or as a sociological phenomenon. By setting it opposite to the classic grammar of the times he opened the discussion of alternative models of language.

[4]. Not all dialogues would have congruence as a goal. Conversants could enjoy building a relation through a meandering banter or indulge in intellectual play in a verbal chase across all the platforms—a post-modern delight.

[5] . Luhmann (1987) dissects the role of custom in affairs of the heart, particularly noting the role of silence.

[6]. There is an affinity between the use of 'games' here and the heuristic device that Wittgenstein called "language games." (Stern 1995)

[7] . The claim that there is freedom of choice among grammars does not deny a genetic physiological base; rather it claims that the genetic base is a promiscuous source of variety.

[8]. Salthe introduces a similar use of the "focal" platform in hierarchical systems.(1985)

[9] . [Add book reviewed NYT 29 April 03]

[10]. The aim of this sort of analysis is similar to that of critical theory, which assumes there are always power relationship bearing on every discourse. This theory agrees with the critical position, but does not see that any normal conversation can ever be conducted without some form of power differentiation. Critical theory has to be seen as pleading against exercise of particular forms of power and, thus by implication, for some other form of power.

[11]. The normative platform is one of the most discussed arenas of conflict, as it differentiates between the ethics of the socially constructed worldview and that of the unitary morality of conviction. This axis of conflict is fully discussed by Robert Larmore as a conflict of ethics of responsibility versus an ethics of conviction. (1987)

[12]. I see this model as based in Habermas's communicative model, of technology, relation, and power. See (Habermas 1984) for examples.

[13]. James Agee wrote in 1939 in an essay "Let us now praise famous men":

> A good artist is a deadly enemy of society; and the most dangerous thing that can happen to an enemy, no matter how cynical, is to become a beneficiary. No society, no matter how good, could be mature enough to support a real artist without mortal danger to the artist. Only no one need worry: for this same good artist is about the one sort of human being who can be trusted to take care of himself.

CHAPTER 6: METAPHORIC FOUNDATIONS OF CULTURES

Much of needs to be simplified so I am striping it to the basic metaphors as to fit the new version

The diverse intonation of a few metaphors.
Jorge Lois Borges in *Pascal's Sphere*

You tell me whar a man gits his corn pone, en I'll tell you what his 'pinions is. Mark Twain speaking through Jerry "an impudent and satirical and delightful young black man.".[1]

In the early three chapters, I characterized a number of arenas of dialogue labeled platforms of discourse. The six described platforms provide formalizations of settings in which to conduct a dialogue, six diverse types of causal argument, diverse presumptions about the power any conversant can presume, an unlimited number of variations in grammar, and the use of traditions of the participants' cultures. Clearly most we make most choices habitually and in ways particular to a culture, as Mark Twains' Jerry clearly articulated. The choices, habitual or intentional, are based on intricate devolution of culture and environmental forces expressed in a few diverse metaphors that established the dominant zeitgeist of that culture.

The differences are dramatic at the extremes, say between oriental and western cultures, between traditional and modern, between narrative and analytic modes of expression. Each society evolves to accent some engagement with its environment, articulating it through some metaphors (behavioral patterns) and avoiding others. Those selections accompany the evolution of diverse grammars and thus sub-cultures within a society. Societies, ones we call traditional, restrict expression to a narrow range.

Others including most Indo-European cultures operate with multiple sub-cultures. It is such a diversity that I discuss here to provide an illustration of a range of grammars that arise different metaphors.

Stephen Pepper, writing in the 1940s, constructed a systematic typology of cultures, suggesting that four core metaphors guided the development of western cultures. He used a classification scheme that can be organized in a two-by-two scheme, here identified with his labels and core metaphors.[2]

FORMISM similarity	MECHANISM simple machine
ORGANICISM organism	CONTEXTUALISM historic event

Pepper's images arise from traditional names and cultural metaphors rather than a single generative logic. Though differently formulated, the four describe cultures similar to those evolving from the four realities identified above in Chapter 3. I refine this approach by selecting embodied metaphors that generate the grammars on each platform and thus lead to disciplines of operations that differ systematically according to the logic of the platform. And these logics, in turn, specify the grammars through which inferences become enunciations. In western cultures, system theories have evolved on three of the platforms on which we conduct dialogues.

METAPHORS LINK THE WORLD TOGETHER

A special skill of humans is their ability to abstract the processes of cognition from a particular content, to use the rules of extension (chaining) to make leaps of understanding. We make metaphoric leaps from one structure of knowledge to another hoping to generate fresh insights in another domain of experience. The variety of metaphoric extensions establishes the characteristics of a culture: its forms of discipline with which it excels, its stability, breadth of tolerance, and interaction with cultures having alien rules of extension.

In its simplest form a metaphor is an expression through which we identify some similarity (and thus difference) between a *source* and a *target*. A single-celled animal notices a quality of acidity that is in its experience to be also found in another place. It finds one place be warmer than another and thereby recognize its leaps to the other place. Could a cell speak it might say, "That place is like this place, only it is saltier." So a human might make a leap in asserting, "He speaks with a voice like thunder." All observations of relation and structure are metaphors: all language is built on metaphor. Eva Kittay said, "Metaphor is the linguistic realization of a leap of thought from one domain to another—in which the springboard is a structure preserving mapping." (1987 p.90) and Lakoff, "A gestalt from one domain of experience we use to structure experience in another domain." (1980, p. 230). I concur with Lakoff and Johnson's assertion that metaphors arise from embodied sources. He holds that every metaphor has it origins in the leaps made by the elementary observations of the single-cell ancestors. Every relation is one recognized by the action of a body, wither it be of a protein molecule, a muscle group, or a committee of friends. Lakoff and Johnson

illustrated this point with a concocted exemplar full of words still carrying a hint of their bodily origins: "It is easy to *grasp* that we *choose* to *balance* our *intention* and *control* as we *maintain* our *identity* along *life's path.*" We have viewed all conversations as exchanges of metaphors—extending, integrating, concurring or denying the relationships expressed. The words and signals we use to characterize, direct, and question derive from the fundamental acts that are extensions from the core metaphors such as collecting, pushing, and grasping. Cooper, citing Nietzsche, also claimed that: "metaphor is the basic principle of language and that so called literal talk is a kind of frozen sediment of metaphor."[3]

Metaphors imply that the structure we use to understand a familiar domain will help us understand others. With their expression and incorporation into a language, metaphors expand the application of a structure, showing for instance, that we can better understand people if we know how dogs behave. Metaphors bring into dialogue new territories that are made meaningful by metaphorical extensions from previously understood domains. So the planetary picture of the atom that the physicist Neil Bohr § created gave us access to a world beneath the microscopic. An alchemic model of the Uroboros, a dragon biting its own tail, led {{ § }} from the mythic image to the structure of organic chemicals on the analytic platform. Freud and Jung gave us insight into the *unconscious* by inverting the metaphor of consciousness, and biologist Walter Cannon in the 1920s expanded our concept of mechanical control by feedback to understand physiological phenomena.[4]

A giant leap that matches the rules used across disciplines may provide explosive development of new understandings. Albert-Lázló Barabázi (1996 p. 96-107) provides an example of a remarkable leap between platforms of discourse. It engaged the model of the Bose-Einstein condensates from quantum physics to describe the distribution of business among competing corporations in the Internet. This metaphoric leap occurred when Barabázi brought onto his team researching electronic networks a young graduate student whose primary training was plasma physics. Ginestra Bianconi made the insight-generating leap from quantum physics (using statistical mechanics) to the behavior of people and firms in competitive market advertising in the new world of e-commerce. The source in physics sees reality on the assertive (or analytic) platform, the target is on the exchange platform in a distant intellectual domain. Physics assumes a deterministic world with no options; the exchange platform assumes that human intentionality is involved in market choices. We rarely support communication between professionals that works across platforms, making this leap all the more remarkable.[5]

The creative power of a metaphor fades with use. Metaphors created by poets, writers and street folk become normalized into conventionals, accepted in newspapers and the media, and entered into dictionaries. We have lost the connection that most metaphors have with their origins. They have become pale cognitions that supply the vocabulary for ordinary speech. We can see the stages of decay in the historical devolution of Chinese ideograms into standard symbols with little image–generating capacity. It is the common fate of a once evocative metaphor to become absorbed into our daily speech: 'time is money' has long lost

its evocative quality. So the fate of *Watergate*, following the Nixon debacle: '-gate' is now reduced to a suffix suggesting scandal. The modes of extension are routinized to give precise rules in finding sums in arithmetic, authorized spellings of words, temporal orders for sequencing events in a story, and poetry subsiding into poesy. Most dialogues use rules for extension that lead to target structures obviously related to those of the source. Metaphors lose their power and the word play turns to trivial pursuits. To be creative we must follow the advice of Peter Apps:

> "Unlike Shakespeare we have to blot out most of our lines, or use the 'delete' key on the word-processor all but obsessively. We have to consciously negate the first clichéd gestures of the lyrical consciousness, the tacky syllables of a commercially tarnished ecstasy. We have to speak against the flow. (2003 p. 111)

Fresh metaphors are fecund leaps that may produce new cultural paradigms such as the images provided by 'quantum,' 'DNA' and 'globalization.' Robert Boyd (1992) labels these rich structuring images, 'theory constitutive metaphors.' The metaphoric connections bring whole theoretical structures to targets distant from the source domains. A few terms like 'time,' 'beauty' and 'cool,' are evoked in fresh guises that awaken us to new understandings of otherwise mundane occurrences. Still other metaphor arise evocatively out of current events and literature, have a moment of acclaim, then disappear or are rendered banal by popular use. 'Watergate,' 'gerrymandering' and 'glamour' (once spelled 'grammar') followed equally banalizing course

The measures of a metaphor

The measures of a metaphor are specific to a particular culture and individual. The usefulness, surprise, and strength of metaphors are functions of the knowledge of the individual and the cultural state of the community within which it is used. Its meaning depends on the relation between the context and the knowledge of the user and audience. At one extreme, a metaphor is so evocative that we cannot be assured what it says of the target. Lewis Carroll's "Twas brillig" is one of many brilliant examples, evocative but not specific. At the other extreme, extensions are so commonplace that they read as definitions—'Jack is a prince.' Here the source is a characteristic in which the target participates. Nevertheless, there are descriptive characteristics that render a metaphor surprising, insight generating and often violating customs of a community of users. e e cummings [get quote from house] [and complete sentence]

The power of metaphor is measured by the insights one gains in the leap from a familiar image to a target in a different domain. The first measure is of the length of those leaps that stay with a platform. A short leap may lead to useful and amusing insight. For example, a simple metaphor of the type *A is like B*—"her singing was like cheap perfume"—provides a humorous description in which the target is in the same platform as the source; they are both terms with a sensory base and probably both would be analytic (U-Se) These metaphors are differentiated by the *length of the extension*. Only the distance differs; distance and surprise correlate. In most cases the longer the leap the greater the insights that are generated.

The power of a metaphor is also measured by whether the source draws on images on a platform different from the target. The example given earlier of the leap from the properties of a quantum condensate begins on the assertive platform (theory) but ends on the exchange platform (relationship), producing a huge surprise and grounds for new explanations. The greater impacts are those metaphors that "clash and force accommodations in our conceptual systems." (Kittay 1987 p. 37) The insight generated by the great leap across platforms is exemplified in the use of the quantum theoretic Bose-Einstein condensate to explain market behavior as referred to earlier. So the term 'black hole' defined in physics rapidly became a metaphor for a condition of permanent loss in social situations. Einstein in saying, "science is the greatest myth of the twentieth century" supports a metaphor so evocative that its source may be from any of the other three platforms. Koestler describes such a diverse leap as a *bi-sociation of two operative fields* on different planes, a concept similar to the platforms of discourse. This second measure is of the *divergence of the extension*. Such metaphors often violate the disciplines that 'own' the elements of the metaphor and thus are rejected as nonsensical, yet they may found a new rationality.

The phenomena of chaining

A while ago while pausing on a mountain hike, my son asked my six-year old niece how she liked the hummingbirds that were feeding near us. She said she loved hummingbirds but she like porpoises even better. That seemed to me an odd juxtaposition; a child's misunderstanding of classification, that is of chaining rules. A moment later I caught on. She was reporting that she preferred the way

porpoises fly—the hummingbird's flight was jittery but the porpoise has a graceful path of flight through water and occasionally venturing into the air. Her approach made a functional leap, whereas in Western countries we have been accustomed to use taxonomic chaining. We train children to leap along on a single platform, most commonly using the classificatory rules on the assertive platform (U-M), sometimes using the functional chains associated with effective causal thinking.

A *chain* is a sequence of metaphoric extensions, connections among a series of entities—movements, enzymes, phonemes, words, sentences, or arguments according to some rule of association. The rules of chaining are the specifications of what leaps are acceptable in a particular discipline or culture. Chaining rules indicate how metaphoric extensions are selected, and thus how we construct a language, a grammar, a model, even a whole paradigm for a culture.[6] At a simple cellular level, a chain may be a single rule for switching the direction in which a flagella should rotate. At a more complex level, the rules form neuro-muscular action plans, habituated sequences through which we generate actions—moving a finger, uttering a syllable, or testing word selections before we speak. The rules set the length of a leap and its divergence. Of prime concern here are the richness of alternatives and, conversely, the power that we gain through using strict and narrowly determining chaining rules. An example of a rigid set of rules is that which is used to form a strand of DNA. The construction of the four-foot long chains that sequence millions of nucleotides follows strict electrodynamic procedures by which one of the two-nucleotide pairs is added to extend the string. To my knowledge the form of DNA is the strictest chaining rule and materialization in our known universe, self-reproducing and correcting. It is the

extreme example of repeated, short and linear metaphoric extensions; no great leaps, no engagement with interesting chemistries, no branching that allows variations. In lower animals, variations may occur only through errors or chemical aberrations. In the primates DNA/RNA produces emergent forms that allows branching, thus variations in the metaphorical extensions with which an animal engages with the environment. Perhaps defining chaining rules is a unique ability of higher animals.[7]

However, the growth of freedom suggests an anomaly in our image of primitive human life. It seems natural to assume that with development a culture would use increasingly complex and determinate rules of chaining. Rather, this view of chaining suggests advancement deritualizes a society. Even though the technology of ritual introduces constraints, say, in the use of musical instruments, carpentry tools, and grammars, it increases the range of alternatives available. The earliest forms of human behavior may have been group dance, chanting, and rhythmic speech. Following this line of reasoning we can understand that the earliest grammars would have been highly formalized, having relatively few rules and exceptions. This reasoning supports the view that formal grammars of classic Greek and Latin should resolve into the more casual grammars of the derivative Latinate languages. Articulation breeds diversity in the chaining rules and thus increases the quantity of accessible targets. Our present looser rules support a richness in expression at the same time creating ambiguity of meaning. *Structure of evolving diversity*

The emergence of articulate expressions from intuitive images depends on the rules of metaphoric extension that we may use. Finding articulate expressions also

depends on the range of core metaphors on which the culture resides, the structural characteristics of the language that individuals use in articulating ideas, and the particular characteristics of the involved individuals. Some ideas may not be articulatable, or at best awkwardly expressed, in language or culture. So scientific thoughts may be easily extended in Latin and its derivatives while the expression of poetic metaphors may be easier in Chinese. Each language group and paradigm has distinctive core metaphors and chaining rules. In the following section I illustrate the rise of diversity by describing the way in which different metaphors lead to the evolution of system theories using different sub-grammars.

FROM METAPHORS, GROW GREAT OAKS, PINES AND PALMS

Everything is articulated through the extension of metaphors from micro-movements at the cellular levels to the grand narratives that provide reality to a culture. The extensions produce chains of articulation, developing along some directions and barring others. Distinct varieties, not only the primitive palms, but the pines and deciduous trees that evolved later, adapting to their environments with separate roots and strong independent trunks. The direction of extension produces diverse branching, differing, as do palms from pines and oaks. Their roots, trunk, and foliation present distinct images that grow together to form forests. So the core metaphors, languages, and customs form distinct disciplines growing together to form cultures and inclusive paradigms. I introduce the metaphor of trees in a forest for a variety of purposes: to illustrate the sequence of growth from initial observations; to show how different metaphors underlie systems of thinking used in a culture; to illustrate the structure of growth visible in

diverse species of thinking; and to show the base for a new metaphor of the *forest canopy* that calls for a novel organization of human affairs, beyond part/whole dichotomies that have prevailed in the west for millennia.

I illustrate the sequence of metaphor growing into paradigms that form species of cultures that are alive and developing in current favor. My intent here is to present enough description to differentiate them through the evolution of system theories and their applications.

1. *Classic System Theory* operates on the Assertive platform (M-U), using the metaphors of *containing* and *owning* articulated through assertions of the regularities of logic, mathematics and traditional dogmas of folk knowledge and religions. It is the maintained by control of language and sociopolitical custom.
2. *Dynamic System Theory* functions on the Analytic platform (Se-U), combining the metaphors of empirical science, particularly, *pushing* or *forcing*, with the metaphors of trajectory—changes over time.
3. *Exchange System Theory* uses the mentality of the Evaluative platform (Se-So), developing on the core metaphor of *grasping* and *choosing*. It most significantly differs from the first two by presuming individuals take actions intentionally. Early questions were concentrated in areas of economics and ethics, but now the focus is on control and communications, thus it has become the study of relations in dialogic form.

There is fourth paradigm that is important but has not by its very characteristics taken on formal system characteristics. This is the Generative mode (SO-M) that is the source for metaphoric thinking, the system, if it can be so designated, for diverse chaining that leads to new paradigms.

START HERE TO REORGANIZE.

In part this is a catalogue of system thinking, organized to show the development of the distinct paradigms, their grammars, and how their cultures have merged into a new self-organizing entity, transcending the grounded roots that gave birth to the present paradigms. However, the languages have not evolved to handle the merger, thus we are left with the kinds of conflict illustrated in Chapter 4.§

The three system theories, Classic, Dynamic, and Exchange, have developed sequentially as instruments of Indo-European culture evolving over the last three millennia.[8] The Classic's origins and explication is earliest to be developed, appearing well established by Aristotle's time. It provides the stable base of a transcendental reality, which dominated Western intellectual discourse until the seventeenth century and is still by far the major source of possibilities for literate expression. In recent centuries, those living in western cultures have moved to adopt a more pragmatic base for organizing their worlds expressed by the Dynamic system model. It came into vogue with the beginning of the empirical thinking we call 'modern,' though it too had ancient origins. While the Dynamic paradigm no longer presumes a transcendental reality, it continues the belief that all the phenomena of life are determined by the eternal dictates of the physical universe. In this mindset, articulation is tested against what can be demonstrated experientially: 'Don't tell me, show me.' The third model, the Exchange paradigm, came into prominence with the focus on relations in the interlude of the 1960s, the era of the flower children and the emotional protests against war. It radically differs from the first two as it features the humans as intentional agents expecting they can alter the course of events.

For the brief dozen or so years beginning about 1963 the cultural revolution seeded by Rachael Carson's *Silent Spring,* affected every aspect of our culture, some aspects radically and some merely suggesting the reflective awakening that developed in the decades since. Eric Jantsch labeled this interval a societal 'metafluctuation' (1980). Today we might label the decade as an unstable opportunity for bifurcation. The turmoil of that heady era subsided, the subsequent growth into the system canopy has been rank, with a dozen or so diverse branches erupting from the three root metaphoric tree trunks. The branches are now so intertwined that they form a *canopy* that has created an environment with properties not expressed in the three paradigms. The canopy atop these trunks arises from those trunks but is not of them. It is expressed through languaging which transcends the facility of the individuals, being rather a coupling across cultures.

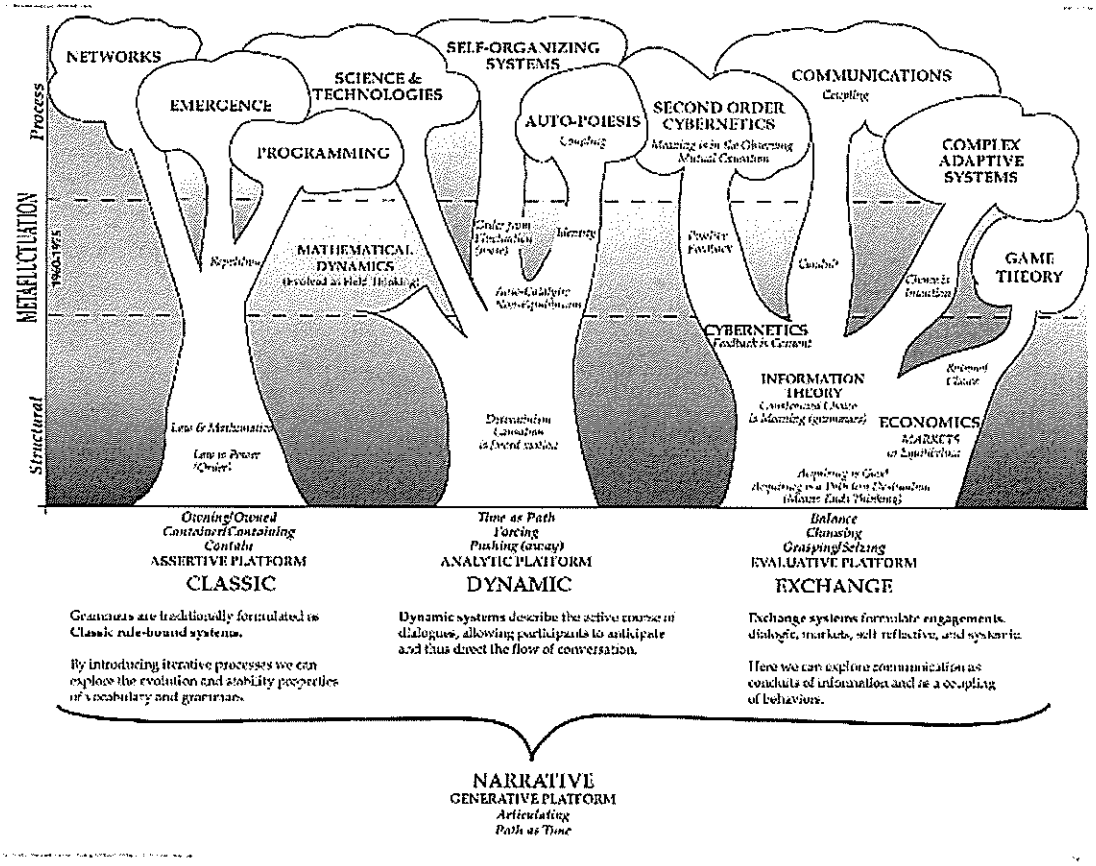
This newly perceived canopy of branches presents a vibrant ecology with new treatments of reality, new characterizations of phenomena and new grammars to articulate its understanding. Its 'emergence' points to trans-systemic thinking that will explicate new cultural forces emerging with the collapse of time and space into an internet of communicative relations. The modes of speech are being founded on processes of coupling and characteristic phenomena that are as distinct from those ground level analytic sciences as poetry is from physics.

Figure 6.1 presents a visualization of the fecund proliferation of the paradigms growing into diverse system disciplines over the years following the metafluctuation and their co-mingling into an overstory. I describe the embodied metaphors as trunks that grew from generative roots in the mythic soil, the

branching that has occurred over the past half century, and the canopy of emergent phenomena. The canopy is a phenomenon of communication, a rampant growth of the exchange paradigm. It is distinguished from the three system theories is its transcendence of the part-whole relation, that relation being replaced by *entrainment*, which describes a *coupled* universe without structural boundaries. It displays much of what is popularly called complexity theory, but is differently organized.

I have not identified the metaphors that generate this overarching canopy. § The appropriate metaphors will be social images, not derived from embodied human beings. Just as we cannot attribute consciousness to individual cells so it is improper to model the social reality on ideas formed at the level of individual components, in spite of such provocative metaphors as Hobbes' Leviathan.

Figure 6.1 The System Forest



COULD USE A NEW VERSION OF THIS GRAPH

The 'forest' in Figure 6.1 displays only three varieties of 'trees.' The combinatorial process from which they emerged, described in Chapter 4, indicates there could be for six distinct system types, one growing on each platform of discourse. As of now only three platforms have given ground to a substantial trunk growing from the Generative soil. I expected the Normative platform (U-So) would have supported a political or perhaps religious trunk, yet no coherent theory has emerged in spite of three thousand years of the study of politics and the existence of societies with diverse political and ethical/moral systems. Focused efforts to form a political or moral system theory end up in radicalizations that sprout as sub-paradigms on the Evaluative and Assertive platforms. The absence of system theories on the Generative (M-So) and Creative (M-Se) platforms may be explained what would constitute a mythic grammar. The mythic ground, whether manifest in a social (So) or a material (Se) platform is the seedbed for metaphors and new polarities. While we design cultures that support the emergence of creative events they do not sustain grammars. Those who try to formalize a culture of creativity find the ground has turned to Analytic or Assertive territories; the aesthetic has been lost.[9] As with metaphors, the aesthetic act may decay into banality. A visible example is the work of the surrealist artist, Salvador Dali.

Establishing stable grammars to express a new culture takes time. New rules appear and disappear momentarily as in the mythic game of "Calvinball" illuminated in *Calvin and Hobbs* (Figure 4.7). In that game the rules are in continual flux. The players must honor only the enigmatic meta-rule, "No cheating" that assures the players will continue to engage. The mode of

articulation, the language, is deeply engrained in human physiology and the extant cultures. The inertia produced by the massive record of the cultures stored in the speech taught to every child, in the writing, and now in a variety of electronic forms could inhibit innovations and stultify communication. However, the concurrent availability of logically different paradigms used jointly with intuitive and graphic images engenders a new culture in the overstory.

In each of the following sections I describe the development and properties of three grand paradigms, indicating their metaphoric bases, the ontological platforms on which they constructed language and the various branches that arose during the last half of the twentieth century.

Classic System Theory

Classic System Theory is the earliest formulation of a system view and it is still the dominant theory in use in developed cultures. The model was formalized in ancient Greece and in the Far East as a way of collecting and containing sets of concepts. Classic theory took form in Aristotle's development of logic and in the hierarchical arrangements of sets, categories, and classes. It is used in the construction of our ordinary grammatical structures. It supports the logics of the law codes, biological taxonomies, formal organizations, governmental domains, and intellectual disciplines. It presumed there to be Truths; Mark Johnson called it the "God's-eye-view" (1987). [§] We use it to structure book contents, arrange goods on a shelf, establish political sub-divisions, and memorize

ROOT METAPHOR
Contain
Order
Logic
PLATFORM
Assertive

a speech. It defines many of the tools of relationship that we use throughout our days Bloom described it in the *Taxonomy of Educational Objectives (1956).*

This system of classification was totally pervasive until the middle of the twentieth century, when linguists found significant variances between the formal rules of classification and the way categories are used in practice. (Rosch 1978) However, the propositional logic of this paradigm will undoubtedly continue as the proper mode of discourse regardless of empirical counter-facts and the appeals of new paradigms of system thinking that transcend the part-whole relation. In its commonly understood form, Classic system thinking uses hierarchical constructions: containers are set wholly within larger containers, nested as are Chinese boxes. Each descending level is characterized less inclusively than its container as given in the following example:

The Logic		An Example
A	⇨	*USA*
B is in A	⇨	*California, USA*
C and D are separate in B; B is in A	⇨	*Los Angeles and Santa Monica, CA, USA*
E is in C in B in A	⇨	*Westwood Los Angeles, CA, USA*

Thus, in practice, every element in a system is described by its lineage, by descriptors as we see in job definitions, parts of an automobile, family relations, parts of the physiological body, and on and on. The form of the relation is containing or contained, owning or owned, and the equivalent level of containment is typically

indicated by the title of the part (sub-system)—as C = *Los Angeles*—or a job title or political jurisdiction. Everything is related to everything else through hierarchical chains. Boundaries dichotomize; an entity is unambiguously identified.[10]

The *cause* of any element is in its logical place in the Classic hierarchy, what Aristotle referred to as 'formal cause'. It exists *because* of its place in the hierarchy. The forms of its *grammars* are propositional calculuses and the everyday approximations used in common usage. Only qualities that are involved in maintaining the order are considered relevant. The differentiations are just those specified; all others that we might interject from an empirical, evaluative or alternative 'system' are irrelevant. The Classic causality is definitively carried out in the domain of computer programming. We use precise sets of rules to count, compute, select, and design with a precision and speed unattainable with direct involvement of human operators and decision-makers. Classic systems continue to provide societies with constant rules for ordering. There are no provisions for change in the normal sense; change comes only from correcting, splitting, or combining classes. Beyond these modifications, the relations among parts of a system are fixed.

The Classic tree grew three branches in the twentieth century with the infusion of new metaphors: *Networks* grew by studying the growth of linkage; computer *programming* and *emergence* grew by reiterative application of their logical operators.

Networks

Network thinking is a natural outgrowth of Classic thinking and now a vital tool for application to a range of problems that once seemed remote from the ancestral hierarchies through which one established his ancestry or the validity of his arguments. Networks are now viewed as generalized organizations of relations between parts of a particular system. The parts, or `nodes,' are connected by links that can be interpreted as indicators of a relation, communication channels, paths for energy flows, or options for moving from the state of one node to that of another. Network thinking has been moved from the classic mentality and grammars arising on the assertive platform to dynamic metaphoric extensions of self-organizing emergent processes Barabázi, author of *Linked* said, "...even in early 1998, nobody could have anticipated the flood of discoveries that would completely reshape our understandings of our interconnected world." (2002 p. 220)

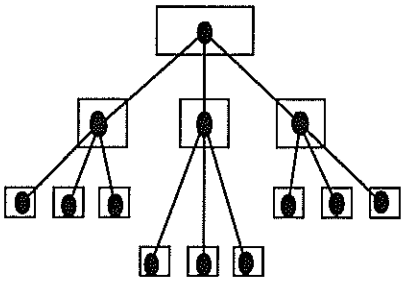
NEW METAPHORS
Connecting
Crossing
Penetrating
(violating)
Probability

PLATFORM
Assertive

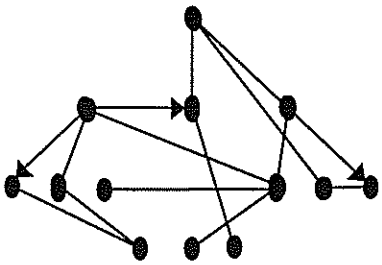
While for all antiquity humans held that everything is directly relatable to every other thing, the dominant paradigms in the West would not consider such a freedom of association until well into the twentieth century. Such open relationships expressed anywhere threaten the claims of a hierarchical authority. By the 1950s it was popular to speak of the 'informal organization' with relations among employees crossing divisional lines (Homans 1950), and anthropologists found they needed to use open network concepts to describe newly identified family connections in non-Western societies. For example, in Navaho culture the maternal uncle has the relation to a child that biological father has in European cultures. Network thinking opened the realm of Classic thinking to a large set of

relations while staying within the basic paradigm of the defined part or node Figure 6.2 compares the Classic hierarchical network on the left with a partially connected network demonstrating circuits of relationships on the right. The available statistical tools analyzed partial networks, using measures such as portion of open channels, average distance between nodes, and connectivity through sequences of links. The newer view of networks further opened the question of directionality of relational qualities and the idea that in networks there could be non-transitive loops in a structure as: A informs B informs C informs A. The traditional use of networks in describing social relations left their study on the sidelines at mid-century because its treatment of authority relations threatened long-established social taboos that covertly maintained boundaries of authority, family structure, and even personal identity. However, the development of computer simulation methods facilitated network applications in operational analysis, neural networks, economic models, and most visibly in the Internet. Works of McWhinney (1964), Per Bak (1996), Duncan Watts (1999), Alberto-László Barabázi (2002), and Steven Strogatz ((2003) provide examples of network analysis and cross-fertilization into other fields, as well as discussing the limitation of the classic network approach.

FIGURE 6.2 NETWORKS



A hierarchical network



a network of the same nodes, but loosely connected to form loops and, for some links a one-way relation.

When the classic tree intertwined with its neighbors, the dynamic and exchange paradigm, in the overarching canopy network studies blossomed in exploring growth of networks through the dynamics of addition and losses of nodes and links. One major finding concerns the stability of nets in economics environments (Barabázi 2002). Under one form of linkage, networks stay open without any one node becoming dominant as occurs in monopoly formation. In scale-free networks, a number of nodes share the dominance, with no one being critical to the network's continued connectness. It appears now that the terrorist networks are of such form, indicating that they will not be scattered, nor will eliminating the top leadership be effective. An interpretation of the three paradigms as networks of metaphoric extensions may lead to a new understanding of the evolution of cultures. The canopy metaphor suggests that each tree has different chaining rules and that the canopy itself may be a setting for the development of interactive grammars. Structure will no longer depend on

hierarchical structures nor the silo thinking that has so damaged western organizational operations.

Programming

Programming a machine to do calculations provided a great gain over an abacus and a slide rule, but it was the introduction of the two metaphors, *conditional branching* and the *do-loop*, that made it possible to leap from linear computations to the modern computer. Branching implemented decision-making based on the formal criteria; the do-loop enabled the program to work iteratively until a desired outcome is obtained and recursively when there is no conversion[11].

NEW METAPHORS
- Conditional Branching
- Cycling

PLATFORM
- Assertive

Computer programming, as introduced in the late 1940s, follows explicit rules expressed in algorithms and heuristics that follows a consistent propositional logic and terminated in a finite number of steps. Well-constructed grammars produce exactly what they are designed to produce. The task at hand could range from calculating the monthly payroll figures for every federal employee, to finding the best moves in a chess game against a world master, to forecasting global weather. But for all the complexity, their grammars are simple, with well-defined elements and operations. It is a perfect exemplar of the grammar of the Classic paradigm—axiomatic, transitive, hierarchical, consistent, and deterministic.

Through the generative energy of the metafluctuation, the design of programs was expanded along lines similar to network thinking. One innovation came by denying the attitude that programming had to follow hierarchical ordering. We recognized that work could be conducted in parallel in different portions of a

program and interjected into other computational sequences at points that enhanced over-all processing speed, according to local conditions 'as needed.' For example, a computed output might be introduced into the over-all process only when another aspect of the problem could not identify a satisfactory outcome of its own task. Parallel and conditional routines began the transformation of programming into a dialogical model. It introduces relations between systems by a structured form of coupling the processes for which are described later in this chapter.

Emergence

Emergence is the appearance of a higher order of complexity from an environment of lower complexity. A prominent example is the emergence of life from inorganic chemical soup. An emergence phenomenon is a behavior or structure that appears unexplained from the application of 'understood' more basic processes. Emergence produces a new level of behaviors for which we must articulate new grammars that can rule the great complexity that was created. The truly surprising finding is that, in spite of its ancient and innate stodginess, incredible complexity can be created using the Classic paradigm. Today's powerful computers have enabled us to understand what happens when you apply a simple set of rules over and over again and shows that *iterations* do produce outcomes that deductive processes miss. The now well-established dictums, "complexity arises out of simplicity," and "order from noise," are confirmed by enormously iterative runs done in experimental mathematics, studying emergent, adaptive, and artificial life processes at the edge of chaos.

NEW METAPHORS
'Again'
Time as cyclical

PLATFORM
Assertive

(Kauffman 1993, Bak 1996, and Wolfram 2002) It is clear that from the repeated application of the iterative rules new and unpredictable 'behaviors' will emerge, as it did in the "Game of Life" that Chris Langton of the Santa Fe Institute developed and demonstrated capable of producing self-organized and self-sustaining logic entities he called 'artificial life'. (Langton 1986, Chou 1997) These new entities no longer produce outcomes only according to the generating rules rather they showed emergent phenomena that seem to be part of a different rule system that that from which they were generated. The outcomes, though the product of a wholly deterministic process, represent true novelty.[12]

The special metaphor of emergent thinking is the idea of *iteration*, of reapplying the same rules to an existing situation.[13] The act of 'doing it again' has an essential recapitulating motion that implies the passage through linear time, though thinking of iterations as occurring over time is but a habit of mind. Iteration is characterized by constancy of repetition. The logic is unchanging, the rules of transition in each iteration are identical, only the present state on which the formula operates is changed. There is no suggestion that it is a purposive process, no final cause is involved. Nor are there energetic or material engagements, thus no involvement of efficient cause. The tools that were so successfully used to build routine into our lives, such as computer programs, becomes tools of creation, self-organization, and, unexpectedly, of evolutionary outcomes. The iterated program produces novelty in the patterns of outcomes. The patterns evolve just as do the phonetics of a spoken language. However, the rules of operation, the grammars are fixed. The Classic paradigm maintains form while the interactions lead to unexpected outcomes. The clearly emergent phenomena like self-organization with its new rules, are concepts

operating at a more integrated level, just as meaning is at level above linguistic operations.

Emergent thinking provided a shock to our theories of evolution by introducing the notion that evolution could follow from simply playing out the natural order of the universe. It suggests that it may be unnecessary to introduce anthropomorphic ideas of purposiveness, design, and progress, as has been questioned in other post-Darwinian discussions. We are left with the new enigma that the Grand Design of the universe may have been formulated in a few very simple rules, but in such a way that we can never figure out what design will realize except by experiencing its devolution. Wolfram (2002) now claims that those very simple rules are sufficient to totally account for the Grand Exposition of the universe. Would that English grammar be so simple.

Classic thinking, freed of the constraint of hierarchical ordering and augmented by the core metaphor of 'again,' of iteration, remains the dominant mode of conceptual operation in daily living and in the intense work of computer programming and operation. We still think linearly in forming and using classifications. And, we are left with the intriguing hint that emergence and evolution may find their resolutions in linear logics that the new sciences so deprecate. Further, this hint of the potency of a logical and deterministic source of emergence may make it even more difficult to decide the necessary conditions for evolution. This possibility is made more tangible when viewing the development of the other trunks of system thinking in the following sections.

Dynamic System Theories

Dynamic system theories express the ancient concerns of Earth, Air, Fire, and Water, and how each is related and interacts with the others over time. The concerns of the Dynamic metaphor are change and equilibrium, and the on-going forceful interactions between material elements, such as atoms and their collections. The work of the students of Dynamics—mostly visibly scientists—is to find rules involving the fewest relations that will make the determinant structures of the environment comprehensible, and hopefully lead to new insights about our worlds. This is a view taken increasing by students of language, Noam Chomsky and Mark Baker (2001) have shown the applicability of this heuristic in organizing the structure of grammar; Lakoff and Johnson (1999) assert that all knowledge is expressed through the extension of embodied metaphors. Donald Schön wrote of it as "technical rationality" (1983) and the educators Clandinin and Connelly called it the 'Grand Narrative" of our Western cultures (2000).

ROOT METAPHORS
Force
Trajectory
Conservation of energy
Determinism
PLATFORM
Analytic

The Sciences

The Dynamic worldview, the world we think of as `scientific,' is well established using metaphors and theories that were largely developed prior to 1960. Events that matter are still treated as the result of forces, exerted over time, among independently existing elements. These elements respond according to determinate laws, which can be probabilistic, like those of gravity, electromagnetic force, and genetics. Behaviors in the old physics version are strictly caused by

prior or concurrent conditions, that is, by *efficient cause.* However, among such conditions there are no laws for choosing *the* minimum set of casual conditions. Our choice of what is relevant to a causal analysis out of the infinity of prior and current conditions is not itself determined by the science. There are no necessary conditions for selecting any particular event to be the cause of another event. Every event is related to every other event and conditions in the universe; we choose what to identify as parts and wholes;[14] we use habitual heuristics to select potentially causative events, based on prior sensory experiences or extant theories; and we look for events based on similar situations, the availability of tools for measuring phenomena, and the appearance of correlations between streams of data. Fortunate choices lead to correlations of data that show robust relations; poor choice produce correlations that are weak.[15] Novel choices arise from using new metaphors or creating narratives in which we imagine a meaningful connection. The modeling selects events, parts that are collected into a whole. It forms a plot line of antecedent and subsequent events. Science begins in storytelling and proceeds to construct increasingly formal grammars that eventually become scientific theories with their methods of establishing correspondence of data and theoretical propositions.

The application of Dynamic thinking as the 'scientific method' have proven to be a robust model. 'Science' grew out of the same metaphoric logic as did a number of technologies in late Middle Ages, for examples: perspective drawing, modern accounting practices, and celestial navigation, all of which facilitated the rise of industrial and military powers. In that metaphoric cauldron of an earlier metafluctuation, a number of metaphors led to the transformation of the Classic

into the Dynamic paradigm. The embodied metaphor following *time as path* became the mechanics of *trajectories*, the embodied *animal force* became *f=ma*; and *determinism* gave a sense of the *control of nature.* These root metaphors, trajectories, force, and determinism opened a new paradigm for the explosive creation in the era that we identify with Galileo, Newton, and Descartes. That metaphoric base provided a fertile ground for the scientists and philosophers of the seventeenth and eighteenth centuries. By the mid-nineteenth century, the unexplainable observations that had accumulated in many fields called for a new injection of metaphoric thinking. What emerged were several metaphors: *probability* from the students of thermodynamics; *field thinking* from electrodynamics; *evolution* from biology; and in the early twentieth century, the *curvature of space* and *quantum thinking* which initiated views that undermine part/whole system orthodoxy. And through all this period there were increasing questions as to the role of time both as a concept of duration and cyclicity. The injection by these new metaphors, questions, and technological innovation combined during the metafluctuation of the 1960s to incite the flourishing depicted in Figure 6.1.

The basic thrust of the Dynamic paradigm as science has continued, particularly in biology, physics, and the material sciences, to produce prodigious findings in the diverse range from the sub-atomic to the cosmological and applied them throughout technologies that fill our lives with an unfathomable technological bounty. I acknowledge them here as a huge Science and Technology branch of the Dynamics Paradigm and turn my focus to the other branches that exploded during the metafluctuation. I identify four new prolific branches. One is Mathematical Dynamics, the study of the properties of fields, or total systems, considering the

flows and equilibrium positions of total systems. It a study of wholes and their qualities; it does not deal with part/whole relations that underlie system thinking and as such is better understood through field thinking. Many of the early students of general system theory made no separation between field and system thinking, partially because the tools they were using had been developed in thermodynamics, economics, and ecology, and were mostly expressed in the mathematics of equilibrium systems as fields. Given the differences in their methods of thinking, I can provide clearer understanding of the paradigms when the methods for field and systems are discussed separately. Thus, I grafted mathematical dynamics into the Field Paradigm as discussed in another publication §

The other two branch may be better characterized as expressing the assumption that universe is constructed of atomistic particles, interrelated deterministically. The extension of this trunk is produced by the allowing *circular* causation, denied in Western thinking since Aristotle wrote on causality and in bringing into good currency the idea that almost every phenomenon is time dependent. Everything is characterizable as mutually involved in relation to everything else. These branches of the Dynamic Paradigm explore the phenomena of Self-Organizing-Systems and Autopoiesis. Both grew from the same metaphors to a new way of thinking about relations, order and the environment. Both also operate in environments that are *far-from-equilibrium*, in environments where energy is distributed very unequally as in a storm, living things, and even on a sunny day in spring. These systems occur where energy is open to flow, forming *dissipative systems*, where high quality energy is extracted from nutrients, leaving the 'spent' lower forms to be dissipated. The free

energy retained by the system is available for creating increasingly complex biophysical transactions. Autopoietic systems are self-organizing, building on the same root metaphors as self-organizing systems, but they have additional limitations and extensions that I explore in a separate discussion following the introduction of the self-organizing phenomena and its metaphors.

Self-Organizing Systems

NEW METAPHORS
Open systems
Order from noise
Non-equilibrium situations
Auto-catalysis,
Dissipative processes
PLATFORM
Analytic

A self-organizing system is one that emerges and operates with intention or direction coming entirely from within. Its order arises from the nature of the elements that are present and the environmental conditions. Self-organization is found everywhere in nature, and in all forms of system thinking. It occurs in the Classic paradigm in the iterative Game of Life developed initially by Langton (1986). It appears in physical environments—in the Dynamic paradigm, and in all biological systems and those where the individual elements are viewed as intentional—in the Evaluative paradigm. From the view of a determinist, all organized structures are self-organized for there is no phenomenal role for *intentionality* imposed on some set of elements.

The study of self-organizing systems began with a problem that was an artifice of reductionist nineteenth century physics, particularly of thermodynamics. The problem arose in the study of closed systems operating in near equilibrium conditions. The second law of thermodynamics regarding entropy assured us that the appearance of highly organized organisms is improbable. Closed systems are entropic, any orderliness they start with is continually dissipated. Within the limiting rules of thermodynamics, of the grammar of physical systems, the

occurrence of life appeared to require an explicit designer acting from outside organizing the complexes. The physicist Erwin Schrödinger in his seminal volume, "What is Life?" presented this conundrum to physicist and bio-chemists. (1945) The answer to his question was concurrently being proposed by von Bertalanffy and others with the presumption that life began in *open systems* into which highly organized energy is imported and from which entropy is dissipated. Adopting this one new metaphor opened the scientific discussion of self-organization, however not until the metaphors of far-from-equilibrium and auto-catalysism were adopted did the studies lead to important new insights.

Some physical systems at rest are highly organized. We observe organized settling in the forming of the six-sided snowflakes as water vapor gives up energy in freezing air. Such settling is visible in the forming of crystals in minerals and metals. Self-organization occurs when certain conditions are met, for example, when the mass of similar particles are assembled is sufficient; when the rate of temperature loss is in a particular range; when there are a few impurities in an assembled mass; and when a system is free from energetic intrusions that overwhelm the organizing processes. No explicit design process is needed for regular structures to appear, it is a result of initial conditions that define the energy field.. Crystallization is not limited to inorganic environments. We can see crystallization in human learning and organizational behavior, in adopting a vocabulary, in all the habits of a culture, as systems settle into positions of local equilibrium. Similarly, patterns of interactions settle into 'roles' produce stable organizations without imposed design, as was shown in the early communication

network studies. (McWhinney 1964)These self-organizing structures are properly modeled with probability theories and other tools used in mathematical dynamics.

Opening an environment to flows of energy, in and out, enables us to model additional self-organizing phenomena. Enabled by the allowance for open system flows of energy, the physical chemist, Ilya Prigogine[17] showed that the constraint implied by the second law of thermodynamics did not hold for situations *far from thermodynamic equilibrium.* Western cultures had previously rejected consideration of such situations. Even the revolutionary Karl Marx assumed that historical fluctuations were simply detours on the way to a grand equilibrium, to an ultimate crystallization. In far from equilibrium situations, Prigogine showed how *dissipative processes* could generate organizations of increasing complex forms that are maintained dynamically, not as stable crystals. A natural example may help the reader envision such order as it appeared for me one afternoon:

> Flying a cross the open prairie of Nebraska and South Dakota on a summer afternoon, I was attracted to the sight of a perfect tiling of small clouds in the sky, rows of square clouds with rounded corners, mostly of the same size and separated by narrow troughs of clear air. The pattern extended for perhaps fifty miles in each direction. Nothing on the ground below could account for the patterning, nor currents generated by regional weather.

It turns out that the atmosphere has been organized to produce this regularity by a very simple process. Sun-warmed air rises, and as it does, it cools and eventually sinks back toward the ground. The expansive hot air collects into columns, creating the freest passage in its upward movement. After rising a few thousand feet, the air reaches an inversion layer. There its moisture condenses into

the pillowy clouds of cool moist air. The air, now cool and milling about, is pushed aside by continuing thermal updrafts and sinks at the sides in thin sheets toward the ground, flowing downward with the cool air falling from the adjacent pillow cloud formations. The organization of the columns of air, rising and falling, is self-reinforcing—the organized flows reduce friction thus enhancing the flows. This enhancement produces a form of self-catalyzing. The physical qualities of the air, as molecules and ensembles, and the heat and moisture determine the size of the rising columns, the cloud tops, and the cascades of cool air surrounding them. These conditions produce the elegantly symmetrical pattern that extends for miles on a meteorologically quiet day. This cloud formation demonstrates the 'Bénard instabilities,' in a simple natural unstable distribution of particles being organizing into a system of flows that reinforce themselves auto-catalytically. The result is a temporary structure that appears to be at odds with what one would expect given the statistical theories of thermodynamics.[18] It exemplifies self-organizing processes that are characterized as *dissipative systems.*

Dissipative systems are characterized as:

- open to flows of energy in and out.
- having energy distributions *far-from-equilibrium* compared to the surrounding environment.
- Are of sufficient volume of material and duration for the natural rhythm of the process to be experienced. Such systems display harmonic properties, here displayed in the repetition of the pillowy cloud forms, as can only appear when there is sufficient space and time .
- *auto-catalytic* in a way that the organizing process reinforces fluctuations naturally occurring in the situation.

The cloud formation also exemplifies the self-organization in fields. Other examples arising in ensembles (masses of similar elements) that self-organize are electron flows, schools of fish, and crowds at a sports event. These become organized under some pressure, respectively: local electromagnetic fields, fear of predators, and the excitement of winning. Self-organization may transform simple ensembles into more complex organizations, with differentiated forms and stages.So cultures everywhere have used rhythmic forms to engage a population to act in harmony, to induce ecstatic trances, to encourage soldiers to go to battle, and cooperative action as did the early poets and orators and contemporary demagogues whose repeating phrases, cadences induce organization.The processes of aggregation and differentiation into distinct roles suggest that organization arises under some form of direction, that there is an active agent, called a leader rather than a *self*-organizing system. One might attribute to some part a quality that allowed them to be chosen to form the centers of aggregation and/or to inherit the resources that will guide the emergence of new organized entites. The catalyzing roles of enzymes in simple organisms or complex human bodies also might be viewed to have a privileged position of controlling a system's behavior. Rather, the philosophy of self-organizing systems has become attractive to students of organizations because it provides an ecologically based model of organized behavior occurring without an assertion of external power. All that is needed is for actors to take on roles in response to the momentary conditions in the environment. There is no need to attribute elite qualities to an enzyme. Each is simply carrying out an ecologically determined role without orders from a central

management. This image of organizations translates back into the linguistic domain as questions of the dominance to control enunciative behavior.

The difficulty in viewing self-organization as superior to directed by internal agents (leaders) is that the self-organizing processes do not deal with the purposes of organization; the self-organizing processes have no goals or desired outputs. There are no guarantees that the self-directedness will not lead to activities that are self-destructive and at odds with the environment or the owner of its resources. The differences between the neutral role of entities in a simple organism and the individual humans in a community limit the usefulness of this metaphor for understanding social behavior. The metaphoric relation asserts a communitarianism in which there are no privileged members, no differentiation of motivation and no ownership of the resources or purpose for the organization arising from outside. It assumes that adaptability of simple systems such as viruses is maintained in complex living animals and in social structures. Further, the absence of purpose ignores effects of an environment that contains organisms competing for scarce resources. When creating ideals for human organizations we are naïve to ignore aspects of purposeful behavior and the ultimate possibility of authoritarian take-over, not only in our social lives, but in basic relations expressed linguistically.

Autopoiesis

Autopoiesis, literally 'self-making,' is the process by which a living system maintains its identity, in spite of changes in its physical composition. The idea of autopoiesis arose out of explorations in the biological sciences at the peak of the metafluctuation. Humberto Maturana (Maturana 1975) initiated work into the question of biological identity, asking, "What is it in a biological organism that remains constant?" "What is identifiable over time when the very material of the organism is rapidly replaced with new atoms and molecules?" "What property of living things enables us to identify generation after generation of individuals as members of a nearly fixed genus and species?" Maturana's answer was that living entities possess a continuous and stable self-making process, which he labeled the organization of a living system. This organization is the sustaining core process of the living being. The autopoietic theory defines a separation between the *organization* and the *structure* of the biological entity, between a system's processes and its material realization in structure. The structure is materialized through auto-catalyzing transformations of nutrients into energy forms and the building materials for the renewal of the living being, one that 'breeds true,' in its own self-reproduction and in forming progeny. A grammar plays the same stabilizing role in language structure.

NEW METAPHORS
- Coupling
- Identity
- Organizational closure
- Time as cyclical
- Resonance

PLATFORM
- Analytic

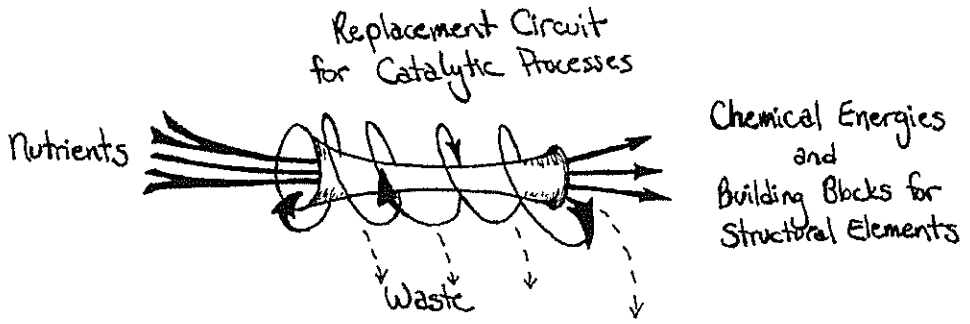
In the biological setting, the self-making occurs in metabolic cycles where new materials, that is, nutrients of relatively high complexity, are:

- imported into the bioworks of the organism;
- transformed into useable forms of matter and energy for its sustenance and reproduction; and,
- integrated into the organism to replace and augment the components of the catalyzing loops that continues the metabolization.

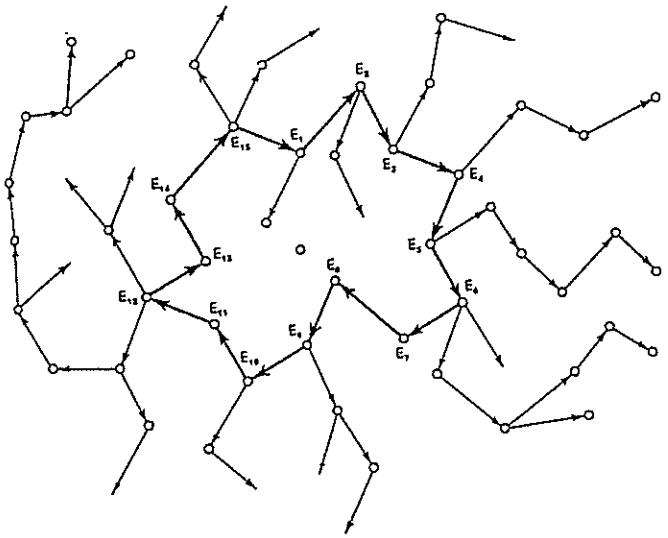
Figure 6.3a § depicts a simple protein cycle with the inputs and outputs of energy available to the organism, new molecules created for the catalytic loop, and waste products that are of lower complexity than of those ingested. Figure 6.3b is a more formal illustration with a comment about the self-correcting properties. The whole cycle is anti-entropic, creating and sustaining complexity.

FIGURE 6.3 AUTOPOIETIC CYCLES

a) A self-making system:



b) A protein cycle that might perform as the loop in the system depicted above: § need reference.



Within a large system of metabolic operations, there is a closed loop of fifteen enzymes, E_1—E_{15} that:

a) catalyzes each other's formation in a way that forms a self-maintaining loop capable of error correction of its own reproduction, and

b) assimilates nutrients and carries out metabolic processes for the ongoing life of host entity. (Based on M. Elgin)

The 'closed organization,' of the cycle normally operates independently of the ongoing transformations with the environment. The concept of a self-catalytic cycle is based on a metaphor of *time as cyclical*. The processes loop back on themselves with a rhythmic patterning of transformations, of remaking themselves by absorbing and releasing energy and material to the environment. While the *structure* of the system responds to perturbations from the environment, the autopoietic system as a whole does not respond to environmental stimuli in a stimulus-and-response manner. The structure adapts to natural perturbations of its cell walls, tissues, bones and so on; the organization itself is robustly isolated from random interferences so long as the autopoietic cycles themselves are not overwhelmed by the perturbations.

Organizational closure creates an identity at the level of the cell and for complex entities built on the closed cycles that appear at every level of an organism. The organism's neighbors are unresponsive to random perturbations; however, the periodic perturbations that are emitted from a system may set up vibrations with neighboring organisms that resonant with their native cycles. When such resonance occurs, the organizations exchange energy and tend toward synchronous operation. They become *coupled, entraining the systems into harmonic relations.* Coupling is the resonance phenomenon that produces the interdependence with neighbors: Prigogine says it succinctly, "resonance couples." Resonance is what coordinates our voices in song and our feet on a dance floor. [19] Coupled systems form supra-systems, which in turn may couple with additional resonant systems. In so doing, the individual cycles may jointly modify each other, changing the cycle

times to coordinate them and bringing more effective catalytic agents into the loops within loops. In coupling with other similarly organized systems organisms, autopoiesis produces more complex organizations, both in content and in the underlying grammar as Luhmann (1987) points out.

Living systems grow in complexity by entraining resonant partners through the medium of their material structures perturbing each other. Maturana and his co-author, Varela (Maturana & Varela 1980), call this resonant extension "structural coupling" to note the way in which an autopoietic entity connects with its environment, structuring referring to characteristic response patterns that assures the entity and elements of the environment to work together. The coupling is of the closed cycles, though it is realized through material processes. It is through coupling that all entities interact, and thus 'coupling' by itself adequately describes the process without the delimiting modifier. Note that systems that do not establish harmonic coupling do not relate and cannot participate in the living processes or provide resources. Non-harmonizing systems may perturbate each other without noticeable impact so long as the organizing catalytic loops are not destroyed.

All complex organizations are composed of a vast number of autopoietic sub-systems that demonstrate harmony with the encompassing supra-system. Societies are composed of people and groups who display resonance among a number of aspects. Such resonance both enables concerted action and delimits the actions to the set of ones that share harmonically related organizations. These delimitations produce the phenomena that the sociologist, Anthony Giddens (1984), calls the

"structuration" that we see in societies and are explicit in the grammars used to regulate communication within a society.

While Maturana and Varela have confined their ideas of autopoiesis to biological entities and strictly deterministic operations, other investigators see the harmonic processes appearing in communications among living things—for humans, in the forming and sustaining of custom and languaging.[20] As described above, any social interaction among humans can develop into autopoietic organizations. All social interactions depend on resonance and are sustained by autopoietic processes. The dynamic paradigm accounts for the phenomenon of personal identity and groups and cultures through the coupling that takes place *between* distinct autopoietic individuals connected through resonant processes. [21] In this model of reality grammars and syntax must also have a dynamic quality, changing with the processes of the society in which they are used.

Analyses within the Dynamic paradigm have continued to produce fecund ideas, increasingly spreading the range of physical and biological phenomena that are explainable by deterministic models. However, as is inherent in models involving emergent self-organization, the next developments are unpredictable. My suspicions are that the most dramatic new insights in system thinking and grammars will come from models that employ interactive engagements between systems, in models of coupling among deterministic elements and among intentional agents as characterized in the Exchange paradigm.

Exchange System Theories

ROOT METAPHORS
(Economic Aspect):
Grasping
Choosing
(Ethical Aspect):
Fairness
Balance
Control
PLATFORM
Evaluative

The Exchange paradigm assumes that systems are driven by intention. Its members make choices based on preferences or purposes. In this mode of thinking, each system behaves according to internal drives. At their source, they are driven according to the embodied metaphors of *grasping* (seizing), as in 'acquiring is good', and *choosing*, as in 'acquiring is a path to a destination' or means-ends thinking. In general, the assumption is that systems are coordinated with the environment or other systems in the environment to the degree necessary for their survival. Exchange systems act as more or less independent *agents* that reach out to grasp (hold, understand, join with) desired aspects of the environment. Independence opens possibilities to compete for those desired resources. Given an assumption that environmental resources are finite there will be issues of exchange and fairness of the exchanges—thus issues of economics and ethics of distribution. The original form of the Exchange model assumed exchange relations among independent agents who had differing tastes—if they were identical, no exchanges would ever occur. The study of exchange (market economics) and the ethics of exchange are ancient topics and had grown as separate social sciences. However, beginning in the eighteenth century, economics began to take a form we would now call a system science.

The ethical root of the Exchange paradigm arises out the embodied metaphor of *balance*, which designs round issues of choosing and acquiring appropriate amounts

of goods, for oneself as agent or in relation to what others in one's society may need or acquire. Attaining balance leads to the metaphor of *control*. This aspect of system behavior first appeared in the study of *cybernetics* that emerged in the 1930s and 40s, first as a feature of homeostatic processes in living beings. Later when the model was extended to describe human systems control issues, it led to ethical considerations. Ethics also appears in economics, e.g., in Pareto's concern with fair division, but has not been fully developed into the economic Exchange model. For most of the last century, fairness has gotten lost in contentions over the interpersonal comparison of utilities.[22]

The development since the 1970s provided the Exchange paradigm an entirely new framework, focusing on acting and reflecting on relations in communicative exchanges. From this developed two fecund branches of Exchange thinking: *Second Order Cybernetics* and *Communications*. These two have not only contributed to extensions of linguistic, they are transforming the traditional ground of system thinking in the study of part/whole relations to an exploration of interpenetration using the coupling metaphor developed in the Dynamic paradigm.

Technologies for systemic choosing

The decades before the metafluctuation were of worldwide depression and deprivation in the service of war. It is understandable that even in remote intellectual realms meaning became associated with what was not available as much as with what could be obtained. José Ortega y Gasset expressed this with great clarity in writing of silence:

NEW METAPHORS
Choosing

PLATFORM
Evaluative

> The stupendous reality is that language cannot be understood unless we begin by observing that speech consists above all in silences. A being who cannot renounce saying many things would be incapable of speaking. Each [language] leaves some thing unsaid *in order* to be able to say others.[23]

If everything is said, nothing is learned. The greater the silence the more meaningful that which is given voice. This is the essence of communication (or information) theory and the source of value in the market place.

Work on Exchange theories, whether economic or communicative, focused on the ways in which people made choices out of a range of possibilities and how those choices gave meaning to their lives. The concern with choice appeared in new system technologies that came into use in the 1940-60 era. Two branches have a bearing on the development of grammars: *Information Theory* and *Game Theory.* They are built on the old metaphors of economics, primarily on the aspect of choice. A third branch, *Complex Adaptive Systems* (CAS) builds on new metaphors of iterative work with networks that arose in programming and the biological sciences during the metafluctuation period.

Information Theory

Information is a measure of the unlikelihood of receiving a particular message out of a set of possible messages. The silence of what is not sent gives distinction to that which is sent. Information is what the receiver creates by knowing the constrained set of possible signals from which the senders are expected to choose their messages. The recipients gain no information if they have no expectations. Messages, without expectation, are just noise. If every possibility were included in a message, the recipient would learn nothing. One must be conscious of the emptiness, which in antiquity was called chaos, to know what it is that one receives in a message. Silence provides order for that which is not silent. The greater the initial chaos the great the order created by receiving a message.

With this basic model of communication, Claude Shannon (1948) at the Bell Laboratories, searched for a measure of the information that defines the capacity of telephonic messages. He began by noting that a message carries no information; the sender's choice is only information in relation to the receiver's expectations. Shannon propounded an elegant theory that measures the reduction of disorder in the mind of the receiver. The measure was designed to indicate the capacity of a channel, a valuable statistic for engineers designing transmission systems, but the formula he devised also set the ground for a brilliant metaphoric leap. It has exactly the form and rationale of the measure of entropy, of disorder that is a central construct in thermodynamics.[24] Shannon's measure of information is given by:

$$H = -\sum p_i \, Log p_i$$

where H is the information value of the average 'letter' in a message and where the probability of each letter i in the 'alphabet' being received is p_i. The smaller the likelihood of any letter being sent the greater the information its receipt provides.

This metaphoric marriage of thermodynamics and communication announced in Shannon's "A Mathematical Theory of Communications" captured the field of communication for decades, diverting the field of communication from noticing that *information is not meaning*. Nevertheless, this theory provided a strong argument for changing the emphasis of communicative studies from focusing on message authoring to interpretation by the recipients to establish meaning.

Information, like the homologous concept of entropy, is an elegant theoretical measure of the results of a communication. It assesses the value of information in a received message. However, information theory said nothing about the processes by which people choose the messages they send. Other system technologies, which are used in Game Theory and CAS, explore the choice-making behavior of people, responding to their intentionalities in particular situations. The economic studies of input/output and game theory evolved in the era of WW II in an intellectual climate still committed to finding conditions for stability and assuming that the decision makers all operated according to a common and well known rationality. CAS is a child of the metafluctuation, using new metaphors in a search for the sources of and responses to complexity.

Game Theory

Market economics began as a meso-level study of the behavior of individuals exchanging goods in the marketplace. In the absence of a psychological

understanding of consumer behavior, economists fell back on the assumption that human beings act rationally when making market choices. They assumed the agents (consumers) acted in response to information about their own preferences and the prices they would expect to pay to satisfy their needs. Although empiricists recognized that the agents seldom made choices in this idealized manner, the rational model seemed the best one available to explore economic phenomena. The interesting observation was that an agent's rational play has to include information about every other agent's preferences and rules of rationality. Economic behavior is not simply choosing what you want but also knowing what the others want and how they will act to get it. Simply, economics and most social behavior need to be viewed as *games* of Exchange.

Von Neumann (1944) opened our thinking about rational behavior by modeling competitive situations that he formulated as games. He noted that since an agent would know what is the rational behavior of others in the market, and that the others would likely know his rational responses, an agent could see that using the rational decision model gave one no advantage in sophisticated markets. Von Neumann noted that an agent will not routinely win by selecting the best, and thus predicted, actions. One needs to 'game' the other agents, recognize one's relation to the other agents and the environment. With this awareness, economics took on a relational quality, dealing with how people take into account one another's mindsets, including emotions, prejudices and information to gain advantage.

A simple illustrative case is the prisoner's dilemma, a game that caught the imagination of social scientists and eventually the general public. The game itself

requires but one move: the two players make independent choices to cooperate or compete in responding to their situation. The interest came from observing how the players can teach each other to trust that neither will 'talk' through repeated plays. The research has shown how cooperative behavior can, under some circumstances, be optimal for all competitive players in an economic game. While the mathematics has proved sufficient to describe only the simplest games with multiple players, the basic metaphor is used widely in business thinking and political strategy. In the heat of the Cold War, both American and USSR planners recognized that their strategic plans had to assume the other would go beyond traditional military thinking to include gaming. Game theory became a required study for strategists, though it was little if ever used.

While the game metaphor itself captured popular imagination, the theory has seen relatively little development. It continues to be a useful system technology in a formal setting and as a metaphor for enlightening those who are just entering the world of competition—economic, political, or social.

Complex Adaptive Systems (CAS)

Complex Adaptive Systems is an amalgam of processes used in decision-making aimed at both understanding emergent behavior and creating optimal responses to environmental situations. Some of the processes are based at a biological level, for example, studying adaptation by the immune system to new biogenic invasions; others have modeled systems at the personal level, doing simulations of chess players and stockbrokers or full organizational activities.

John Holland (1995) constructed a design of the typical CAS operating at any level, consisting of a performance system, an input/output system, and an

adaptive system that includes the 'payoff' functions. The performance system is a perfect example of a grammar, designed so that:

The rules must use a single syntax to describe all CAS agents.
The syntax must provide for all interactions among agents.
There must be an acceptable procedure for adaptively modifying the rules.

The inputs and outputs form the vocabulary and CAS adapts in its use of the rules to payoffs for performance that provides the motivation, or intentionality, for one's behavior.[25] It is a rudimentary model of language in use.

Holland designed a variety of sophisticated search heuristics to explore the effects of interrelation with other agents (people, firms, and governments) on paths to the acquisition of goods or other beneficial conditions. Some of these heuristics 'play games against nature,' working to find goods in a neutral environment; others have agents play games in the presence of competing agents. Holland has generalized from early modeling based on neural networks to "constrained generating procedures," heuristics that are now used in planning and operating strategies for commercial and other organizations.

CAS became an instrument of economic thinking by postulating competitive agents who desire similar goods. Introducing competition requires the agents to revalue goods in terms of the costs an agent must bear to obtain them from the environment or competitors. The agent must use heuristics that take into account the motivations of other agents, with goal functions sufficiently different from their own to enable both parties to profit from the exchange. Viewing a CAS as a proto-communication system provides a simple setting in which to explore the evolution of a language as a game or market in which each participant acts to

render the play favorable to them. In the above discussion of programming it has been shown that with use a language will grow, become stable, and in some cases § questions will arise about the role of motivation in the emergence of languages.

Cybernetics

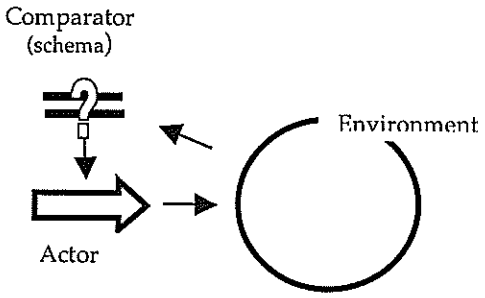
In 1947, the mathematician Wiener and the physician Rosenblueth encapsulated a collection of problems and innovative ideas of control and communication into a field they named 'cybernetics,' derived from Greek *'kyber'* for 'governor.' It was to be the science of systems organized around the phenomena of *feedback* that adjusted a system's behavior to achieve its goals. Cybernetics provides a science of control, primarily designed to stabilize performances at acceptable levels.

NEW METAPHORS
Feedback
Cyclical time,
Control &
Design

PLATFORM
Evaluative

Feedback expresses the metaphor of *time as cyclical,* using looping back to adjust that which was done before and selecting what act to take next. This feedback image combined with the idea of *intentionality* to *design* systems to achieve pre-established goals. Feedback loops with an comparison function can be designed to *control* the output of a system by the degree by which the action deviates from the desired value. The comparator gives data to the agent to correct the next. 'Negative' feedback by reducing the error, stabilizes the system; 'positive' feedback amplifies the error (deviation), leading to explosive, sometimes creative, growth. Whereas negative feedback mutes change. positive feedback ultimately destroys the system. The signature mechanism of cybernetics is the *cybernet,* as graphed in Figure 6.4.§

FIGURE 6.4: A BASIC CYBERNET



This representation is a version of the common cybernet: The actor stimulates the environment, the comparator notices changes in the environment including the actor's impact and feeds back a corrective message to redirect the actor's next act. This fundamental system model is presented in Bateson's discussion of learning types (1972) and in the consciousness models of Libet (1985) and Cotterill (1995).

The cybernet not only introduces the processes of control through the feedback of results, but also the control function carried out by the comparator that is an instrument of intentionality. In the common example of a cybernet, the thermostat, the comparator is formed by a bimetal devices that bends with changes in temperature open or closing a flow of fuel; the `actor' is the furnace which give heat when the thermostat detects a lower temperature than desired stops it when the desired temperature is achieved. In human systems, the comparator is the overseer of the transforming activity carried out by the 'actor,' a worker or machine.

The cybernetic model was quickly adopted as a metaphor for controlling units (workers) within organizations, which were stacked in hierarchies: manufacturing teams within a department, departments within a factory, factories within a division, divisions within a.... This image of a hierarchy of control is idealized in Stafford Beer's work, first appearing in 1960. Beer's hierarchical model answers the question, "Who sets the comparator's target from which deviances are measured?" It

is the boss. That answer is naturally followed with, "And who set the boss's level?" The answer is; someone even further higher up, such as government regulators? The cyberneticians first models were strictly hierarchical, ones in which the operation of each cybernet was controlled by the line of comparators above it. In this form it became an operating adjunct to classic administrative concepts. Whereas classic systems defined how the targets were set at each level, the cybernetic extension provided the mechanism to correct deviances all along the line. In this function, usage was to make experience conform to theory, denying exploration of deviant paths. (Buckley, 1967)

The societal use of the cybernetic control metaphor was pervasive, as it became the popular model for corrective responses in education, interpersonal relations, management, health, and ecology.[26] The model put a modern scientific tool in the hands of those who wished to impose control on the environment. It gave hope to those who would design the world's production of food, build effective business organizations, and construct consistent rules of communication; that is, it provided grammars that could be taught to followers efficiently (e.g., Senge 1990) and as often happens, the metaphor was contorted in the service of its popularizers. Educators and psychologists renamed negative feedback 'positive reinforcing feedback' to laud it in support of the virtue of conformity. "Positive feedback," so interpreted, was the perfect instrument for an era in which America and Europe wanted to hold steady the course of recovery following the Second World War.

With the metafluctuation in the 1960s, there was a social celebration of rebellion lauding deviation from the established models that provided freedom to explore

benefits achieved by amplifying deviations. The switch to focusing on positive feedback introduced a new metaphor that was in tune with the explosive changes that were occurring in society. Migoroh Maruyama (1968) captured this metaphor in phrase 'second cybernetics' designed to study the constructive outcomes from exponential growth, which, still within the Dynamic paradigm, lead to the autocatalytic and self-organization models. When imported into Exchange paradigm the consideration of two kind of feedback induced a general study of the phenomena of feedback. It produced a broader view of possible relations of a comparator to actions into new causal modes and the evolution of epistemologies and theories of meaning.

The expansive metaphor of 'looping back' that has been used in the iterative programs of the Classic paradigm, and autocatalytic cycles that produced self-organizing and autopoietic systems in the Dynamic paradigm is radically changed in the Exchange paradigm by recognizing the goal oriented behavior of the comparator. The most socially significant extensions were in education as a new model for learning and into engineering as a prime technology for design and manufacturing. The cybernetics image also enhanced the transition of networks formed in the Classic paradigm from the pyramids constrained within that theory to general communication networks composed of intentional nodes connected in closed loops for two-way exchanges of messages. (see Barabázi, 2002) § Step-by-step the system metaphors grew into the *canopy*—discussed later in this chapter) in which language and its grammatical structures are becoming entangled.

Mutual Causality and Second Order Cybernetics

The development of cybernetic and economic modes that involve feedback cycles rejected the philosophical position that an entity could not be the cause of itself. It raised both questions of identity and of the implications for self-awareness that had been rejected in the empirical sciences. So long as cybernets were viewed as mechanical devices, no one raised questions as to whether the controller and actor were a unity and the mechanical actor remained practically unchanged by the controller's actions. But when the cybernetic metaphor was extended to human communications, it raised the old questions of identity and the possibility of self-causation, thus of mutual causality, which had been denied since Aristotle pronounced its impossibility.

NEW METAPHORS
- Social Construction of reality
- Reflexivity

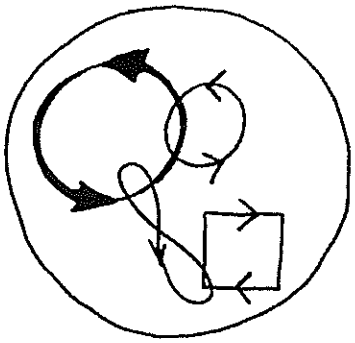
PLATFORM
- Evaluative

Mutual causality, or circular causality, calls for a phenomenon not easily incorporated into scientific thinking, that of an act causing a change in itself. Its graphic presentation as in Figure 6.4 gave the impression that the impact of an act was *fed back* to the instigator of the act thereby producing circular causation. It would have been more accurate to represent that impact as *fed forward* to affect a next event and produce a next version of the actor that produced the effect. The pure Newtonian positivistic models deny circular causality. In spite of the logic of that position, it does seem that events are 'caused' by one's own behavior if we accept that identity is maintained with minor changes in the material composition of an entity. A cybernet model of the controller/observer and the actor as a unity of a conscious choice-

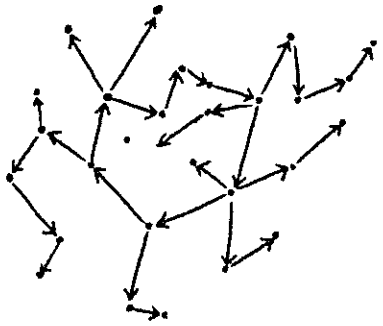
making element and an acting element provided such a form. Discussion of this paradoxical form arose in the 1960s concurrently with discussions in the social sciences of the interdependence of the observer with that observed. The concurrence led to extending the issues of control to a mutuality of effects and radical changes in the study of communication processes and to *second-order processes* (Bateson, 1972, Argyris and Schön, 1978). The plausibility of maintaining identity with changes was further developed with Maturana and Varela's concept of autopoiesis. This feature of an organization provided a non-metaphysical means to separate the identity of a living organism from its material composition. The identity of an organism is derived from the core autopoietic cycle through which it maintains its essential metabolic persistence while under going changes in its material composition.

The acceptance of mutually interdependent intentional agents into system thinking led to radical changes in its content and role as a follow-on of the intellectual fervor of the metafluctuation. It opened the system questions to issues of control, of participation by the parts of the system and, ultimately, to the source of reality implied by the acceptance of participation in defining a system's operation. The view of systems grew through two metaphor of participation in which *the observer becomes participant* and *the causal source becomes a construction of the defined system*. These two extensions began the break from the whole-part premise in system thinking and undermine the logic of western grammars.

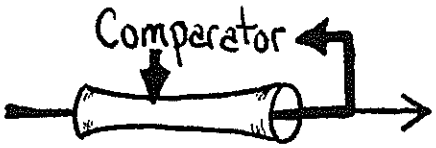
FIGURE 6.5: FORMS OF MUTUAL CAUSATION



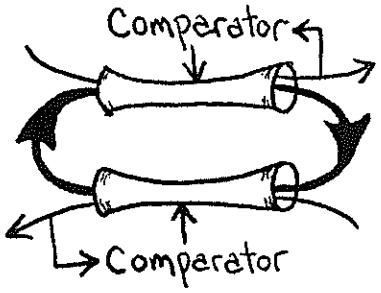
a) FIELD RELATED
Deterministic dynamic flows within given control parameters. No intentionality involved. Can produce stable or chaotic behavior



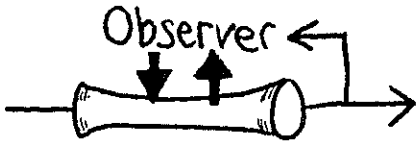
e) NETWORKED
Mutual response among a (partially) connected group of transponders of any type exhibiting one closed loop.



b) CYBERNETIC [MODIFY DIAGRAM]
Process intentionally directed by controllers that use data from outputs effect on environment to modify behavior.



d) DIALOGIC
Mutual response between two observed processors of data.



c) REFLECTIVE CYBERNETICS
Observer-comparators are aware that they are a part, and reflective of the processes they control.

[

That which is called mutual causation takes a number of forms that are dependent on the existence of feedback, or feed forward. In Figure 6.5, I present five variations on mutuality that differ in their recognition of identity of the parts, in the placement of control among the parts, and in the assumed source of reality:

a) FIELD RELATED examples: markets (wholistic assumptions), ecologies, and cultures situated in a society.
These (dynamical systems) models are wholistic, defined to be without parts. The totality responds as a whole. It is not meaningful to think in terms of an element causing another's behavior. The whole can be thought of as mutually caused, but mutuality is empty. The total behavior is determined by exogenous law and specified by control parameters. It is usually studied with the tools of difference and differential equations.

b) CYBERNETIC examples: directed learning and machines.
A cybernetic model presumes the independent existence of parts and specifies an operating and a control element. The behavior is goal-oriented, the cause is teleological in direction while efficient cause best describes its operations. The processes are directed by choices made by the controller. The model is a rudimentary exchange system, limited by a uni-directional intentionality from control to processor. Strictly it is only applicable to situations where the environment contains of a defined set of alternative states allowing the comparator to reliably judge the deviation from the desired outcomes. These situations support what Bateson labels Learning I (McWhinney, 2005)

c) SECOND-ORDER CYBERNETICS Example: family system therapies where the therapist sees herself and operates as a member of the family-in-process. A second-order cybernetic model represents a step toward full mutuality in participation. It recognizes the controller as an *observer* independent of the processor, then, as a *participant*. Its observing function affects the behavior of the ongoing process—a belated application of the Heisenberg Principle in social

science. While the form is the same as the first order cybernet, the designation 'second-order' alerts us to the interdependence of the observer and the closed loop of behavior-observer-control cycles (Figure 6.5c). In second-order cybernetics, the focus on exchange is replaced by observations about the actions (inputs and outputs of the operating cybernets), while impacts from the outside world recede from the focal conversation (as when Alice went down the rabbit hole and lost contact with outside reality.) Everything that is known about the system becomes an observation made by observers who by definition become internal to the system. The dominant characteristic of the responsive system becomes observing and reflexivity.[27] As an observing system, reality is found in the mutually reacting behavior of the observers. Its values and interpretations are common to the whole set but not tied to any particular agents' declarations. As self-reflecting agents they construct their reality socially. Von Glasersfeld labeled this socially constructed variety of reality *radical constructionism,* "exclusively an ordering and organization of a world constituted by our experience." (1984) This reality specifies that we see the observer and the observed to be both *of* the system, *and* somewhat *independent of* the external environment.[28] Any interpretations of data received from the environment or other agent nodes expresses biases of the originators' worldviews and their memories.[29] Thus every message is an expression of the mutually developed images; its understanding requires a continual hermeneutic cycle of reception and reaction. In this sense, every message in observing systems and organizations affect the language in use. It is not as portrayed in the classic mode, as a given to be adopted by all parties.

d) DIALOGIC example: normal dialogue between self-aware people.
A dialogic model presents the full mutuality between separate individuals, each of which are treated as goal-oriented systems exchanging in an environment constructed socially (as defined by constructionism). It extends the second-order cybernetic to issues of power between participants and to relations to the environment while retaining the concern with interplay of self-observation with other systems.

e) NETWORKED examples: markets (atomistic assumption) and computers. A network model is viewed here as a dual to the field model. It is composed of individuals who are in dialogue with others in the system; that is, it is a communication system. It can be a digital approximation of the field model or following the Lewinian model, be composed of individual elements each with their own fields of influence. In either case, we can describe the behavior as mutually caused, though not necessarily producing the dialogic quality that flows from full participation.

The over-all impact of second-order cybernetic thinking is to move the focus of system thinking from the isolated image of a cybernet to considering self-aware elements in a larger context with responsibility for maintaining meaning in its setting and to operate with whatever causal model is appropriate to the issues.

COMMUNICATIONS

Communications can be described by two extremely different models that both arise out of the Exchange paradigm. The more immediate form of communications describes individuals signaling to each other on occasions of danger and opportunity, desire, and rejection. All living organisms exchange such messages—this ability is definitive of living organisms. Signaling conveys messages that the recipients learn to respond in cycles of stimulus and response. The signaling mode is described by the *conduit* metaphor where messages containing intentionally relevant data are exchanged between a sender and receivers in a coded form. In the current metaphor, this is the *digital form* of communication based in a mechanical analogy of cause and effect relations between separate objects or systems.

The digital form is a highly articulated version of the basic form of communication that is used by all living organisms. The second model of communication operates through *coupling* that we see most clearly in rhythmic entrainments, chants, dancing, and in the ritual retelling of cultural epics and myths of creation. Coupling produces communication by establishing systemic relations among participants rather than by choosing and sending messages. It is best viewed as a functioning within a system. While coupling appears to occur *between* systems, it is better understood as intra-system phenomenon.[30] Coupling is the condition of systemness. The coupled system is an environment in which the cultural interpersonal relations are maintained and semantic relations develop. Coupling uses harmonic structuring of intersystem relations to create meaning in dialogue, to give meaning to social engagement.[31] We will see that all social exchanges are functions of rhythmic coupled interchanges.

These two modes of communication are a dual pair: the *conduit* model is linear and discrete; and the other, the *systemic coupling*, non-linear and complex. The conduit model explains the way a receiver gains information; the coupling model explains the creation of shared meanings. Almost every communicative act can be viewed alternatively in the linear and the rhythmic form; each presents aspects of the exchange that are weakly treated by the other. I present these by first expanding on the conduit processes that has been introduced in the discussion of information theory, then introduce system coupling that was introduced in the discussion of autopoiesis. In Chapter 8.§, I further extend the discussion of coupling phenomena to relate it to the processes of engagement.

The Conduit Model

Communications are commonly considered to follow from exchanges of signs and symbols through conduits of discrete signals between persons. As indicated in the information theory discussion earlier in this chapter,communications are achieved when the exchanges reduce uncertainty for the participants. This use of this mode of communications increased with the development of symbol systems which linearize enunciation as occurred with the evolution of written languages and all forms of authored information: music, art, technologies.... An author creates messages that are packaged in books, paintings, cinema films, junk mail, or simply in words. The current common sense of communication is characterized as exchanges of items chosen out of a set of icons, signs, or symbols that conduct the sender's intentionality.[32] The formed messages are sent along to known or unknown destinations. Messages gain the power to communicate the sender's intent by using standardized grammars, which delimit everything we might say. Dictionaries and grammar texts support the precision of the transmissions, however, it is within context that they are interpreted to enable understanding. Our daily conversations depend on a vast context in which the messages are embedded. For all their specificity, the messages do not contain information. As Heinz von Foerster insists, "The environment contains no information: the environment is as it is." (1981, 263) Communication is not in the transmitted message, but the drawing of attention to an element of content in the vocabulary and mind of the recipientSo, while messages are conveyed, communication occurs only to the degree that the sender and receiver operate from the same contexts. This has been the assumption of linguistic studies over past centuries. It fits the physiological premise that we are

stimulated only by messages which produce a difference and thus give us cause to respond.

As noted in the discussion of information theory earlier in this chapter, a message impacts the recipient only to the degree that it is formed in the context of an encompassing silence of what is not said. The conduit image of communication presumes that the senders imbue their messages with a meaning that will be conveyed to the recipient, that is, that the author creates and defines the meaning. This presumption is rejected by Shannon's work (page §), which places the formation of meaning with the recipient. His work asserts that an author does not create information, rather information is defined by the recipient's expectations. The fact of it being *conveyed* to the recipient assures that the message cannot fully take into account the context in which it will be received. For example, a political editorial gives one meaning to a supporter and another to an opponent. Meaning is created in the context in which it is received. So almost any interpretation made by receivers who hold different sources of reality will lead to differing and often conflicting interpretations. In its baldest form, awareness of processes by which meaning arises in communication is the central issue of the book—the concern for construction of articulations that will engage others in coming to a shared meaning though an exchange of utterances. Meaning is a joint product of source and recipient.As formally persuasive as Shannon's theory is, it was the work of literary critics that raised a broad awareness that meaning could not simply be transmitted from an authoring source to a receiving person. Awareness of this alternative view of communication was generated by the interpretive and hermeneutic thinking of the German phenomenologists, writing earlier in the

twentieth century. Its impact was greatly increased by the writings of a generation of literary critics. In the 1970s,[this message was sent] by Jacques Derrida (1973), then in a more accessible form by Paul de Man, and, with greatest relevance to the communication world, by Paul Ricoeur.[33] Ricoeur wrote: "to understand [a transmitted message] is to generate a new event from the text in which the initial event has been objectified." The meaning is created by reaction to the text upon its reception. Understanding a communication becomes a process of extracting a meaning from the entire situation of the reception: a hermeneutic cycle reflecting the mindset of the reader, the medium, the cultural moment, and incidental knowledge of the conditions under which the author created the message. The recipient's interpretation is independent of the author's intent. The meaning ascribed by the receiver is itself transient, taking on new meanings with the context of each reading and each recall.

The view that meaning is in the context proved useful in clearing the ground so we could see that "the emperor wore no clothes." The conveyed message is but a glyph instigating the recipient's mental processes. However, the deconstruction of the authored meaning did not provide a way to reconstruct a meaning that related to the authoring source. The conduit model of communication has to be complemented with one that allows the recipients to use interpretive processes in addition to conveying the choices the author presented with the incoming message. The conduit model developed in the context of the empirical sciences—in the traditions of the dynamic paradigm. In this model there is no way to explain the transmission of meaning. We need another approach to get beyond the intrinsic isolation of the atomic presumption of the conduit model.[34] The source of

meaning is found on a different path of exploration. I transit to this path with a fictional device, a story to bridge the diverse thrust of the two models of communication.

Coupling

In some mythic cosmogony, there was a time when human beings lived in harmony. In this blissful condition, the people had no need for a complex language, because everything was commonly known and shared among those living together. They experienced this unity in performing ritual dances, engaged through rhythmic syncopation and recited epic tales of their origins. Thus they sustained their unifying harmony. They were living 'at one.'

There was never such a blissful time for with consciousness came individuation. Each person developed a distinct worldview and appreciation of the environment. Each contributed differently to maintaining a community, to mending the rents that opened at the fringes. Their need to manage the rents led to informative exchanges. Language appeared in the space between the silence of understanding and the noise of novelty. Conventions formed and developed for what needed to be uttered and what could be left unsaid. The domain in between harmonic silence and uncorrelated cacophony became the *semantic domain,* merging *order* and *noise.*[35] In the arenas of disharmony, the post-Edenites constructed the conventions that matched their rhythms and contained their social norms. In this domain they organized platforms of discourse (Chapter 4), attributed qualities and collected characteristics (Chapter 5)§, and choose actions that facilitated increasingly complex relationships. They formed speech to

reestablish unity in the presence of noise. The semantic domain became the arena for maintaining commonalities and displayed and organized differences.

Even though there never was an Eden or a Babel, the myths remind us that our languages arose out of a silence before there was noise; there were no constraints until there was the need to exchange emergent intelligence, to deal with differences.. From this view, communication is the noticing of a difference among members when the on-going presumption is similarity. The differences are noted on an occasion when there are non-coordinated movements, disharmonies. The disharmony is experienced when the receiving members notice that an action sequence it generates does not match its environment. It responds to the mismatch, not to the stimulus itself. We are acting continuously with the environment by engaging in acts that we expect to be a disturbance of harmony. When the responses are surprising and disjointing we counter with a new sequence of actions in an attempt to reestablish harmony. Communication occurs in these exchanges that tend to reestablish harmony. These exchanges produce and are evidence of *coupling*.

Coupling is a general process, as fundamental as are time, space, and energy. Coupling enables articulation, the simultaneous joining and separating of elements of a system. It is the process through which a system such as a culture functions, forms meaning, and maintains a context. It is through coupling and differentiation that humans establish and maintain membership and identity. Maturana and Varela (1980) wrote of *structural coupling* as a way of describing the essential connection between an organism and its environment and the essential distinctions that are maintained in the autopoietic identity. This dual requirement brought attention to this mode of relating of an organism to its environment, but it

is just one function of coupling. Coupling provides a general framework for transcending the dichotomies of system thinking, of part and whole; it further questions the image we have of words as separate free-standing entities. And as an inference from this encompassing function it provides a general approach to communication phenomena, first accepting part/whole communications between elements, then showing how coupling connects flows of fed back messages that create meaning.

I began by considering communication through the conduit model. That model provides an explanation of how we reduce uncertainty by receiving symbols from another systems, from out of the environment of our receptors. But gaining meaning requires that the messages be received in a context within which the uncertainty had been defined. Symbols attain meaning by being placed in a context.

> Meaning enters our communication only through their *association*, which they acquire through being associated with or opposed to one another in all sorts of contexts. Meaning is therefore a function of the ways in which we create and otherwise experience contexts. (Wagner, 1975, p. 37.)

Meaning follows from the way we create contexts. We do that by coupling in increasingly complex relations. Meaning comes about in experiencing hermeneutic circles.

Coupling is the way by which we detect the other, see a beam of light, feel the pressure of a handshake or hear a spoken word. Everything that we can detect, we detect because our system is able to couple with the dynamic properties of other systems to form a relation of momentary or significant duration. Every interaction

between fields of potential is accomplished through coupling. Every 'recognition' and actualization is achieved through resonance that enables distinct entities to couple and thereby materialize an interaction—to mirror its structure. Coupling is the rhythmic energy exchange that effects relations between systems—molecules, amoebas, humans, and galaxies. It is the temporal process though which entities 'come together' to form a coordinating wholes and generators of meaningful contexts.[36] What we understand to be the impact of one object upon another, a contacting, is better viewed as a series of rhythmic exchanges that transfers energy and momentum between the involved entities. Between electrons, a series of photon exchanges carry the energy back and forth, 'bouncing off' each other until the coupling forces are resolved, leaving the particles to go their separate ways.[37] We sense the same process in the vibrations set up on striking a bell, blowing softly across the reed of a clarinet or seeing the ripples produced when we drop a pebble into a pond. Between people, coupling is also fundamentally a rhythmic dance, a pacing of actions and reactions, whether of words, images, actions, or what we refer to as 'vibes.' So the elements of an ecology are coupled by the ebb and flow of energies and resources—the sun and rain and organic metabolisms.

Everything we see, everything we know comes to us though coupling; everything we observe or feel we do so because we can generate responses in turn with the stimuli. In recent years there has been a variety of theories substantiated by experimental data that show evidence of such coupling in humans and animals: Vittorio Gallese (2001)[1] writes of 'resonance' in empathetic relations; many

[1] Gallagher, Shaun 2001, "Here Hermeneutics and the cognitive sciences" Journal of Conscious Studies" GET PROPER REFERENCE

researchers have written on the concept of mirroring in which an individual understands another through having a neuro-motor sequence that is called up on receiving a message, (Gallagher 2004)

Coupling enables the harmony of well-trained choral groups. It accounts for the convergence of menstruation cycles of women who work close together. It brings together human beings by inducing similar patterns of reaction, identifying similar associations, by converging mindsets. It works to produce trivial agreements on having dinner together as well as shared moral and intellectual stances maintained across diverse cultures.

Coupling is exquisitely evident in a group dancing rhythmically coordinated with the music's beat, in a pair of porpoises plunging down a wave front, or the wind amplifying long waves at sea. We enhance a resonant exchange when pushing a child on a swing by timing our effort to begin just at the moment the swing begins to fall away from the peak. Pushing 'in phase' amplifies the swing. Pushing out of phase decouples the pusher and the swing, dissipating its motion into random fluctuations and heat. Conversely, pushing *exactly* in phase and with similar momentum makes no impression. The difference, kept small, between the pusher and the pushed, maintains the coupling of the two. The energy of an impact is only noticed if the energies of the involved bodies emit are of nearly the same frequency or some whole or even multiple of that frequency. If they flow together with *perfect* harmony, the bodies pass without interaction.[38] Alternatively, if they are of extremely different energies they will pass without notice; a neutrino passes entirely through the atoms that make up the earth without encounters—

there is no 'time' to stop and dance. Complex entities like molecules are likely to encounter and vibrate with other molecules, and one human seldom totally misses the other person passing by. The incredible skill for matching is illustrated in the human immune system in which cells can respond to a resonance that distinguishes any of a hundred thousand proteins[39] and in our cerebral systems that can separate out and identify as many as a quarter million distinct words.

Matching is a temporal process; it is a function of the length of time a process requires to complete a cycle such as the time it takes a child's swing to go out and come back. In a physiological world, the timing is depends on the rate of metabolizing proteins. In the motor-neurological setting it is the time required for a sequence of muscular contractions and relaxations to be completed, according to newer ideas of neurological operation, the cycle will include to set up a *movement plan* for such sequences to be executed. Such plans, also called proxies in cognitive psychology (Cotterill 2001b), are stored instructions for sequences of muscular firings.[40] For example, the proxy for how a leg muscle group would respond to a sense of falling (disequilibrium of one's body), or the visualization sequence that generates an image on receiving the word 'daisy.' These are elements of a neural network related by their ability to evoke responses from other dynamic elements. The muscular group is readied before the order comes to execute the sequence. Once we decide to move a finger or utter a sound, it takes a small but finite interval to effect the action times (measured in tens of milliseconds.) Typical muscular responses in animals take about 150 milliseconds, with many acting concurrently. A whole pattern of response, which might include the synthesis of complex protein molecules, may last far longer—seventeen years for a variety of

locusts. A response pattern may be linked into a vast cognitive chain that allows one to reproduce an entire symphony or an epic poem. Muscular plans at the biophysical level appear as the memes and stories of which our conversations are mostly composed. The duration of the plan's execution, plus muscular recovery times, determines the feedback cycle and the rhythm through which an organism couples with the environment. (Libet 2004)

That we can communicate with the other beings comes from the presumption we are much like those others, that the receiver's apparatus can generate rhythmic sequences that parallel the sender's. We receive actively by initiating a neuromuscular sequence that mirrors the incoming message, though we usually inhibit its vocalization. (Meltzoff, 1995)[2] We can recognize such echoing behavior on seeing to a Japanese speaker responding to a request with a nod that an American might interpret as agreement. Rather, he is indicating, "Yes, I have configured your message in my cognitive system." "Yes," simply indicates he shares an enunciation. We form a message in order to receive it. It is captured in a *proxied movement,* a mirroring that we comprehend by generating the actions that we would have taken to express the received communication. Awareness of the other's message is the echo-within of ideas and images evoked. It is not the passive impression of a message on a *tabula rasa,* the blank slate on which the sensed world is inscribed as envisioned by the philosophers Thomas Aquinas and John Locke. Neither is the echoing sequence ever a perfect copy, nor can we use it to reconstruct a perfect copy. Rather the errors in reproduction become the instrument of

[2]. Meltzoff, A.N. (1995) "Understanding the intention of others: Re-enactment of intended acts by eighteen month old children" *Developmental Psychology* 31, *p. 838-50.*

engagement—we contact others to work discrepancies and through hermeneutic exchange to establish meaning.

Dominance

Reviewing the way systems couple provides an evocative base for understanding what happens to communication as a function of the differences among systems. The classic example is of two pendulum clocks hanging together on a wall. (Abraham, n.d.) The clocks are designed to identically mark the passage of time, but there will be errors due to minor variations in the pendulums. However, the two clocks influence each other through slight vibrations transmitted through the wall. Over time, the clocks will entrain each other, coming to mark time with identical, though opposite, swings of their pendulums. If the clocks are of the same design and manufacture, their tempo and swing will split the difference between the marking of time they displayed before coupling. If they are quite different designs for example, if one has a much heavier pendulum, the rhythm of one clock will dominate the other, causing the one with the lighter to swing at a tempo off its natural rhythm. The difference that matters is the power (or resistance to change) that each system displays in the coupling, the dominance being directly related to the power—weight—differences. Big systems tend to drag smaller systems toward them in proportion to the ratio of their power in the mode through which they entrain.

The dominance in a coupling relation can suppress the natural qualities of the lesser element. The pendulum in a clock perfectly exemplifies the effect of dominance—the massiveness of a whole pendulum suppresses the effects of its elements; the physical inertia of the pendulums overwhelms the diverse rhythms of the molecules of which it is made. The thermal motion of the metal particles and

the gas molecules of the air, the friction the clockworks, and the vibrations coming through the wall are so dominated by the massive pendulum that we ignore them. However in many other systems the energies are more evenly distributed; in communications among members of a group or an organization

This simple model of harmonic motion has been an important contributor to the design of mechanical and communication technologies; and, it is a good model of massive systems the movements of which are easily simulated. However, modeling even two real systems such as the slightly plasticity of the moon and earth brings in far more complexity and far richer modes of response than between these two bodies. I describe two of these modes, spectral coupling and hierarchies of feedback

Spectral Coupling: Great bells ring their own chimes

In natural systems, say of interacting molecules, the earth's atmosphere, living cells, or a whole community of individuals, there is a multiplicity of significant couplings among the elements. Read a poem and the audience generates dozens of metaphors. Purse your lips and your feet turn slightly inward.[41] In any living, system, a vast range of related harmonic systems come into play when any part of the system is coupled to a stimulus. In most natural systems, engagements produce complex tuning among many frequencies generated by the entrained bodies and multiple entrainments form *couplings across a spectrum* of messages.[42]

All communications arrive as invitations to dance, to move with, whether it is via a tap on the shoulder, a question from a spouse, or a humming bird flitting into our view. Messages never arrive simply. They come, like invitations to dance, with over-

tones and under-tones and 'noise.' Their reception evokes a variety of harmonics in the receiver beyond those of the overt message. So as a massive church bell rings out, neighboring bells, large and small, echo in harmonic tones. Every received symbol (tone) generates a spectrum of related signs, some clearly harmonic, others so complex that we hear them as noise. The bowing of a violin evokes a range of harmonics and some noise from the strings. The 'shape' of these responses determines the quality of the sympathetic responses—a rich variety in a fine instrument, and a narrow and noise-laden response from a poorly designed one. So, it is useful to think of any message as a broadcast with its diverse components being received by the sensory receptors of various elements of an organization. People and systems tune in, responding over a spectrum of responses.

A spectrum of energy in any waveform that produces light, heat, sound, and even earthquakes distributes energy at various frequencies (or periodicities of the feedback loops). The distribution may be apparently continuous as in white light or consist of energies at discrete frequencies such as the intense yellow we see emanating from sodium vapor lamps on urban highways. A spectrum can also describe the range of paces of people walking on the avenue and the verbal rhythms in conversations. Spectral coupling is the entrainment of two or more systems across such spectra of energy or messages. The coupling initiates a new meta-system or reinforces an existing pairing.[43] The two-clock coupling is illustrative of the simplest case, showing coupling at one frequency. In living systems, coupling will occur across a spectrum and many orders of coupling. Messages are received at many levels, at different power levels and at different times. Some signals will resonate and exchange; some will be too weak to induce a coupling. Those that resonate pull

on elements of the organism's system according to their comparative power and the degree of match between the natural periodicity of elements of the receiving systems. As the merging sub-systems come close to harmonizing, sub-tones and super-tones and non-linear combinations cooperate to yield new couplings. Spectral coupling is achieved though developing resonant feedback loops within individual's neurological and (harmonic) social systems. In living systems, inputs from diverse internal sub-systems and from outside find and reinforce co-resonant feedback loops. The coupling induces more harmonics and thus creates networks of related neuromuscular loops (or data circuits) that enhance the system's abilities to couple with messages in the environment. Each has cybernets; those within the individuals we speak of as reflexive or reflective, and those calling on outside sources, as hermeneutic cycles. Transients and chaotic responses induce and lock-in serendipital couplings.[44]

Hierarchies of reflection and dominance

Coupled systems in which the elements are of near equal power display a greater range of sensitivities to the environment, are more open to intelligence from the environment, and can be more diversely responsive than can a disparate collections of such elements. The human immune system gains incredible power through its coupling into a discriminating system. However, the unique power of coupling found in higher animals; it is that which comes from reflection and the hierarchies of information that characterize organizations. It is through ordered hierarchies that systems attain properties beyond those available to a conglomeration of atomic (independent) parts.

TO BE DEVELOPED The following material is both incomplete and disconnected. I have omitted it from this copy as it would be more oncfsing than helpful.

In classic organizations and formal language used in the mathematics and administration. The aim is to have the linkages control and §

Non-hierarchal relations – typical of reflective explorations

Tie to Roach's work re classifications\

gets the most out of the environment, building multiple channels of exchange. All living entities chose to filter out information that will overload their capacity, some filters are genetic, some are willful established while in the womb, in the first few months of life, and through out the rest of life.

Development of dominance and relation to triptych (CHAPTER 4)

But higher animals also have abilities to reflect on information they have received.

It also leads to unmanageable rich demands for exchange if the participants are to share meaning across their spectrum.

and partially interpret by assigning qualities, noticing characteristics, or values. These become the tags by which observations are collected. The collections can be labeled, as demonstrated in Chapter 2 and themselves become objects. There are rules for what are included in an object—e.g., the whole is of greater capacity than the sum of the parts due to established relationships. A closely

working team taps into a broader spectrum of information from its environment than available to a set of agents working individually. Participants gain both freedoms for individuation and stability through synchronization and stability of multiple resonant relations.

Entrainment of living systems engenders capacity to handle complexity. It produces systemic resonance that leads to an accelerating growth of complex coupling. The coordinated behavior that ranges across a spectrum of responses allows a system to recognize more of what had once been 'noise' as meaningfully structured. The structure is then realized in new vocabularies of molecules, muscular sequences, phonemes, words, literatures, and in grammars that evolve into new system paradigms. Entraining diverse harmonies adds to the repertoire of potential responses, so long as elements of the system have open capacity, and energy is available to convert noise into language. Every exchange produces sub- and supra-harmonies in upwardly reinforcing spirals of organized capacity to handle variety. *A non-equilibrial environment of systems with open vocabularies and grammars spontaneously self organizes comprehensible structures.* These self-organizing systems grow exponentially into an encompassing meta-system that we recognize as a culture.

The human condition in this era supports such exponential growth in our capacity to handle information. The growth occurs through the creation of new grammars, networks, and vocabularies on a path that began with the evolution of speech tens of thousand years ago. We are experiencing an accelerating exponential growth in recent centuries following the availability of printed books and now with the spread of audio and video telecasting that transcends cultural boundaries.[45] We

have created a capacity for handling complexity within a technological environment that can support orders of magnitude more complexity than we are currently handling. However, there are no guarantees that we manage our capacities; our exuberance can grow into acts of terrorism that will collapse our extended harmony into a heap of noise. Prigogine discusses models of such self-organizing phenomena as proposed by Manfred Eugene. (Prigogine 1980, 108-109)

Coupling is the communication form through which we transfer meaning between systems; communications via a conduit are a reduced form in which the harmonics have been systematically clipped to limit the range of messages thereby reducing ambiguity. The conduit thus carries meanings that are relatively simple, of low dimensionality, and conveyed a bit at a time being strung out on a clothe line as Suzanne Langer was quoted describing in Chapter I (page ?) Conduit communication is a linear form, with serial dependence of one symbol on its immediate context. Coupling is a wholistic mode in which every symbol is related as an integral element of the total context. Normal exchanges are made up of discrete elements, e.g., words, that have been coupled. A major aspect of style is achieving the right balance—to inform ad connect.

[[A new language will be needed for a new vision, one that may draw on poetic and musical expression more than analytic discourse, an analogical language of engagement rather than of digital distinction. So, I shift this discourse toward a new metaphor for the space in which we will find the flow of languaging.

THE FOREST CANOPY[46]

Canopy: a diaphanous fabric
spread over a bedstead to
keep away mosquitoes. So the
Greeks defined *konopos*. It has
since become canvas stretched
between poles to shield a
celebration from the sun and
rain. For ecologists, a canopy
describes the roof formed by
the great trees of a rain forest
that hides the ground from
sun and drying winds.

The canopy operates as an ecology distinct from that on the ground below in the shade of the great trees. This ecology is a 'groundless ecology' floating fifty to two-hundred feet over the forest floor, a tangle of branches and vines inhabited by its own flora, fauna, and phenomena. It is both of the earth beneath and transcends its rules. For those creatures and plants that inhabit it, the canopy is also a field of forces reflecting the whole floating strata and of the individual micro fields generated by the ensembles of

living things. It is no longer rooted in the embodied metaphors, but is a self-generating ecology, making use of the resources of the forest. Its metaphors are no longer rising out of the individual body but out of the social body.

The great rain forests are but one example of ecological niches that we place between the ground and the over-story above it. Some are not of so grand dimensions. There is a canopy of mosses and lichens but a centimeter high that grow on the granite boulders around a Norwegian fiord, and there are swarms of electronics elevated a few millivolts above 'ground' within a canopy of a superconducting metal. A Creole language forms a canopy to bridge the speech of the cultures 'below.' 'Canopy' can be used ass a general metaphor for a world of emergent phenomena that appear above the organized level of complexity. 'Canopy' leads to two powerful metaphoric extensions in the domains of meaning and communication. First, as a metaphor for exploring *ensembles.* Second, to explicating *paradigms*. Both of these targets domains lie between an assumed *ground* and the *overstory,* relating trees to ensembles and the forest canopies to paradigmatic models, relating species of organisms and ecologies, and the individual phenomena to grand theories of culture. They are long leaps, great imaginating trips that suggest features of the targets that have not been obvious before making the connection with the source image. This metaphoric leap suggests a variety of insights—extensions that take us beyond the paradoxes of communicative processes:

- Targets in the canopy metaphor are social phenomena. Those related to meaning-making and coupling in communication. The metaphor sources are *relational* with origins in interpersonal behavior rather than embodied as George Lakoff claims undergirds linguistic structure and most of our

vocabulary. These social metaphors articulate relations between individuals and among groups, constructing meanings in the metaphoric canopy, human cultures, that is an emergent phenomenon, not from embodied ideas.

- Representations in the canopy are dual, akin to articulation of connection and separation and particle and wave. Or, paralleling the dual pair of the atomistic and wholistic mind sets in which:

  The atomistic view describes ensembles inter-acting in meaning-making;

  The wholistic view describes couplings that form unities.

  For example, the neuro-physiological description of mental processes requires the language of electro-chemical circuits and of coupling of electromagnetic fields generated by the cells. (McFadden, 2002) And so communication is achieved with digital messages though conduits *and* harmonic coupling. Neither mode by itself is enough to sustain the ecological 'canopy.'

- Identity is a constructed notion, arising from metaphoric extensions. Which extensions are accepted is a social choice, regardless of where the entity is believed to have its source of reality. The entity can be simple—a situated characteristic such as a texture and color; a complex gestalt or an encompassing paradigm. Since identity is a social construction, metaphorically generated, any entity's extent and application is arbitrarily bounded. Each metaphoric tree such as the three system 'trees' described here has boundaries set by the population for whom the metaphor is accepted, thus the validity is fuzzy and/or statistically defined.

- Since the boundaries of a paradigm are uncertain, the applicability of any particular causal relations is uncertain. Any form of causality is only locally true (acceptable) within a bounded domain. However as the boundaries are not clearly defined, it may not be clear which causal argument is applicable in a particular situation.

- Ambiguity is pervasive and it is essential to communication. Communication carries no meaning in a condition of certainty. There must be uncertainty for there to be an exchange of information or energy.

I view these characteristics as properties of the canopy above the supporting forest of paradigms. Life in the canopy operates above the whole-part minds sets that have grown to dominate Western societies over the past millennia.

SUMMARY

This chapter presents a way of thinking about the processes that led to diverse forms of system thinking, and how those processes greatly expand the bases for alternative grammars. The focus is on methods, not content or outcomes. The chapter scans the stages of paradigmatic thinking, from initiating insights to the grammars with which the businesses of law, science, markets, or virtually any discourse are conducted, and concludes with considering systemic images that transcend the part/whole axioms that have been the basis of western grammars. Linguistics grows from extension of metaphors and polarities. It is through articulative thinking that we notice differences and through metaphors that we make connections among domains of knowledge. Metaphoric leaps disclose unseen unities of thinking and multiplying the dimensionality.

In displaying the forms of cultural paradigms, I began with the embodied metaphors from which the current theories grew and showed how each produces distinct understanding of phenomena we wish to articulate. I began with a description of paradigms of system thinking looking for correlations among bodies of knowledge, starting with the heuristic rule that there would be distinct paradigms

built on each of the platforms of discourse, as described in Chapter 4. This proved a useful assumption. Three of the paradigms operate within one of the platforms:

Classic paradigm on the assertive platform (U-M)
Dynamic on the analytic (Se-U)
Exchange on the evaluative (Se-So)

The normative platform (So-U) provides a space for political systems, however a coherent theory has not evolved in spite of millennia of study of politics and normative sciences and recent developments such as provided by the political philosopher John Rawls. I comment on it further in the final chapter. There are elements of a narrative paradigm on the generative platform (M-So), however, formalizing storying processes would be an illusive, perhaps counter-productive effort for the narrative paradigm serves a different purpose as the generative underpinning for all paradigms. The creative platform (M-Se) provides the space for invention, and similarly it maybe that to have a formal theory of creativity is counter-productive. My search for methods of articulation and invention which initiated this book did not find anything like a systematic paradigm of creation.

We have a forest of paradigms, a few of its species are well defined, others are still in the shadows. In the last decades of the twentieth century these metaphoric 'trunks' grew branches forming an overarching canopy. The spreading canopy draws sustenance from the diverse roots and strengths from the formalized trunks. Its emergent properties are just now appearing. There is a pervasive novelty in the canopy's emergence, in the appearance of phenomena not explainable in terms of the embodied metaphors. Attempts to interpret the evolved canopy according to the typologies of paradigms and platforms seem retrogressive. The canopy is

better considered an aerie for the birth of new social phenomena, not based on the metaphors of bodily action as Lakoff and Johnson assert, but on the metaphors extending phenomena of coupling and articulation.

While the social body is analogous to the bounded individual human body, its metaphoric extensions opens us to immensely more complex view of social possibility. The complexity is in the diverse ecology of the canopy, no longer ruled by our logics of part-whole, non-contradiction or assumptions that we will find pervasive truth.

We might have better described our human ancestors as advanced quadrumans. These predecessors who uses feet like hands to travel through the canopy of primeval forests, their movement flowing freely in three dimensions. It was not until the four handed primates dropped down to the savanna as humans that 'up' and 'down' and 'right' and 'left' became distinct. When humans moved to the savanna floor they differentiated the vertical dimension and strode on newly evolved feet moving 'upright' across the remaining two dimensions. Humans must have regretted loosing access to freely moving in the third dimension for ever since 'upward' has been the positive direction of evolution. Now as we come to range through the canopy, 'upright' is a no longer a favored moral direction. To be effective in the evolving world we need to reach beyond simple dimensionality into new spaces, folded, fractal and ephemeral. For us to explore life in the canopy we will need to extend metaphors that go beyond spatial images of to-and-from, intimate-and-distant, and preceding-and-following. Electronic communication

networks have already shaken us loose from that world. So living in the canopy may free us from the limitations of linear grammars, syntax and logics.

NOTES

[1]. Quoted by Robert Boyd and Peter Richardson (1985)

[2]. Pepper further elucidates these by associating the four with major philosophies. See Harrell Internet URL: www.sunyit.edu/~harrell/Pepper/Index.htm (2003)

> Exemplars of **formism** are Plato, Aristotle, the scholastics, neoscholastics, neorealists, modern Cambridge realists. **Mechanism**, also called "naturalism", "materialism", and sometimes "realism", is associated with Democritus, Lucretious, Galileo, Descartes, Hobbes, Locke, Berkeley, Hume. **Contextualism**, also commonly called "pragmatism" is associated with Pierce, James, Bergson, Dewey, Mead. Exemplars of **Organicism** are Schelling, Hegel, Green, Bradley, Royce. Pepper merely mentions these examples to give a sense of how he is using the terms attached to the world hypotheses. He points out that many of these theorists are, in fact, eclectic and some only partially develop the categories of the root metaphors.

[3]. This is a quote from McClintock *et al* (2004) in which the authors present many of the same ideas presented in this chapter regarding the role of metaphors in relation to models and paradigms. They do not go as far as I do to assert that metaphor lies under all language phenomena. Thus thee is no question

[4]. I use the concept of feedback as it is the conventional term, but it is more accurate to model the loop as feed forward as the response affects the system in a subsequent time.

[5]. [She] made a second leap, one more esoteric but of at least as great creativity. In her model of the market she inverted the nodes and links of the network, so that in her model the link represented a sender and the node the repository of the message. This inversion is a familiar device in quantum physics.

[6]. McClintock, Ison and Armson (2004) this describe the sequence of metaphors, models and paradigms

[7]. See John S. Matick. 'The Hidden genetic program of complex organization,' (2004) *Scientific American*, **291**/4 p. 60-67

[8]. George Miller and Phillip Johnson-Laird (1976) explore English with a set of three verb groups that are intriguingly similar to the three core metaphors on which the three system paradigms are based. I compare their use of "possession" with the metaphor group based on containing/owning; "motion" with forcing/pushing' and "vision" with seizing/choosing. Their whole work expands greatly some of the metaphoric ideas discussed here. It would be a source work for a more detailed analysis of some of the system metaphors.

[9]. There is an extended discussion that bears on culture and creativity focusing on role of art in relation to the sciences in the special issues of the *Journal of Consciousness Studies* Vol. 7, No. 8/9 (2000)

[10]. A highly practical though small extension of classic thinking, "fuzzy logics", proposed by Lofti Zadeh, opens the possibility that an entity can be probabilistically assignable to two or more classes. (1965)

[11]. Programming is not strictly a claic example as it introduces serial eents and conditionals.

[12]. Searle (1992) distinguishes various degrees of emergence. See also Van Gluick (2001)

[13]. The recently published, *Chaos and Life: Complexity and Order in Evolution and Thought* Richard J.Bird (2003) Columbia University Press, is an exhaustive extension of the possible applications of iteration.

[14]. Salthe points to several rules for defined events and conditions, but they are all set in particular physical theories, such as Putnam's rule that confines conditions by the speed of light. A most practical rule but hardly a fundamental one. (1985)

[15]. George Howard (1991) discusses the role of stories in the formation of science.

[16]. The description of fields will be in a system text under preparation (2006).

[17]. His publications on non-equilibrium processes began in the era of the metafluctuation. See Prigogine (1980) for a clear introduction.

[18]. Bénard instabilities are described in many works on non-equilibrium systems. For examples see Jantsch (1980, p. 22) and Prigogine (1980).

[19]. Coupling is extensively discussed later in this chapter. For a more technical discussion see Prigogine (1997) p. 39-46).

[20]. Maturana in a recent statement reinforces the formality and determinism of his autopoietic theories. Maturana (2000)

[21]. I introduce Luhmann's term "interpenetration" to describe a more intense expression of coupling in the later section on communication processes. (Luhmann 1995)

[22]. Kenneth Arrow's denial of the possibility of interpersonal comparisons of utility became the focus of vast work in the following decades. (Arrow 1951)

[23]. Quoted by A. L. Becker in Steier (1991).

[24]. Intriguingly, the measure of information, formally called 'negative entropy' for it is a measure of ordering, is also identical to the 'power law' used in studies of self-organized criticality studies. See (Shannon 1951).

[25]. Nowhere in Holland's book *Hidden Order* does he acknowledge that his *CAS* do not follow a purely deterministic model. With the system of giving credits to successful adaptations, he gratuitously introduces a motivation and thus, purpose.

[26]. Of particular impact was the work of Jay Forrester (Forrester 1961) in the rubric of 'system dynamics' which was popularized by Peter Senge in the mid-1980's, long after

it was recognized that local control of cybernets typically produced dysfunctional consequences for the over-all organization or ecology in which the cybernets operated.

[27]. Of course, this observation was made by and remains as one made by academic observers and consulting intervenors, socially remote from the actions impacting the environment. The function of observing has to be replaced with that of acting to fit with the model of consciousness adopted here.

[28]. if taken literally Von Glasersfeld's definition of radical constructionism implies the mythic reality of the individual observer: "The world is as I see it to be." Or more explicitly " as I create it."

[29]. Fred Steier comments that:

> "Radical constructivism is a vehicle for creating and sustaining the very things that our theories are designed to comprehend. For example, the massive research on performance appraisal and the tools that have been elaborated to conduct it have made appraisal into an activity that leaves hidden both the epistemological foundation on which it is predicated, and the agenda of those whose interests are served by the [appraisal] system. (1996, p. 131)

[30]. Within living systems, the dual is realized in the electrochemical transmissions through the neurons as the digital component and coupling of electromagnetic fields generated in the neurons as the field component. See McFadden (2002).

[31]. Barnett Pearce (1999), a communication specialist, identifies the same two, labeling the first the transmission model and the second the social constructionist model. Pearce uses a communication vocabulary while I stay with a system theoretic frame that presents the two modes as duals of each other.

[32]. Charles S. S. Peirce used these three terms in his writings that founded the science of semiotics in the late 1800's. A vast number of variations of these have been introduced in attempts to clearly identify the language forms that we use to communicate among ourselves. As the exploration continues, we are likely to find the variety of expressions is an unlimited as is the number of sentences we can create with any natural grammar.

[33]. By their own theory, they should not have expected us to get meaning from their messages. Nevertheless, they wrote and published profusely, e.g.: Derrida (1977), de Man (1978) and Ricoeur (1975).

[34]. The two forms of communication create meaning by totally different paths. The conduit model assumes a stimulus that evokes a response. The coupling model begins with an efferent probing action that detects a difference. In mammals and humans, the two forms use different neural paths. In the stimulus/response mode, a message impacts the sensory receptors immediately evoking a primitive muscular reflex or following a slightly longer path through the sensory cortex to the reflexive action. In the coupling mode, action sequences cause the sensory apparatus to encounter the environment and notice differences from what is expected; it then uses the difference to direct the next action. (Cotterill 2001, 2003)

[35]. I think the dual proposition is necessary. Neither noise nor simplicity alone moves us anywhere. It is the continuing increasing ability of harmonizing systems to engage with

noise that makes for complexity. This pairing parallels von Foerster's order from noise, and order from order. (1981)

[36]. Strogatz (2002) suggests that not all coupling relies on temporal harmony, but can follow from similarities in theelectromagnetic profiles of molecules, and in the rhythms that are implied in printed songs or music. Any pattern can contribute to a coupling process.

[37]. Capra describes the physics of this interaction in very accessible terms. (1975, p. 215-217)

[38]. As I was writing this, I was overlooking a quiet lake surface. There were two wave trains on its surface; one produced by a gentle and persistent breeze; and, across it flowed a second wave pattern generated by a motorboat. They passed without disturbing one another to any noticeable degree, leaving an elegant moire pattern decorating the surface as each continued on its way.

[39]. Oddly, the identification seems to be done by matching shape, not by simple resonant coupling. However, shape is itself the product of the resonances present in the immensely complex protein molecules and the ways in which they fold.

[40].These are complexes comprise a vast number of muscle bundles. Over 100,000 might be used to vocalize a single second of speech. See Cotterill (2001b) for physiological descriptions of the process.

[41]. This is one example of the sympathetic response of the many sphincter or ring muscles that animate all animal forms. (Garbourg 1994)

[42]. There is neurophysiological evidence §

[43]. The coupling model provides no discrete objects; thus all couplings reinforce the grand meta-system of 'all'. However, in the discussion of the communication model I presume the elements are atomic and interact in discrete time-space events.

[44]. There is a rapidly increasing flow of findings about coupled systems. Much work has been done with computer simulated neuro-networks, yet the publications have not achieved sufficient sophistication to assure that the forms are plausible in real organic structures. See for examples, Pasermann (1999) and Strogatz (2002).

36. I have no knowledge of the general growth and stability properties of spectrally coupled self-organizing systems. I would guess that they form more stable units that eventually come to inhibit further amalgamation—that is, we would find the usual 'S' curve of epidemiological spread.

[46]. In the 1991 article, "Fractals cast no shadows" I labeled the systemic metaphor of an *Arabesque*. I still view it as a rich metaphoric image, but after 2001, that label is likely to draw in irrelevant associations rather than an appreciation of a new form of thinking. I now prefer the canopy metaphor introduced here. It expands our view into a three-dimensional space, going beyond the figurative two-dimensional world of the written arabesque metaphor.

BEYOND NETWORKS IN SOCIETY

CHAP 1

Will McWhinney
July 2006

[These are still notes – preliminary and incomplete. I had hoped to have a final, but the ideas kept coming, and my energy is not up to driving through to closure. The good side of this failure is that you should feel free to comment and correct and I welcome any offers from you to work on the ideas with me!]

I'm presenting a new version of the oldest tale—one that lays out two interwoven images of how we created reality and the emergence of language, social roles, organizations, and society that flows from a new ontogeny. I begin with the conventional story that originated to give root to the forms of organizations and society we experience today. I characterize this version of culture by networks—most typically by hierarchical form—and then briefly by the dynamics of changes in their form and extent. I follow with a story of a co-evolution describing a form of social organization that lies in the shadow of the dominant model used in the first tale.

This exploration began with discussions I'd been having with Jim Webber. He was involved with a number of client systems in New England in which the managers were attracted to using classic network models to understand their organizational problems. As has happened many times over the past decade, Jim's talk of a consulting problem became a challenge for me to do some new thinking—in this instance, to go beyond conventional "classic" network to think about relational communications processes.

The classic models coming back into popularity as "Social Network Analysis" with excitement about Robert Putman's "Social Capital." Electronic networks and the data available from email records have made it easy to measure the qualities of

CHAP 7 3/23/07

6/06/06 JBW

NETWORKS IN SOCIETY

Will McWhinney
April 2006

JBW
CH13s

I'm presenting a new version of the oldest tale—one that lays out two interwoven images of how we created reality and the emergence of language, social roles, organizations, and society that flows from the new ontogeny. The first image begins with a conventional story that I believe originated to give a root to the forms of organizations and society we experience today. This version of culture can be characterized by the qualities of networks—mostly of hierarchies—and then a brief venture into describing the dynamics of changes in the networks that continually revises those representations. I followed with a story of a co-evolution that describes a second conception of social organization that lies in the shadow of the dominant model used in the first tale.

This exploration began with discussions I'd been having with Jim Webber. He was involved with a number of client systems in New England, in which the managers were attracted to classic network models to help them understand their organizational problems. As has happened many times over the past decade, Jim's talk of a consulting problem became a challenge for me to do some new thinking—in this instance, to go beyond conventional network thinking to describe communications structures, both as languages and as networks of people and groups. I have worked with these models since the 1950's and have grown skeptical of the classic models and tools of analysis that are being widely used. I see them as inadequate to deal constructively with most problems facing organization, so I tried to see if there is a different route to using ideas of

communication networks. I have arrived at an image that I provides new insights, or at least a new foundation, not only organizational behavior but also the origin of language in human cultures.

MERGE THIS PARAGRAPH INTO THE PRIOR ONE I started the new exploration with the 'myths of origin' of cultures, at a stage before language, organizations, and diversified social roles were established, to begin with the little differentiation that we could associate with a 'garden of Eden' or the moment before the Big Bang. I switched from the fanciful to the analytic style used in network theory and present something about its role in present social theory and practice. I then started over again at the beginning with the new approach introducing a newer *ontogenic* theory describing the origins of reality, which I use to explore emerging features of organizations and language. It leads to some evocative possibilities for redesigning various social structures. Support for the new theory is developing—even since the beginning of this year with ties between social structure and new research in neurophysiology of the mindbody and a few pieces of anecdotal evidence about some surprising phenomena. There is little time in this session (space in this note) to develop these bases, but I have provided references to the source material for you to continue probing.[i]

So I began.

Imagine that life began in an environment with benign conditions of an Eden or equally in the moments before the big bang—not the chaotic roiling chemical broth usually imagined to have existed at the birth of life. I proposed that life began in locales characterized as steady and orderly with a rich variety of substances that might give nutrition for emergent living organisms. These would be conditions favorable for the repeated generation of the simple self-

reproducing organisms and a benign culture that is rarely seen today. The environment might be characterized rather simply:

Near stability in ecological conditions.
Growth of the population naturally adjusts to stay in balance with the available requisite resources.
Negligible fear of shortages of resources.

The stay in Eden could not last forever. The benign environment that was the setting for the emergence of the life form also led the population to grow beyond the capacity of the land; changes in the climate produced seasonal swings in the available food supply. The very generativity of life destabilized the communities and required restructuring society to develop skills for gathering food and fuel and staving off marauders. The emergence of the fragmenting forces that appeared with scarcity led to the dynamics that we know as history, tales of evolution species and individuals, of good and evil leaders, of the emergence of powerful empires and their demise. It is mostly an epic of fragmentation and assembly driven by behaviors we commonly associate with masculine drives.

The new behaviors radically changed the idyllic social forms suitable to a benign environment. Shortages led to fragmentations and then to recollection in more structured societies with specialized roles for individual, to the emergence of the rich languages we know and, most of all, to a new image of mankind (sic). The fragmentation-recollection into objects in diverse relationships can be simply described as made up of distinct *nodes* —elements, objects, people, words, places—*linked* in networks separated from another by their differences, bounded by their particular roles and particular functions in an organization—as words differentiated by a grammar, or roles differentiated by their functions. Behaviors

appropriate in the benign living and its universe were replaced with ones designed for competing for scarce resources. Stories of struggles for power replaced the tales that appear in so many myths of origin. The scarcity behaviors and its structuring of our worldviews came to so dominate that it is accepted as the sole story of life

With scarcity and threats to a community's life, new facilities were required to respond. The simple learning environment of an Eden was insufficient. The new condition called for higher rates of innovation, which cascaded the development of inequalities within a group and between groups. Some of these increased the resources, say with the emergence of agriculture; others gave individuals greater access to knowledge. Innovation, hunting, and pillaging became necessary tools for a community to survive. And still others enabled the strong to capture the resources of others, within or beyond the intimate group boundaries. So there emerged a need for new intelligences, hunting skills, weapons, and individuals who organized the efforts of others. New practices, some of which came to be passed on as e.g., as genetic strains, led to role differentiation. Teaching others to use those skills became a necessary step on the route to resources. As resource shortages threatened a community, the skilled ones emerged as leaders who provided resources and organized their distribution. They controlled the means of communication, by differentiating and by organizing of symbols with rules of use and propagation—its grammars and syntax. Languages shifted from tools for harmonizing and maintaining the growth of diversity to directed dialogues with explicit action messages, using highly differentiated, closely-defined vocabulary (dictionaries and educators

provided these) and social roles (job descriptions and marriage contracts). The power of symbols arose to give those with the symbols, power.

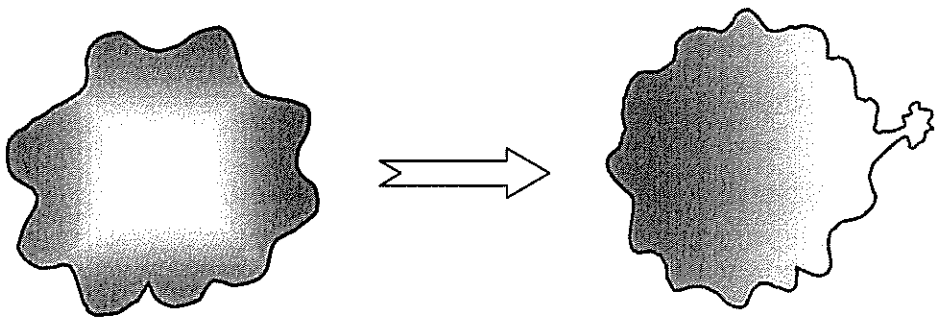
The new leaders either took control of whole communities and its resources or they left to form new colonies in more attractive environments. There, they became 'founding fathers' and entrepreneurial CEOs of their colonies and companies by propagation and by fragmenting the social tasks to facilitate acquiring more resources, initially by education and training, and later, by forming or capturing capital goods. The harmony has disappeared even within individual humans who have evolved with a complex triune brain. The new individual and social roles were organized with directed relations from the founder, with successors as heirs, owned by, dependent on, or subordinate to. The very act of differentiation led to more constrained relations, e.g. roles and job specifications, than were experienced in the earlier wholistic communities, though these earlier societies had fewer options available.

The new relations are more definitive than amorphous roles available to worked in the cooperative with links than by an amorphous field models that we represent cultures of gathers. Figure 1 illustrates the shifts from a whole community to an image of leaders emerging as entrepreneurial individuals forming a new community—leading to the appearance of the 'self.' Successive elaboration produces the hierarchical forms that emerge under a leader and eventually a society made of semi-autonomous communities, directed by various forms of leadership developed in the paradigm of power.

FIGURE 1. EMERGENCE OF 'SELF' AND NETWORK

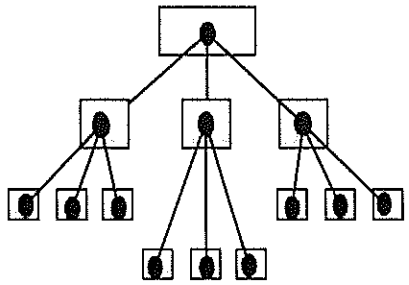
An undifferentiated community

The community survives through the emergence of a 'hunter' or other leader and thus a new role/self.



A total community may die off after it disorganizes to produce one or many 'hunters' who leave an inhospitable environment to start a new colony or it may return to lead with revitalizing resources.

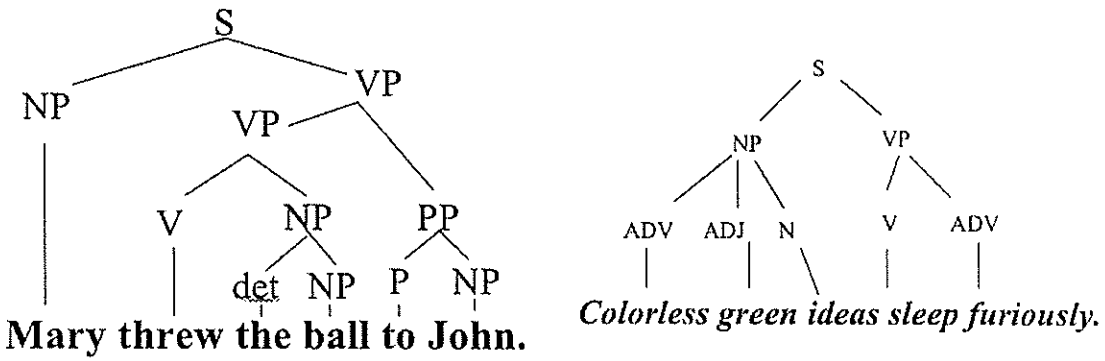
A hierarchical form that differentiates leaders and a cascade of followers



The hunter becomes a leader of a community, produced by establishing subordinate elements, which in turn similarly repeat the generative act. The sequence forms a *hierarchical* net, a self-same open tree of relations between entities, defined as roles, words, locations on a map, or decision procedures. New trees may emerge as the source loses sufficient coupling to continue under a single unifying leader or actor.

The figures illustrate the emergence of an open hierarchical form from the harmonic whole that has no internal structural differentiation. So the new representation of our environment replaces the paradigm of a pervasively coupled whole with a part-whole paradigm of subordinated linked objects, words or ideas. The whole-part or atomic models are now established as the natural base for understanding our world, The presumption has reduced our thinking to cognitized abstractions of nodes in a network delimited by characterizations such as 'atom,' 'cell,' 'daughter,' 'typist,' 'noun,' and 'decision point.' The link signifies, for example, an available communication channel, a relationship of dominance in family, work structures and governments, and actions that could follow a decision made in an analytic 'tree.' The hierarchical form also produces the way we organize and analyze grammars and syntax.

FIGURE 2: HIERARCHICAL STRUCTURE OF ENGLISH SENTENCE



Examples showing the standard form with a meaningful sentence and another illustrating an application that is meaningless yet uses the form properly.

See references to Noam Chomsky's universal grammars starting with *Logical Structure of Linguistic Theory* (1955), and their analysis by the deconstructive theories of Derrida and the countering empirical explorations of Eleanor Rosch (1973) and Arthur Lakoff. (1987) and Steve Mitkin (2006).

Network theory

Network modeling is ancient. It appears in various guises: family trees to show the relation of off-spring; and charts that defined the relations of subjects to their rulers; classification schemes and typologies to organize knowledge; logics ruling the deduction (link) of one statement (node) to another; and causal sequences to show how one action follows from the prior ones. Classic network consisting of *nodes*—objects, persons, states, locations theories—and *links* that indicated the connections—communications channels, rules of deduction, descendents, parts of whole—provide an abstract language for describing all sorts of part-whole relations. But it was not until the early twentieth century that we had an analytic format, the sociogram devised by Jacob Moreno, that social scientist had a device suitable for research into organizational form. They are descriptions of fixed systems, such as a logic of relations or a moment in time as in the communication patterns among employees of a company. And until recent decades there were very few methods of characterizing the variations among networks or studying the impact of one versus another on the systems they depict.

In the 1950's a study was done of the communications among the employees of the restaurant at the grand Edgewater Hotel in Chicago. It occupied two floors: the seating area on one and the kitchens and preparation areas below.

They were connected by stairs that the bus boys used to bring orders down to the Chef and bring back prepared meals to the waiters. The boys were the sole link between the floors as illustrated in Figure 3. Thus they had inordinate power to control the service to customers, the sequencing and accuracy of orders and their timely delivery to the waiters. They were the *link pins* that by themselves held the organization together and the busboys used their linking role to squeeze large tips from the waiters. Clearly, this awareness initiated the development of an analytic approach using the sociogram to understand behaviors in organizations. Concurrently Alex Bavelas, also in Chicago, moved the study of communication networks into the laboratory with a search for optimal routing of messages for decision-making in small groups. These were beginning of quantitative explorations of networks but one that languished until an effective means were developed for collecting the routing of messages between large groups of nodes such as those using e-mail and other electronic nets connecting people, organizations and machines.

With the new facilities researchers found it easy to collect a variety descriptions of the organizational nets in the hope that they would correlate with its functionality. For examples:

- The *diameter,* the count of the largest number of links separating any two members and the distribution of the distance for all members.
- The number and distribution of *links per node,* defined as the number of connections an individual members or units has.
- The *centrality* of individuals or units – a measure of potential leadership.
- Measures of the *bureaucratic restraints* on communications measured by the number of levels up that a communication must travel to get action.
- Measures of potential network designs to find *optimal connections for various tasks.*

See Cross/Parker and Stamps/Lipnack. In only a few cases have the researchers presented empirically justified guides for deciding what 'shape' is optimal for an organization or what are the dynamics of change, natural or induced.

FIGURE 3: A SAMPLE OF A NETWORK ANALYSIS IN A MINING COMPANY

Formal Organization chart	Network of E-mail contact routing

[Insert charts modified from Robert Cross. figure 1.1]

MEASURES

Diameter (the longest minimum route): 5. **Average**: 3.7. **Minimum**: 1.6 (Cole)

Links per employee – Average: 3.9. **Mode:** 3 Maximum: 10

Centrality of any individual: Employee Cole is the sole link between a group of 4 and the rest of the division. The senior officer, Jones is relatively isolated with only two links and an average diameter: 2.5.

Note the striking difference between the formal authority chart and communication network.

With the emergence of the part-whole hierarchical paradigm the pervasive harmony in which life began (at each cycle of development) has been replaced by rules of behavior and assertion of various forms of causality. The meaning of symbols is their derivation through channels of hierarchical extension. Viewed as a product of deteriorating environmental conditions (formalized in the idea of entropy) that over hundreds of thousand years of evolution of the leader-dominating model of hierarchical relations becomes not only a tool for examination of our society, but it has taken on a position as the logically necessary paradigm of human society. Perhaps it arose to legitimize the masculine image of leadership and the logics of competition for resources and is represented in the prevailing image of social networks that is embedded in the organization of family trees, corporations, and governments and justifies the pervasive necessities of war and other societal conflicts. It is reified in the roles we use to organize work and as the underlying social form ascribed to organizations and family trees. It appears in social studies everywhere, historical and political treatises in all cultures, and in the 20th century analytic quantitative models. I introduce here examples on the technical use of network theory as presented in Cross and Parker's recent work in network analysis (2004), and the deeper analytical works by Stamps and Lipnack, who ordain hierarchy as the transcendent Platonic form for social intercourse. For over 50 years these models have been used to [validate] all manner of social structures, illuminating their similarities and differences, and varying effectiveness, but avoiding discussion of their dependence on the scarcity model, thus allowing only explanations that assume scarcity. This basis becomes evident when one looks the growth and

decay of networks that represent organizations, cultures, languages even individuals.

Dynamic Networks

Most users of the network model see it as the only frame for describing a given situation; as an elegant and simple model for the structure of the brain, social organizations, interpersonal behavior, and languages. There are no features that describe modes of change in either the linking relations or the number or definitions of the nodes. In using them most social network investigators have ignored the undeniable phenomena of change. Network models of organizations are snapshots, taken at a moment in time too short to notice characteristics that change. Some quantitative studies of phenomena of change were published even earlier, e.g., in Jacob Moreno's journal, *Sociometry*, starting in the mid-1930's(?). A few early explorers (mostly mid-1900s used the network language examined the evolution of communication in organizations (Bavelas 195@), of biological species, rumor propagation, and interestingly, of growth and decay of markets for particular products. One example of the dynamics of change entered public consciousness with publication of an article (in the 1950's) titled, "The epidemiology of a drug." It presented an eye-catching inversion of the image of disease epidemics. My own study (1964) used computer simulation of the self-organizing properties of communication networks, elaborating on experiments done during the prior decade.

The changes considered in these studies were, for the most part, studies of the natural devolution of systems toward stability. Examples include the evolution

species after a significant change in its environment and the path of the market of a drug from its introduction to its disappearance, and the changes in a organization's communication network after a merger. A number of new analytic methods were developed for studying such changes taking place within a dynamic basin, for example

ADD A NEW TOPIC GIVE EXAMPLES OF NEW TOOLS FOR STUDYING MOVE TOWARD STABILITY applications to epidemiology, marketing, and the Internet using statistical tools and computer simulation.]

The newly developing measures describe how a population described as a network of potential customers (users) can predict and be used to control the growth and decay of languages, markets and other phenomena of social change. Many studies since have explored using network theories, as mentioned in Barabasi's *Linked* (2002). Of particular relevance is the devolution of meaning ascribed to words (or tasks to a job) from narrow context-independent definitions as required by the disciplines and, most recently, for computer languages, to broader less-tightly controlled vocabulary words used in by a populous at large. To this simple model of the decay of disciplined speech using 'small boxes' to one using definitions of 'large boxes' I am creating a third model to describe processes of continuous expansion of vocabulary (and roles) in the present era. In another context, I introduced the idea of a 'fractal brick' as a metaphor for the unending spread in the uses to which we put a word or phrase (or equivalently, the ways a person gets involves in a growing range of issues surrounding a defined 'job.') There were also unanticipated changes that radically alter a system's ultimate direction, e.g., the death of the leader during a

revolution or an earthquake's impact on a city's renewal, or growth of a civilization beyond its ecological capacity. (E.g., see *Ekman).* We can explore these events that change the ultimate settling conditions of a system with methods designed for far-from-equilibrium situations—field models such as introduced by Prigogine and as forms of complexity much studied at the Santa Fe Institute. They include methods of qualitative epidemiology and the mathematics of self-organizing systems. (Add references using methods from the physical and computer sciences. The extensions of dynamic thinking about networks bring a potentially powerful framework for social science investigators and change agents. However, the highly abstract terminologies can only model situations far simpler than we face with social behavior in organizations and communities. There are potential applications, but to date the new models associated with the term 'complexity' have been use for promoting consultants' image than to resolve practical issues.

In the following section, yet to be fully developed, I suggest an alternative model for the discussion of the growth of languages, cultures, and civilizations that draws on the current concerns with meaning and dialogue as well as basic understanding of interaction processes. I move now from evolving the stories about situations where the occurrence of scarcity (real or created) diverted civilization from the path of cooperative development to competitive behavior and explore the potential ways of living with awareness.

[ADD comments on the application to understanding and analyzing language dynamics.]

Convercircles and coupling

Under such conditions a community can emerge that can support its offspring through relatively long maturation while they learned skills and in which adults shared in developing new ones; creative responses were not rejected as 'missteps' that would not endanger the resources. Communications were co-operative, primarily serving to maintain harmony. We see remnants of this behavior in music, ritual dance and choral singing. (Make reference to the arguments that language began in music.) Symbolic exchanges—gestures, words, and inscriptions—were originated to support community and to establish meaning for messages of alarms about impending dangers, emergencies, or to signals competitive relations by those who claimed special skills and knowledge. Group members were relatively undistinguished except by gender and age—the adult doers procreating and demonstrating to the younger members and others their practices for getting and using resources. There was little need for some to be 'leaders.' It was a creative environment, though it might have slight incentive for developing innovations. The slime mold and Orangutan cultures provide images of this developmental environment as indicated in the articles listed in the references.

I intended to renew social theory by starting with a reinterpretation of the myths of creation mentioned above. [I have just encountered Mitkin's new work

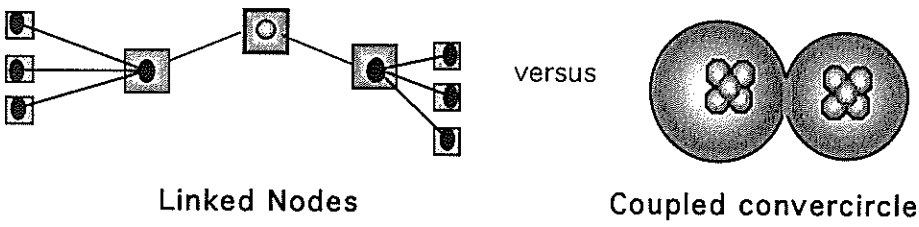
which hints at much the same social phenomena.] I introduce its presentation with an event that is more immediate to our experience than slime molds and orangutans. In his recent book, *The Tipping Point,* Malcolm Gladwell tells us about the revolutionary hero Paul Revere and his contemporary David Dawes both setting out on horse back to warn the local militia that the British troops were coming. Revere was apparently more successful in getting the message out than was Dawes. Gladwell explains that Revere was successful because he had more connections, more friends than did Dawes. That Revere had more connections to the people in the area is one explanation of his greater influence, one consistent with communication network theory. I propose an alternative explanation. Revere may have known more people, but I suggest more significantly is the fact that he was owner a Masonry lodge that was part of a network of lodges that spread across the country. The network was established along the major routes along the highways at intervals of about two leagues (12 miles, a day's travel at that time) so as to make it easy for a gentleman to stay overnight in a lodge every night along his travels eventually to extend all along the routes from Maine to Georgia—according to a Ben Franklin biographer. The Masons at that time were a political discussion society whose members were among the leaders of society—e.g., a majority of the signers of the Declaration of Independence and members of the constitutional Convention were Masons. On any night there are likely be a few gentlemen smoking their pipes in the sheltered if not secret meeting room set aside in every lodge. The members discoursed on the issues of the day, and to an unusual degree, held similar values and opinions. They could hear or better, 'grok' each other (per Heinlein's 1960's, a *Stranger in a Strange Land,)* and could thus be assured that their

messages would be understood in the coupled conversations of the Masonry lodges.

I introduce the contraction *convercircles* as a general label for exchanges, ranging from feedback loops in neurological brain circuits to hermeneutic circles through which we interpret literature from long gone cultures that create and reinforce meaning, illustrated in Figure 4.

Among the revolutionary leaders, the lodges, carried Revere's words more rapidly and reliably than those of Dawes passed along to people he knew. Messages past on to strangers or people one knows only casually are not so trustworthy and as meaningful as those passed through friendship groups.

FIGURE 4: NETWORK VERSUS COUPLED RELATIONS



The convercircle is akin to that instrument displayed in Figure 1. They consist of a few or many sub-convercircles so coupled that they are their meanings are interwoven. In figure 4, the linked sets of nodes versus the sets of coupled convercircles that are themselves coupled is exemplified by the communication processes of the two revolutionaries. Along the Revere route were the groups in a lodge while Dawes encountered merely incidental contacts.

In the full development of this model, convercircles operate everywhere, within an individual, among individuals, and between groups and whole

cultures even those existing in distant times and places. We measure the effectiveness of exchange in the coupled model by the product of the degree of coupling between the sets and the amount of new information brought to one convercircle by the other. The maximum is achieved with a high degree of both, with a lack of either reducing the amount of meaning communicated. (The theory provides a measure of meaning, an extension of Tsallis's new model of entropy, but it is far from a tool that can be used in consulting practice. See chart and notes in Appendix A).

Each new reaching-out that brings back a message (that must nearly fit a hypothesized expectation) provides the organism a chance to enhance its existing images of the environment. When what comes back is close to some messages already integrated, that is, is highly coupled with ideas it stored, the response can be constructively used to reinforce its existing images and trust in one's convercircles; it further expands the variety of relations that articulate its environment or builds new diverse chains of relations that lead to surprising connections. The last we think of creative or conflict inducing.[iii] In the Revere-Dawes tale, Dawes had a lower level of coupling between the people in his communication loop so Revere made the greater contribution because of the tightly coupled exchanges achieved through the sharing they had done in the lodge rooms across the country. There is a clear lesson for today, for political campaigns in the internet era and in awareness of the tactics used in some mega-churches to attain intimacy and synergy.

Back to the tale with which I began, to the mythic time when communication was primarily a tool for maintaining harmony as humans were zpjust beginning

to articulate and enrich their engagement with their environments, first within plenty of 'Eden,' then in the scarcity that arose with the acquisition of knowledge. With scarcity, those who had the knowledge and skills, one way or another built new social arrangements in which they led the communities that they helped in the role of hunters, warriors, educators, innovators, entrepreneurs and shaman. But all aspects of the community of plenty did not disappear. Effective leadership continuously reestablished the conditions that allowed cooperative learning and accelerated the accumulation of resources, material, and intellectual. At the very least, they supported the education of their offspring and followers to keep control of the power. Sometimes, the cultures of leadership produced a haven for cooperation in which individuals and groups were free to grow a diversity of ideas and refine their arts. We can see evidence of such opportunities among the orangutans in Borneo and in the renaissance arising in the northern Italian city states in the 13th-15th centuries (Robert Putman, 1993) In each situation the adults let their offspring learn by watching and listening and adults (in some occasions) sharing their knowledge without fear that they are giving away a 'good' that could be traded for some other good. The members work without internal boundaries, or in the case of the slime mold, without cell walls separating the nuclei that represent members of a community. Ideally, this condition existed in the enclaves available to any family, small communities, and observed occasionally in the creative technological firms in 'Silicon Valley' and in examples of extensive participative decision-making by employees holding corporate and government jobs. Such micro-environments of cooperation are hard to maintain for the very tools and vocabularies used to operate the interactions use the implicit power-based paradigm of parts, material or ideal.

The language we use leads us to fall back on to thinking of the 'other' and ourselves as separately existing objects operating or independently existing things. [What is to be made of the feminist movement in this view of social evolution?]

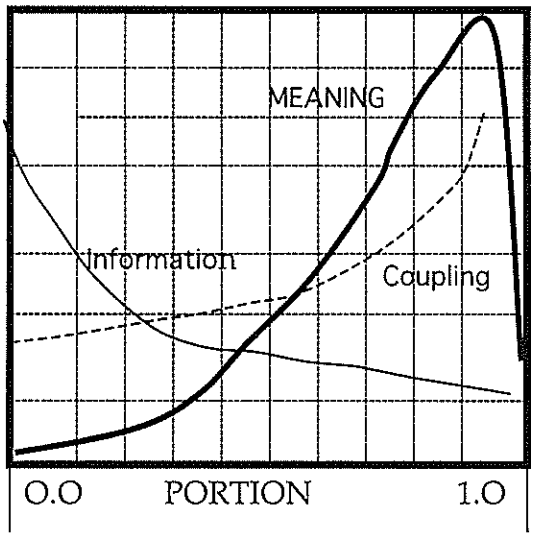
The coupling of convercircles, in their infinitely varied forms may provide an alternative cosmology or ontogeny to either the atomistic or wholistic paradigms, one that does not presume part-whole relations or the oneness of all, rather one that allows to use alternative operating hypotheses as the situation requires. We will have to see if such freedom will support cooperation and increase the stability of such communities and whether the results would be generally beneficial. That exploration will take a long time, but while such monumental studies are underway we can explore applications to language e.g., the hypothesis that language began in music and related harmonic expressions and strengthen our abilities to create social structure that are built on *engagement*, not on power-based networks, and on *coupling*, not relations of domination.

MUCH MORE TO COME !

This is obviously a raw speculation on an emergent idea that has to grow be reformulated and tested for usefulness.

APPENDIX A

MEASURE OF MEANING



The meaning that is transferred from one Convercircle to another is measured by the product of the degree of coupling and the novelty of the messages. (Following from the ideas of Constantino Tsallis (2000) on nonextensive entropy.) [The graph has to be redone as a 3D chart of information with meaning to show peak is close to 100% coupling.]

OTHER STUFF

This worldview presumes what we call parts are interwoven hypothetical constructions. By convention we treat them as sub-units—physical particles, words, people, etc—as separate entities. Our convention of seeing individuals is parallel to treating an atom as a unit of matter consisting of a nucleus circled by much smaller electrons; and the nucleus is itself a unity made up of parts revolving around each other. This image was created by the physicist Neils Bohr to make comprehendible the particle structure of the universe, because the field

model that modern physicists had devised was too difficult for the non-scientist to image. The atomic model and the net/link network are similar fictions created to popularize a less understandable but more fundamental worldview.

FIND A PLACE for this thought on effective learning communities.]

The form of community that has periodically flourished to produce a rich flowering of cultures in which the fragmentation resolves into a coherent dominant community but with a network paradigm. Great examples of such an outcome include the ascendance of the Muslim/Arab culture in 800-1200, the European Renaissance and the Age of rationality from 1700 on. And then the deep differentiation that lead to the elimination of the less powerful fragments by genocides, and isolation is exemplified in the extinction of the Neandertals 30,000 years ago, by the Reformation in Europe and Chinese isolation after its flowering in the 13th and 14th centuries.

REFERENCES AND NOTES

i. For articles giving examples of:

Slim mold:

Randy Darrah, Steve Stephenson "Hunting Slime Molds" *Smithsonian Magazine*, March 2001.

Orangutans:

Carel van Schaik, Perry van Duijnhoven (photographer) *Among Orangutans: Red Apes and the Rise of Human Culture.*

Social organization:

Putnam, Robert D. (1993) "Social Capital and Public Affairs" *The American Prospect*, 1993/13.

Origin of language:

Steve Mitkin (2006) *Sing Neandertals*

Marketing & advertising:

"An Epidemic of 'Viral Marketing'" *Business Week* online, 20 August 2000 www.businessweek.com/bwdaily/dnflash/aug2000/nf20000830_601.htm

'Viral Marketing' Wikipedia, the free encyclopedia.

Entropy measure:

Constantino Tsallis, 2000, "Entropic Nonextensivity: A possible measure of complexity" arXiv:cond-mat/0010150v1.

ii. Mario Vaneechoutte, University Hospital B 9000 Ghent, Belgium "The memetic origin of language: modern humans as musical primates." The idea that the origin of speech lies in our ability to sing can be traced back to at least Jean Jacques Rousseau, in the seventeenth century [73]. It was suggested by the famous linguist Wilhelm von Humboldt in the nineteenth century [94] and by Otto Jespersen early in this one [41]. (Sources in an article available through Mario.Vaneechoutte@rug.ac.be).

iii. I believe a full scheme can be constructed showing that the convercircle model can provide the same variety of communication experiences as a network model, building a more plausible story of how humans create reality and meaning, i.e., theories of ontogeny and epistemogeny, without giving priority to a part-whole paradigm. I am developing that story in a later work as part of Grammars of Engagement.

8

CHAPTER 9 LIFE IN THE CANOPY

FIRST 2 PAGES

> Cross-culture data reveal that it is the *job* of human culture to obfuscate our view of ourselves and the world we live in. Charles Whitehead
>
> [Whitehead 2004 "Everything I believe might be delusion, Whoa." *Journal of Conscious Studies* **11**/12 p.87) 68-88]

[JUST NOTES FOR WHAT MIGHT IN THE FINAL CHAPTER]

Third Order thinking for the Canopy. Start with Marc's idea about film's in which the counselor took on the patient's pathology – treat this as step one in 3rd order – working with the other – but not 3rd order which requires we maintain our own views.

SOCIAL METAPHORS – Coupling, meaning-making languaging

THIRD ORDER ENGAGEMENTS

the articulation of an idea can never be done without an audience. The question is how do we incorporate the audience into our processes of articulation of the image. I have proposed that we do it according to how we transcend our own choice of reality source.

.

At one extreme we believe there is a given expression and we are simply finding it - in the classic unitary mode. AND SO ON.
But what do we do once we recognize that our audience holds diverse constructions of reality.
Dialogue is dangerous for it forces everyone to adopt a social reality that will lead to shadow agreement

Build list of alternative elements of grammatics:

Details on alternative grammars go in Appendix

- how differs from grammar as it develops rules for when to use what grammar elements.

rules recognizes the choices we make are reality based, so modify them in anticipation of an audience – sometimes positing an expectation of their reality, sometimes forming enunciations that are essentially ambiguous, that will force the audience to explore the possible interpretations and in so doing they will couple with you as source. Seldom argue from one's own position as this will set up conflict. Role of graphic forms in third order learning – forms that deal with non-linearity of the represented world.

- Spectral coupling is always to a degree nebulous as it is among infinite waveforms. Make a point of the relation between coupling and semi-objects – the grammatic forms are a practical form of the ambiguity of communication. [also Rosch re non-transitive typologies
  Articulation – always ambiguous outcomes never a pure reality base. Never a full assurance, because the processes of realization have an arbitrary element. ESSENTIAL AMBIGUITY

GRAMMATICS

Strategic uses of (choice among) variable grammars in dialogue - both external and internal (& non-present) audiences.

Grammatics is not an empirical science, but like the systemic thinking from which it originates, it uses data and models from linguistic and philosophy of language sources.

The variable elements include

- Metaphors
- Platforms of discourse: serial use of the projection operator.

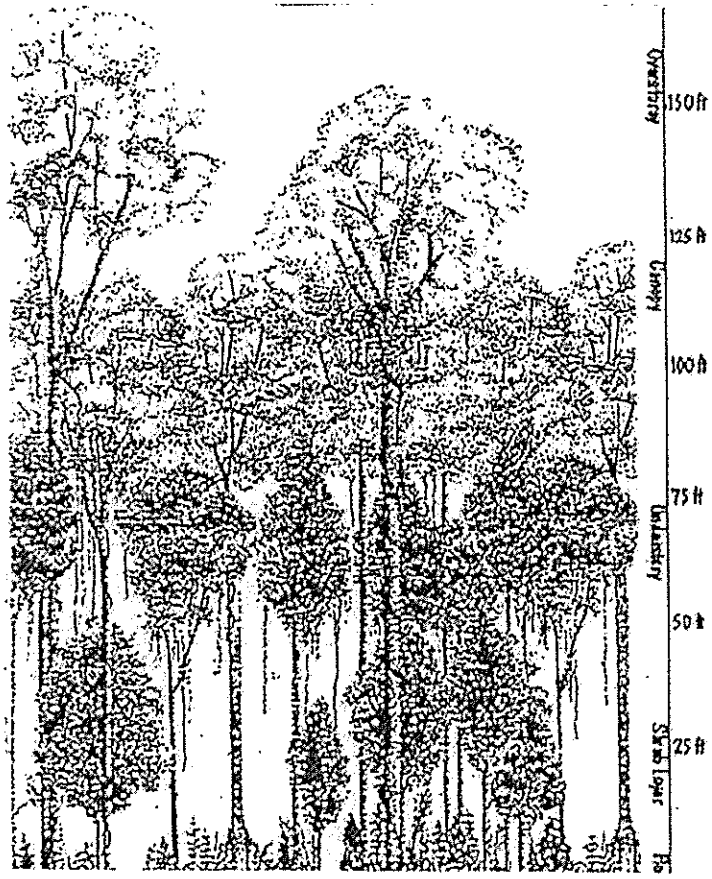
CHAP 9

Growing into the Canopy

Will McWhinney, PhD[1]

The Forest Canopy[i]

Konopos is the classic Greek word for mosquitoes. It came to be applied to the diaphanous fabric we spread over a bedstead to keep away mosquitoes. More recently it was applied to the canvas we stretch between poles to shield a celebration from the sun and rain. And now 'canopy' has been returned to nature by ecologists, who use it to label the cover formed by the branching of the great rain forest trees. This canopy has an ecology that is distinct from the deeply shaded ground below and from the trunks and vines soaring out of the moist earth.



This rain forest canopy is an ecology floating fifty to two hundred feet over the forest floor, a tangle of branches and vines inhabited by its own flora and fauna. It is both 'of the earth' and transcends its domain. It no longer depends on the individual trees and vines. It is a self-organizing ecology that draws sustenance

[1] With appreciation to Marc Tassoul and James M. Webber for their contributions and editorial comments.

from the forest, but has functions that transcend it. The canopy is an ecological fabric displaying qualities not present in individual plants. For me it is also a metaphor for our complex society. It is a fabric no longer embodied at the individual level, but realized in the phenomena of "languaging," which has properties of a group but not of individuals.

The canopy evokes rich metaphors through which to describe engagements with the systems of thinking in diverse paradigms (the species of trees in the human forests) in which I participated, the distinct trunks (paradigms) of system thinking and as a way to characterize life in the airy social ecology. I articulate these ideas through a tale of my fifty-year climb through the trunks and vines and meetings with remarkable men.

An Earthy Beginning —> 1951

My engagement with system thinking is a history of recognizing the multiple and complex ecologies of our intellectual forest, of growing up with system thinking from its seedlings in the 1950s to the emergence into the mature discipline in the new millennia. My teachers who were colleagues and followers of John Dewey prepared me for this journey through fourteen years of progressive schooling. What I learned led me to accept phenomena in the natural world, sciences, art crafts, and literature (as history and mythology). Each learning had a truth system that did not require conformity to the others. Each worldview had a clear domain of application and rules of operation. I was to adopt the worldview and truth system that was most constructive in each given situation. The diversity was enriching, but the greatest delight I found was in the confrontations between disciplines that led to bi-sociation of ideas of which

Arthur Koestler wrote of in *Insight and Outlook* (1949), and in the uncertainty that Heisenberg injected into every observation. I felt safe in holding multiple views when I heard Einstein's assertion that "the greatest myth of the modern world is science." And I was delighted in Phil Stanley's philosophy course called Techniques and Ideologies to find that Marx and Freud were the technologists and empiricists and psychoanalysts were treated as the theorists. Reality becomes process; Process becomes reality. I took ownership to these inversions in my first published paper (1951) in which I compared F. S. C. Northrop's Taoist views in *The Meeting of East and West* (1946) with the digital formulations of Claude Shannon in *Mathematical Theory of Communications* (1948). These juxtapositions led me to question how we *articulate* phenomena—how we separate and connect parts in every dialogue. So I entered the professional world dancing across the border between the connected and the separated, the holistic and the atomistic, the scientific and the mythological. I also learned that one could not argue the truth of one reality in the face of another, but it took me thirty years to find a systemic approach to managing the duality that was produced.

Computers and Management Science, 1951—58

In 1951, I asked Professor Stanley where I would find an environment in which I could work with myth, philosophy, and mathematical models of organizational behavior. On Easter holiday on Cape Cod, he put the question to his neighbor Fritz Roethlisberger, the Harvard business professor, who responded, "work for AT&T," then, the largest private organization in the world, which he envisioned as a great Leviathan dominating the communications industry. I took his advice and went to AT&T to explore philosophical ideas. He was right. My initial job was

to help plan the first trans-continental TV network. The technological aspects were intriguing but it was the internal network of administration and manufacturing that most ensnarled the task. I was nineteen levels down the hierarchy from the corporate president. Fortunately, I learned early about making *small world connections*—a direct line though my sibling at the Federal Reserve Bank to the AT&T president's office that helped me work the human side of administration. A few months later I experienced entirely different worldviews when the US Army drafted a few of us to do counter-intelligence in wartime Korea. Reading Northrop on Eastern philosophies proved an auspicious preparation.

In 1953, I came back to New York and AT&T, this time to select and program the first electronic computer to be installed for industrial applications. Some of our tasks were simple doing payroll, others were complex ones like automatic data processing between suppliers and customers, and optimal allocation schemes using linear programming. Shortly after returning I heard of the formative meeting of the General Systems Society in 1955. There, I met Von Bertalanffy, Boulding, Wiener, and others and became a charter member. Their discussions gave me a name for what I was doing—system thinking—to views beyond the formal organization models of AT&T to explore biological and social phenomena. Intrigued to find this new discipline, I sensed the university would now be a better place to continue learning and went to study with Herbert Simon at Carnegie Tech.

Chess and Go at Carnegie, 1958—62

Herb Simon and Allen Newell's Problem Solvers were learning to play chess using programmable rules, unambiguous responses, and well-defined pay-offs.

Their systemic approach was as hierarchical as I experienced at AT&T. It modeled a narrower view of system thinking than I encountered in the System Society and I found that system thinking is not a homogenous discipline. I shied away from the discipline of chess to work with the Japanese game of *Go*, which is as different from chess as East is from West. I joined with two colleagues to program the rules of play. That was easy, but we recognized that Go has field-like properties, calling on players to develop spheres of influence, and subtle powers more aesthetic than declarative and far beyond our competencies. I demoted Go to a recreation and moved to a more practical engagement to program multi-agent tasks as initiated by Selfridge's *Pandemonium* (1958).

Viewing the possibility of programming a computer as a collection of agents working cooperatively suggested exploring multi-agent systems. In 1954, Belmont Farley and W. Clark (MIT) had presented a paper at an IREE conference on a *self-organizing system (SOS)*, which they defined as "a system that changes its basic structure as a function of its experience and environment." (Yovits, Jacobi & Goldstein, 1962, p. ix.) I expanded this to "self-organizing systems viewed as complex adaptive internally goal-driven entities that respond to events in their environment" for my thesis using data on communications networks and built a computer simulation incorporating agents in which each had its own goals. The simulation, limited by the 64K memory, provided some insights on social network behavior that I reinforced with statistical modeling based on information theoretic measures and Zipf's Law. (McWhinney, 1964)

Self-Organizing Systems, 1958 —>

The question that has driven the study of SOS is *what preconditions will result in the appearance of order out of chaos*. The answers developed in the intervening forty years have made it one of the most significant arenas in system thinking. The early research and conferences focused on the need for elements to be connected in feedback loops: Pure hierarchies do not self-organize. My work focused on forms of the requisite energy inputs. Later, in the 1970s, Ilya Prigogine showed that all living organizations have to be dissipative, that is, the energy inputs are organized, while dissipating the more entropic metabolic products. Concurrently, Humberto Maturana, a biologist, began writing of self-producing auto-poietic organizations, wherein the entities manufactured their own components and maintained the vital order, thus recreating themselves. By the 1980s, Hermann Haken and others reformed self-organization in terms of the coupling and fluctuation of transitions through which emergent biological and cognitive process were stabilized. The research on self-organization focused on boundary conditions and more recently, according to Scott Kelso (1995), on the dynamics of coupling and nonequilibrium phase transitioning.

While this research has progressed, organizational consultants have adopted SOS with casual attention to boundary conditions. They encourage groups within organizations to work participatively without considering the controls that are imposed by the boundary conditions set by managers, or the ambitions of individual members of a group. For all the good intention of the consultants, even democratic societies are wary of emergent forces. So I found when I tried to make

application of the self-organizing processes in industrial firms, revolutionaries are seldom appreciated.

Industrial Democracy and Open Systems Planning, 1962—74

When I completed the work at Carnegie, I had the choice of following a career in formal systems and computer modeling, or of exploring organizational behavior. A chance offer to help found a Carnegie-like business school at Leeds University in England delayed the decision. The faculty we assembled at Leeds included the disciplinary split that C.P. Snow described in *Two Worlds (1962)*. The faculty, that was assembled included members in the newest disciplines trained in operations research, computer modeling, and advocates of more radical forms of organizational behavior. They shared little language and few values. Within a year the internal discord was so great that we had to bring in a mediator. Eric Trist came from the Tavistock Institute in London. He smoothed over the conflict but the success was short lived. More significantly, he brought his ideas of *socio-technical systems* and the commitment to industrial democracy that Fred Emery, Einar Thorsrud, Philip Herbst, and he were developing in Norway. Their work with participative governance in the work place and community (since named, *participative action research*) was an earthy setting for testing self-organizing systems. It went beyond the formal logics and experimental models of communications to encompass social, political, and psychological factors. It expressed a third type of system thinking that added ideas of *intentionality*, sharply distinguishing it from the deterministic classic and dynamic models being advocated by others who were bringing the new systems discipline to industry.

On returning to the US, I set out to continue developing the technique of self-organizing systems using the behavioral laboratory and computers at UCLA, but a different path was foreordained for me. In the first week in Los Angles a senior faculty member invited me to lunch at the prestigious Bel Air Hotel. He handed me Heinrich Zimmer's *The King and the Corpse* (1947) with the imperative that I absorb it. This work is a mythic companion to Carl Jung's psychology of personal transformation. It displays the role of myth and metaphor in personal life. It started me on a new systemic quest, beginning with Jung and meditating on the works of the Lakota seer Black Elk, the Russian mystic Gurdjieff, and Sufi poets. Their insights started me along a personal development approach to *self organization.*

About this time I happened to meet with a group of consulting clients from Proctor and Gamble who were learning socio-technical systems from my colleague Jim Clark. I listened to the stories of their work places. I reframed them in archetypal terms echoing stories that arise in every organization's life. The group was intrigued with the insights and asked me to join the team as mythic interpreter as well as system-technologist. With their internal consultant, Charlie Krone, we combined the realities of systemic design, human relations, and mythic insight into a practice we called *Open Systems Planning.* With OPS we enabled groups of workers to design their work environments and gain a deep sense of participation in management tasks in many of the P&G plants and thereby creating many of the earliest semi-autonomous installations in companies across the US and Europe between 1968 and the mid-1970s. The plants were profitable, efficient work settings that contributed deeply to the employees' lives. The workers, renamed "technicians," learned that they could engage responsibly in the

work place that extended beyond to participative engagement in their communities, their churches, and local governance (Elden, 1981). Community engagements sometimes started with search conferences, sometimes using art events to recreate spirit as was an essential first step in the devastated Los Angeles communities following the Watts riots in 1965. The model of enabling participation in industry worked well in communities and governmental units—as Eric Trist had also found.

The Open System work place was a constructive generator of local autonomy for citizens and workers. However, we soon found that the autonomy the organization's workers and low level managers gained was massively threatening to government and corporate executives. The effective power on the shop floor was countered by renewed control from above. Managers fenced the teams into 'play-pens'—supervisors agreed not to meddle in the operating pens if workers would stay away from business issues and government administrators blocked funds to these "upstart" projects. Sustaining change in society was more complex than our utopian models had anticipated, even in the midst of the social revolution of the "60's."

The Rise of Complexity and a Response, 1962—79

Erich Jantsch, looking back from 1974, called the '60s an era of "metafluctuation" in the course of history: Political chaos shaking up the world, the Cuban stand off, the assassination of John F Kennedy, the racial and student riots across the US and Western Europe, the Beetles, mau-mauing, and the flower children at Woodstock. Other changes introduced complexities at a deeper level: Lorenz's discovery of deterministic chaos in the weather predictions, Mandelbrot

identifying fractals, and the French proclamation that the modern world was passé. No language adequately described the complexity that devolved; we needed new metaphors and vocabularies as well as new techniques for managing beyond what we had understood.

Twenty years earlier Stephen Pepper proposed that cultures tend to operate out of some combination of four core metaphors (1942). C. P. Snow saw a similar source of conflict in the Cambridge University faculty cleaved into opposing worldviews. In 1962, just as the metafluctuation began, Thomas Kuhn wrote that we were in transition between the scientific paradigms that dominate a culture for long stable intervals. By the late 1960's the turmoil in the western world indicated that no single paradigm could long support a particular societal form and then only tenuously where there was totalitarian or theocratic governance. Kuhn's model had to be replaced with one that assumed a concurrent multiplicity of paradigms (core metaphors) led any culture.

I intensified my search for such a model when the management faculty at UCLA acknowledged that it lacked an adequate model with which to guide the MBA students into their work worlds. I joined in an effort to redesign the MBA curriculum to respond to the emerging complexity by assembling a committee from disciplines around the campus. The frustration we suffered in our meetings was reflected in the ultimate recommendation. The discussions mirrored the divisions and conflicts present in the outside world, finding its realities as diverse as Pepper's metaphors. The group fragmented across four worldviews that closely matched sets appearing over the millennia in cultures around the world. I labeled them Unitary, Sensory, Social, and Mythic, as in Figure 1. The intransigent

differences in the committee's recommendation reduced us to the conclusion that each instructor should just reflect his or her native 'language' and the students would be left to choose among the approaches as they would have to in the management world beyond the classroom.

Figure 1. FOUR BASES FOR REALITY

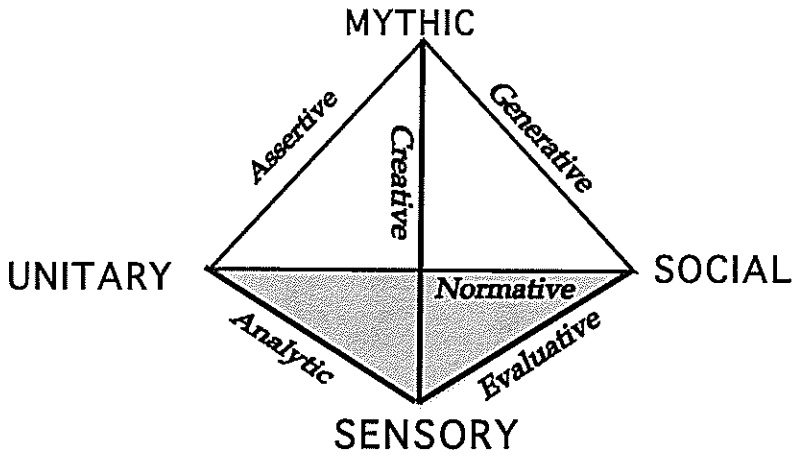
UNITARY Deterministic systems of truths, assumptions, and propositions. Logics, morality, and spiritual oneness. PRINCIPLES	**SENSORY** Raw characteristics and atomistic objects derived from the senses. Empiricism DATA
IDEAS Free creation of symbols, words, and objectness. Creativity, assertiveness, and in the extreme, solipsism. **MYTHIC**	VALUES Emotions and group values associated with distinct individuals and groups. Ethics and human relations. **SOCIAL**

By focusing on what languages are used in understanding complexity I awoke to what I had long felt that it is 'academic' to question which view of reality was correct. Rather I sensed the issue is *selecting the form and sequence by which alternative realities need be brought into a situation.*

Bi-sociation of Reality and Myth, 1980 —>

In Koestler's bi-sociation two distinct components suddenly come together for form new insights. Such a bi-asocation occurred for me as I began applying ideas that came from diverse universes. One idea was Whitehead's conception of prehension—the view that we establish a reality through engagements between reality sources; the second arose from tales of the rites of passage such as the Orphic, Masonic, and others I had experienced years before. I, along with many others, have taken a long time to understand *Process and Reality* and the Jungian "The King and the Corpse." Forty years after first struggling with Whitehead's material that I realized he provided the process I needed to operate within the diversity of worldviews. It was clear that one's concept of reality was to be found in the interaction of worldviews. The most obvious was empirical reality established between ideas as theories and sensations as observations. I *observe* something to be a flower because the characteristics I attach to a prototypical flower; I *value* a flower according to the socio-emotional preferences with which I grew up; or I accept the *truth* of its membership in the class 'flower' as a condition for membership in a discipline or society. The first insight was that awarenesses come by projecting one worldview onto another. Projections can be made in infinite ways, but I, and cultures everywhere, collect the worldviews into small sets between which projections form stages for discourse. I form six platforms by projecting each source through the others. (Figure 2).

Figure 2. Six Platforms of Discourse



Each prehension of one source of reality by another creates a different context for discourse. For example, projection of a mythic view into a social arena produces a *generative* exchange as a story, while examining the muscular system of a frog (sensory-unitary) uses *analytic* methods. The pain one feels on the loss of a spouse is realized on the *evaluative* platform (sensory-social.) On the *normative* platform, choices are worked out between social ethics and ordained morality (social-unitary). Every discipline and science is organized on a single platform, though casual discourses float among the platforms sometimes creating the bi-sociations that delighted Koestler, evoking humor and invention but often producing misunderstanding and conflict.

The platforms of discourse are one component of a bi-sociation pair that presented itself to me some years ago. The second component was the rites of passage of human and social transformation. By associating platforms with transformative paths, organizational change processes could be seen as occurring through a sequence of platforms, following paths used in rites of passage and in stages of human and social transformation. As I worked with organizational clients

I heard echoes of the great myths of origin—Kronos and his sons—and of transformation— "Amor and Psyche" and the Heroes Journey of which Joseph Campbell wrote. On occasion, simply reciting these tales exposed the conundrums in a client system and allowed its members to see their own stage of development.

This second bi-sociation came by conjoining the mythic tales with the ontological descriptions of rules for behavior within each stage. Personal and social changes follow paths of diverse projections: different paths for different destinations. (McWhinney, 1992) This 'flash' immediately facilitated the re-design of strategic engagements. More recently I have used it to understand the paths along which cultures develop, why one is creative and another seems stuck in disciplined regime.

Systems of Thinking about Systems, 1981—83

System thinking, and more so, teaching system thinking were both difficult and unpopular during its first decades (1950-1980). Few faculties accepted it—then and now—as a proper discipline and students were seldom prepared to deal with the richness of mathematical, biological, and sociological applications. The difficulty arose from the power of system thinking. It is not a discipline such as physics and linguistics, but a modeling of philosophies with diverse ontological bases. There was no over-all structure to system thinking. The existing texts illuminated single approaches such as cybernetics and ecology. Applications were limited to engineering problems and often unsubstantial extensions to biological and social systems. Each system theory approach has foundations in a specific philosophical tradition, going back to classic Greek and to a lesser extent to Oriental and Arabic sources. With this recognition, it was easy to separate system

thinking according to distinct ontologies, identify the progenitors, and give each a name.

The general term system was first attached to work started in the 1950's by Ashby, Von Bertalanffy, Boulding, Shannon, Weiner and others who came from an empirical foundation, using the analytic platform. I label this variety of work, *dynamic*, based on the metaphors of *doing*, of which cybernetics is a prime example. Formal system theories were espoused by mathematicians and logicians: von Neumann, Turing, a number of East Europeans, and, more recently, by Stuart Kaufman. This approach, widely labeled the *classic*, is based on the assertive platform (mythic-unitary), its core metaphor is *containing*. The third type of system theory, I labeled *exchange theory*, is based on the evaluative platform (sensory-social), incorporates choice, expressions of the agents' preferences, using the metaphor of *grasping* or reaching out. The exchange platform grew in importance with its application in the industrial democracy movement, communications, and second order cybernetics. Significant figures here include Bateson, Rapoport, Maruyama, and Trist and Emery. The classification scheme also indicated the variety of incomplete system theories. There is no adequate theory to deal with *normative* issues (unitary-social) such as politics, ethics, and conflict resolution. Or for creative activities (mythic-sensory) or generative (mythic-social)—both of which may defy systemic formulation.

Articulation of system theories' exuberantly branching into the canopy (Figure 3), makes the evolution of system thinking is not only easier to comprehend, but makes more manageable the complexity that has emerged in the 21st Century. I have detailed this approach for organizing change efforts and managing conflict in

the *Paths of Change* (1992) and for exploring the system canopy in preparing the manuscript for *Grammars of Engagement*. However we need to go beyond this approach that still accepts the duality of part-whole thinking and speech. I propose that can be achieved by replacing the models based in the container and force metaphors with coupling-based descriptions. Forced-based models have served the empirical sciences[2] well but I believe they are inappropriate for understanding social phenomena, especially those mediated by (spoken) language. I develop this argument in the second chapter "Coupling" of the coming monograph (2007).

Systems Education at The Fielding Graduate University 1979—>

In 1979, an opportunity to start an innovative graduate student program at The Fielding Institute (now the Fielding Graduate University) provided me with a challenge similar to founding the program at Leeds University in England, which were both similar to a UCLA business school graduate degree program I later established. At Fielding with the commitment of the new program's director, Don Bushnell, we were able to design and develop a program that spanned the full range of system thinking. Although few of the program participants and faculty had an analytic background in system thinking we did offer an integrative worldview and students began the doctoral program in social change with systems as a foundation.

The avoidance of the more systematic aspect was offset by their greater comfort working with experiential learning—dance movement, choral experiments, graphics and building analogies. It provided a sense of working with the whole without thinking in terms of relations between. For most, this approach

achieved a better sense of dynamic systems, or as I've suggested elsewhere, system potentials, than does learning through the formidable calculus. Doing such rhythmic and non-verbal expression allowed them to get beyond thinking of relations between individual parts to the phenomena of coupling. With this approach it was far easier to make sense of the diverse paths taken by the schools of system thinking—or of any discipline—and thus giving a rationale for organizing the process of the diverse elements of a doctoral curriculum which so often dictates the otherwise focused advanced students. It was a step toward developing an integral core from which to generate relations to disciplines that often seem unrelated. Graphic devices such as the following figure that uses the forest as metaphor were used to create an integral awareness.

Preparation in system thinking gave an added benefit in that it gave the Fielding students more open and appreciative views of the faculty and the professional clients who maintained strong commitments to specific disciplines and their use in work. Unfortunately the negative results of the attempted innovation were also the same. In spite of commitment to instruct from the interpretative worldview, most faculty reverted to the methods and worldviews of their familiar discipline: the psychologist returned to the discussion of human relations; the sociologist returned to see every issue as socio-political; the empiricist bias reappeared in every thing as tables and measures of significant differences.

Although I found the experience of introducing an integrative program at Fielding as disappointing as I had found in both other schools and corporations, it reinforced my belief that we need new approaches for living in the canopy.

Coupling, 1983—>

Early in the 1980s Ralph Abraham was featured in *Newsweek* displaying the chaotic path of a Pacific typhoon. The magazine article introduced the public to mathematical dynamics and computer graphics of *chaos*. I called Ralph in Santa Cruz and we met on his next trip to Los Angeles. We talked of fractals, attractors, bifurcation sets, scale-free expansions, and the beautiful creations produced by computers graphing simple fractal expressions. My joy was partly in unfolding the fractal images but even more in the dynamic descriptions of the life of entities, particularly of social systems that we so arduously unraveled with hand drawing just twenty years earlier. (McWhinney, 1968)

This work, variously called mathematical or field dynamics is not another species growing in the system forest.[ii] It differs from the classic paradigm in that it describes a system over time. It differs from the dynamic and exchange models assuming properties of wholes, not the relations among parts. Its realizations are landscapes; diagrams that illuminate the states through which an entity will go, sometimes predictably, sometimes chaotically. The applications of mathematical dynamics suggested that we are spectators, watching events for which we cannot be responsible, for even a butterfly in Brazil can change the course of our history. Prigogine's dissipative systems 'happen'; Per Bak's theory of avalanches and earthquakes has then occurring with probabilities set by the power law; and networks self-organize around one or two central nodes. Control is determined by energies external to the managed system. The field view places the controls beyond that system. It locates them in a higher power, a statistical god, a rule

maker or simply a manager or parent. Adoption of a field view calls for transfer from responsibility for action to setting the conditions that set our courses. Unfortunately it serves organizational consultants by extolling the paradoxical freedom from certainty while simultaneously boosting self-organizing systems. Their interpretation of field thinking is a misapplication: Whitehead comments "continuity [of a field] concerns what is potential; whereas actuality is incurably atomic." Field thinking is for mapping, system thinking for action. The dual condition is present in a community, in a commodity market, among the audience at a sports event. These are examples of the coupling we see at every level. These properties—as we see in electrons, molecules, a flock of birds or in people doing a 'wave' at a football game—follow from their coordinated or *coupled* state.

Most forms of coupling are harmonic, obvious in dancing, less obvious in brief and violent contacts that occur from the scale of atomic particles. In normal conversations responses take on a rhythm, couples walking down the street coordinate their step, and the biorhythms of an intimate group tend to converge. Every engagement requires that there be elements that *connect,* indicating coupling, and processes that *separate,* indicating difference. Paradoxically, coupling requires a degree of ambiguity; exchange takes place between elements only if there is a balance of distinctions and commonalities on relevant dimensions. For there to be communication there needs to be articulative processes that connect and separate.

The Canopy, 2000 —>

Out behind the house where I went walking this afternoon vines are climbing up into the trees. Without reflection, I began pulling them out. I didn't noticed that

the intermingling of species were evolving toward the very canopy I have found so intriguing. For all I have said here, I am still hooked on maintaining a neatly delineated landscape of the English estate. I am not yet at ease with living in the complex canopy with its trees and interwoven vines. I resist giving up the stable accoutrements of the rational life style. However, there may be no choice; we may all be living in such an ecology. It is only a matter of how soon we recognize it. It might even be that eventually I can come to enjoy the canopy finding that worldview more integrative, less stressful, more copasetic with my flow, and in the end, accepting that it has always been our environment. It will take some readjustments for us to live with the cultural requirements of the canopy and its overstory.

We have to accept that the opportunity given first to Adam to name the animals and plants is a continuing one. It is the fundamental creative work for all humans that has been neglected over the recent eons, On rising into the canopy I would see there are no permanent labels; everything interpenetrates, everything connects and is separable. Names must continuously flow from parents and poets and theorists.

- The universe is most fully represented as a single field. Things and ideas are artifacts designed for our convenience. I would give up the idea of there being material or conceptual boundaries. Conversely, the canopy is not open territory. Wherever one goes there will be "sporadic occasions of violent closure" that denude its culture—fires in a forest, jihads in a society, and pathologies of our own turmoils.

- The metaphors of guidance we would use in the canopy transcend those embodied, ego-based compasses that have set our individual paths for operating in the forest below. There will be *social metaphors* of coupling such as languaging, and organizing.

- The social ecology of the canopy is not stably defined. Its description and behaviors are co-products of the dance of my cognition and the context in the canopy. I would best skip among the ecological event without egocentric justifications. I no longer own a patrimony; my identity would be in a dance with the ecology.

- I anticipate that we will all suffer the ambiguities of articulation and the duality of connecting and separating, and conversely, we can celebrate coupling in relations that transcend our individual existences. We will enjoy both our separate identity and being at one with all those others who would leap around the multi-dimensional culture.

- The most visible change will be to drop the habit of using *force* as the fundamental cause of all happenings among "things." In its place we can adopt *coupling in our daily conversation on every topic from quantum mechanics to the love we feel for one another and our environment.*

There is the tale of the reporter interviewing a wise old sage on the occasion of his one hundred and thirtieth birthday.

"To what do you attribute your longevity?"

He responded: "Humility."

The reporter quickly proposed the alternative, "I think it is your wit and the good Scotch whiskey."

The elder paused,

"You might be right."

[i] In a 1991 article, "Fractals cast no shadows," I envisioned the canopy as an *arabesque.* That metaphor is still a valid image, but since 2001, that label is likely to draw irrelevant implications. The canopy metaphor is safer and it expands the image beyond the low dimensionality of an arabesque into a transcendent n-dimensional field.

[ii] These descriptions are formed as dynamical systems graphically presented by Ralph Abraham in the 1980's and more formally by H. Hermann Hakon (1982), Wolf Singer (2003), and Tim Jarvilohto (1998). The Europeans have explored field thinking more than the Anglo-American researchers whose empirical studies of neural networks produce finer articulations.

REFERENCES

Elden, Max (1981) "Political efficacy at work: the connection between more autonomous forms of workplace organizations and a more participatory politics." *American Political Science Review* 75 (1) 43-58.

Kelso, J.A. Scott, (1995) *Dynamic Patterns The Self-Organization of the Brain and Behavior* Cambridge, MIT Press

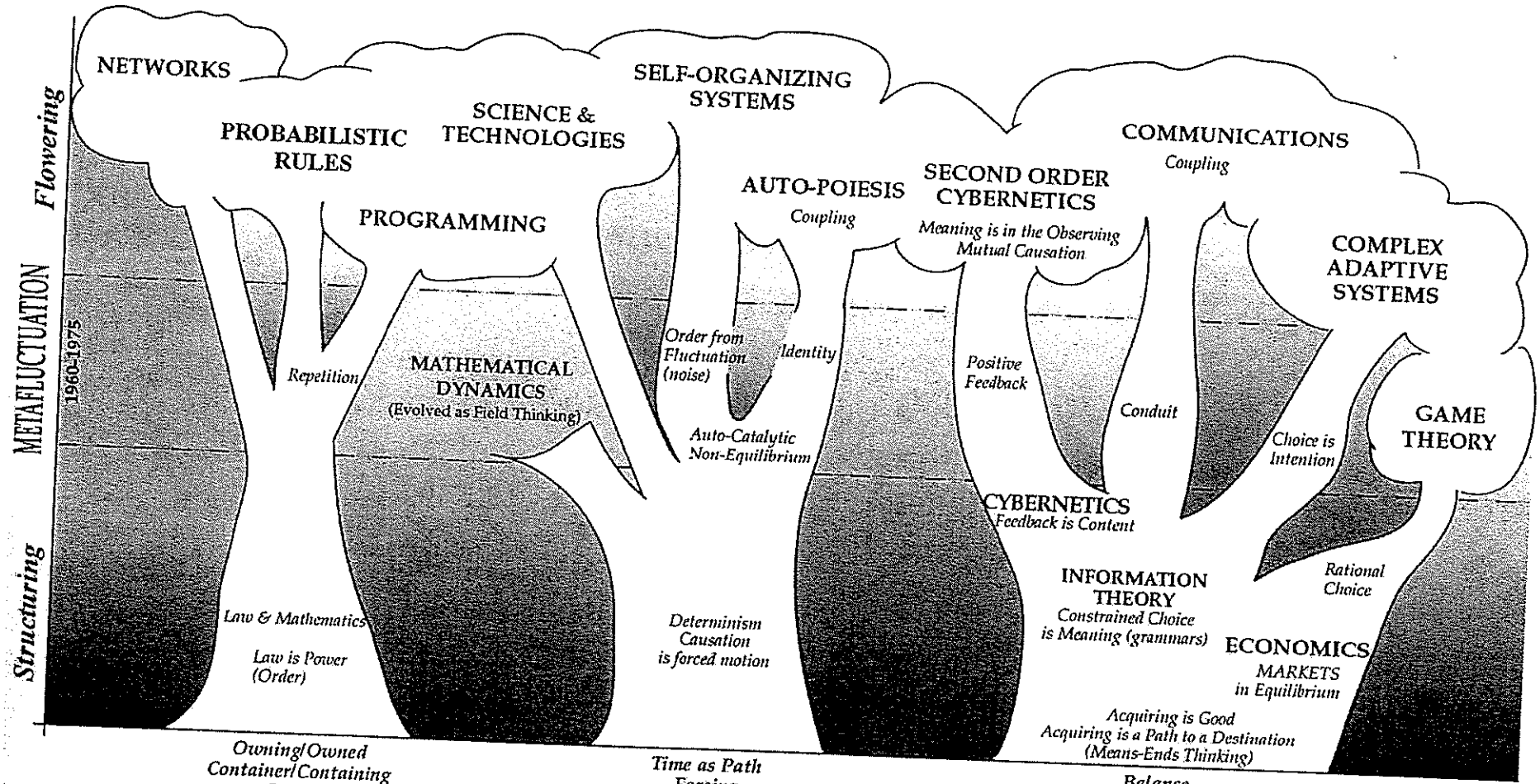
McWhinney, William H., (1964). *Self-Organizing Systems.* Industrial Administration. Pittsburgh, Carnegie Mellon.

McWhinney, William H., (1968). "Synthesizing a social interaction model." *Sociometry* 31(Sept): 229-244.

McWhinney, William H., (1992/97) *Paths of Change.* Thousand Oaks, CA, Sage Publications.

McWhinney, William H., (2007) "Coupling." Available from willmcwh@aol.com

Yovits, Marshall, George T. Jacobi, & Gordon D Goldstein (eds) *Self-Organizing Systems 1962.* Washington D.C Spartan Books



Grammars are traditionally formulated as **Classic rule-bound systems.**

By introducing iterative processes we can explore the evolution and stability properties of vocabulary and grammars.

Dynamic systems describe the active course of dialogues, allowing participants to anticipate and thus direct the flow of conversation.

Exchange systems formulate engagements: dialogic, markets, self-reflective, and systemic.

Here we can explore communication as conduits of information and as a coupling of behaviors.

Figure 3. The Systems Canopy

REFERENCES JBW

2006 Wills Booth

ADD TO PRPER FILE ON G4
Katz, Bruce K."a measure of musical Preference JCS 11/3-4 204

Reference Type: Book
Record Number: 76
Author: Abraham, Ralph, H. & Christopher D. Shaw
Year: 1982-1988
Title: Dynamics: The geometry of behavior
City: Santa Cruz, CA
Publisher: Aerial Press, Inc
Volume: 1 -4
Number of Volumes: 4

Reference Type: Book
Record Number: 171
Author: Abraham, Frederick David
Year: n.d.
Title: A Visual Introduction to Dynamical Systems Theory for Psychology
City: Santa Cruz, CA
Publisher: Aerial Press
Keywords: Coupling

Reference Type: Book
Record Number: 95
Author: Adair, Robert K.
Year: 1987
Title: The Great Design: Particles, fields, and creation
City: New York
Publisher: Oxford University Press
Keywords: fields, physics

Reference Type: Book
Record Number: 175
Author: Allinson, Robert E. (editor)
Year: 1989
Title: Understanding the Chinese Mind: The philosophical roots
City: Hong Kong
Publisher: Oxford University Press
Keywords: Grammar, reality, epistemology

Reference Type: Book
Record Number: 241
Author: Apps, Peter
Year: 2003
Title: Against the flow: education, the arts and postmodern culture
City: London
Publisher: RoutledgeFalmer
Keywords: Transformative education, arts, culture

Reference Type: Book
Record Number: 160
Author: Arbnor, Ingeman & Bjorn Bjerke
Year: 1997
Title: Methodology for Creating Business Knowledge
City: London
Publisher: Sage Publications
Edition: 2nd

Reference Type: Book
Record Number: 149
Author: Arrow, Kenneth J.
Year: 1951
Title: Social Choice and Individual Values
City: New York
Publisher: John Wiley & Sons
Keywords: Utility

Reference Type: Book
Record Number: 58
Author: Ashby, W. Ross
Year: 1956
Title: An Introduction to Cybernetics
City: New York
Publisher: John Wiley & Sons

Reference Type: Book
Record Number: 12
Author: Auyang, Sunny Y.
Year: 1995
Title: How is Quantum Field Theory Possible?
City: New York

Publisher: Oxford University Press

Reference Type: Book
Record Number: 79
Author: Auyang, Sunny Y
Year: 1998
Title: Foundations of Complex-System Theories in Economics, Evolutionary Biology, and Statistical Physics
City: Cambridge
Publisher: Cambridge University Press

Reference Type: Book
Record Number: 197
Author: Auyang, Sunny Y
Year: 2000
Title: Mind in Everyday Life and Cognitive Science
City: Cambridge, MA
Publisher: MIT Press

Reference Type: Book
Record Number: 184
Author: Axelrod, Robert & Michael D. Cohen
Year: 2000
Title: Harnessing Complexity: Organizational implications of a scientific frontier.
City: New York
Publisher: Basic Books

Reference Type: Book
Record Number: 206
Author: Bachelard, Gaston
Year: 1991
Title: The Poetics of Space
City: Boston
Publisher: Beacon Press
Translator: Jolas, M.

Reference Type: Book
Record Number: 109
Author: Bak, Per
Year: 1996

Title: How Nature Works
City: New York
Publisher: Springer-Verlag
Keywords: self-organized, criticality

Reference Type: Book
Record Number: 231
Author: Bakhtin, Mikhail H.
Year: 1986
Title: Speech Genres and Other Late Essays
City: Austin
Publisher: Univesity of Texas Press
Translator: McGee, Vern W.

Reference Type: Book
Record Number: 242
Author: Barabázi, Albert-Lázló
Year: 2002
Title: Linked: The new science of networks
City: Cambridge , Mass
Publisher: Perseus Publishing
Keywords: networks, power law, language

Reference Type: Book
Record Number: 2
Author: Bateson, Gregory
Year: 1972
Title: Steps to an Ecology of the Mind
City: New York
Publisher: Ballentine Books
Keywords: learning, co-dependency, systems

Reference Type: Book
Record Number: 65
Author: Bateson, Gregory & Mary Catherine Baterson
Year: 1987
Title: Angels Fear: Towards an epistemology of the sacred
City: New York
Publisher: Bantum Books

Reference Type: Book

Record Number: 174
Author: Baumol, William J.
Year: 1965
Title: Economic Theory and Operations Analysis
City: Englewood Cliffs, NJ
Publisher: Prentice-Hall
Edition: 2nd

Reference Type: Book
Record Number: 54
Author: Beer, Stafford
Year: 1985
Title: Diagnosing the System for Organizations
City: New York
Publisher: John Wiley & Sons

Reference Type: Book
Record Number: 159
Author: Bentz, Valerie & Jeremy J. Shapiro
Year: 1998
Title: Mindful Inquiry in Social Research
City: Thousand Oaks, CA
Publisher: Sage Publications

Reference Type: Book
Record Number: 194
Author: Berman, Morris
Year: 1981
Title: The Reenchantment of the World
City: Ithaca, NY
Publisher: Cornell University Press

Reference Type: Book
Record Number: 82
Author: Black, Max
Year: 1962
Title: Models and Metaphors
City: Ithaca, NY
Publisher: Cornell University Press

Reference Type: Book

Record Number: 46
Author: Blauberg, I.V., V.N. Sadovsky & E.G. Yudin
Year: 1977
Title: System Theories: Philosophical and methodological problems
City: Moscow
Publisher: Progress Publishers

Reference Type: Thesis
Record Number: 33
Author: Bliss, Tamara J.
Year: 1996
Title: Leveling the Playing Field: How citizen advocacy groups influence corporate behavior
City: Santa Barbara, CA
University: Fielding Institute
Thesis Type: Dissertation

Reference Type: Book
Record Number: 77
Author: Bohm, David
Year: 1980
Title: Wholeness and the Implicate Order
City: London
Publisher: Routledge & Kegan Paul
Keywords: Field theories

Reference Type: Book
Record Number: 154
Author: Bohm, David
Year: 1995
Title: On Dialogue
Series Editor: Nichol, Lee
City: London
Publisher: Routledge

Reference Type: Book
Record Number: 85
Author: Boulding, Kenneth
Year: 1956
Title: The Image
City: Ann Arbor, MI
Publisher: University of Michigan Press

Notes: 1. static structure
2. simple synamic systems, clock works
3.cybernetic systems, control mechanisms
4. open systems
5. Genetic blueprnts in plants, lower organisms
6. Animals
7. individual human
8. societal, socio-cultural
9. transcendental, symbolic systems

Reference Type: Book
Record Number: 243
Author: Boyd, Robert & Peter J. Richerson
Year: 1985
Title: Culture and Evolutionary Processes
City: Chicago
Publisher: University of Chicago Press
Keywords: culture, Darwin, probabilistic

Reference Type: Book Section
Record Number: 128
Author: Boyd, Richard
Year: 1992
Title: Metaphor and Theory of Change: What is "metaphor" a metaphor for?
Editor: Ortony, Andrew
Book Title: Metaphor and Thought
City: Cambridge
Publisher: Cambridge University Press

Reference Type: Book
Record Number: 94
Author: Boyer, Carl B.
Year: 1968
Title: A History of Mathematics
City: New York
Publisher: John Wiley & Sons

Reference Type: Book
Record Number: 97
Author: Briggs, John
Year: 1992
Title: Fractals: The Patterns of Chaos: A new aesthetic of art, science and

nature.
City: New York
Publisher: Touchstone Books

Reference Type: Book
Record Number: 52
Author: Buckley, Walter
Year: 1967
Title: Sociology and Modern System Theory
City: Englewood Cliffs, NJ
Publisher: Prentice Hall

Reference Type: Book
Record Number: 170
Author: Bunge, M
Year: 1979
Title: Ontology II: A world of systems
City: Dordrecht
Publisher: D. Reidel

Reference Type: Book Section
Record Number: 144
Author: Campbell, Donald T.
Year: 1974
Title: Evolutionary epistemology
Editor: Schlipp, P.
Book Title: The Philosophy of Karl R. Popper
City: La Salle IL
Publisher: Open Court

Reference Type: Book
Record Number: 53
Author: Campbell, Jeremy
Year: 1982
Title: Grammatical Man: Information, entropy, language, and life
City: New York
Publisher: Simon and Schuster

Reference Type: Book
Record Number: 60
Author: Campbell, Robert

Year: 1985
Title: Fisherman's Guide: A systems guide to creativity and organization
City: Boston
Publisher: Shambala

Reference Type: Book
Record Number: 3
Author: Capra, Fritjof
Year: 1975
Title: The Tao of Physics
City: Boulder, CO
Publisher: Shambala
Keywords: Tao, Physics, systems,

Reference Type: Book
Record Number: 136
Author: Capra, Fritjof
Year: 1996
Title: The Web of Life
City: New York
Publisher: Doubleday

Reference Type: Journal Article
Record Number: 172
Author: Chou, Hui-Hsien & James A. Reggia
Year: 1997
Title: Emergence of self-replicating structures in a cellular automata space
Journal: Physica D
Volume: 110
Issue: 3-4
Pages: 252-272
Keywords: Artifical life, emergence

Reference Type: Book
Record Number: 141
Author: Cilliers, Paul
Year: 1998
Title: Complexity and Postmodernism: Understanding complex systems
City: London
Publisher: Routledge
Keywords: Postmodern Complexity

Reference Type: Book
Record Number: 127
Author: Clark, Stephen H
Year: 1992
Title: Paul Ricoeur
City: London
Publisher: Routledge

Reference Type: Book Section
Record Number: 72
Author: Coleman, James S.
Year: 1960
Title: The study of small groups
Editor: Solomon
Book Title: Mathematical Thinking in the Measure of Behavior
City: Glencoe
Publisher: Free Press
Pages: 1-150

Reference Type: Journal Article
Record Number: 179
Author: Condon, William S.
Year: 1975
Title: Multiple responses to sound in dysfunctional children
Journal: Journal of Autism and Childhood Schizophrenia
Volume: 5
Issue: 1

Reference Type: Book
Record Number: 4
Author: Conze, Edward
Year: 1951
Title: Buddhism: Its essence and development
City: New York
Publisher: Harper Row

Reference Type: Book
Record Number: 167
Author: Cotterill, Rodney M. J.
Year: 1998

Title: Enchanted Looms: Conscious networks in brains and computers
City: Cambridge
Publisher: Cambridge University Press
Keywords: Consciousness

Reference Type: Journal Article
Record Number: 157
Author: Cotterill, Rodney M. J.
Year: 2001a
Title: Evolution, cognition and consciousness
Journal: Journal of Consciousness Studies
Volume: 8
Issue: 2
Pages: 3-18
Keywords: Sensori-motor consciousness

Reference Type: Journal Article
Record Number: 177
Author: Cotterill, Rodney M. J.
Year: 2001b
Title: Cooperation of the basal ganglia, cerebellum, sensory cerebrum and hippocampus: Possible implications for cognition, consciousness, intelligence and creativity
Journal: Progress in Neurobiology
Volume: 64
Issue: May
Pages: 1-33

Reference Type: Book
Record Number: 187
Author: de Chardin, Teilhard
Year: 1965
Title: The Phenomenon of Man
City: New York
Publisher: Harper & Row
Translator: Wall, Bernard

Reference Type: Journal Article
Record Number: 135
Author: de Man, Paul
Year: 1978
Title: The epistemology of metaphor

Journal: Critical Inquiry
Issue: 5
Pages: 13-30
Keywords: Deconstructionism

Reference Type: Electronic Source
Record Number: 145
Author: de Quincy, Christian
Year: 1999
Title: Language, energy and consciousness
Producer: Scientific and Medical Network
Type of Medium: www.cis.plym.ac.uk/SciMedNet/home.htm

Reference Type: Book
Record Number: 204
Author: deCharms, Christopher
Year: 1998
Title: Two Views of Mind: Ahbidrama and brain science.
City: New York
Publisher: Snow Lion

Reference Type: Journal Article
Record Number: 70
Author: Dell, Paul F.
Year: 1985
Title: Understanding Bateson and Maturana: Toward a biolgical foundation for the social sciences.
Journal: Journal of Marital and Family Therapy
Volume: 11
Issue: 1
Pages: 1-20
Keywords: epistemology, ontology, causality

Reference Type: Book
Record Number: 5
Author: Dennett, Donald C
Year: 1990
Title: Consciousness Explained
City: Boston
Publisher: Little Brown & Co.

Reference Type: Book
Record Number: 229
Author: Derrida, Jaques
Year: 1973
Title: @@
City: Chicago
Publisher: Northwest University Press
Translator: Allison, David B.

Reference Type: Book
Record Number: 134
Author: Derrida, Jacques
Year: 1977
Title: Of Grammatology
City: Baltimore
Publisher: Johns Hopkins University Press
Translator: Spivak, G. C.

Reference Type: Book
Record Number: 6
Author: Eddington, A. S.
Year: 1935
Title: Time and Gravitation
City: Cambridge
Publisher: Cambridge University Press

Reference Type: Book
Record Number: 237
Author: Edinger, Edward F.
Year: 1986
Title: Encoutner with the Self: Ajungian Commentary on William Blake's Illustrations of the Book of Job
City: Toronto
Publisher: Inner City Books

Reference Type: Journal Article
Record Number: 100
Author: Falkenhainer, Brian, Kenneth D. Forbus & Dedre Gentner
Year: 1990
Title: The Structure-mapping engine: Algorithm and examples
Journal: Artificial Intelligence
Issue: 41

Pages: 1-63
Keywords: Metaphor

Reference Type: Journal Article
Record Number: 200
Author: Feinberg, Todd
Year: 2001
Title: Why the mind is not a radically emergent feature of the brain
Journal: Journal of Consciousness Studies
Volume: 8
Issue: 9-10
Pages: 123-45

Reference Type: Book
Record Number: 92
Author: Feldenkrais, Mosche
Year: 1972
Title: Awareness Through Movement: Health exercises for personal growth
City: New York
Publisher: Harper & Row

Reference Type: Journal Article
Record Number: 165
Author: Feser, Edward
Year: 1998
Title: Can phenomenal qualities exist unperceived
Journal: Journal of Consciousness Studies
Volume: 5
Issue: 4
Pages: 405-414
Keywords: Qualities.

Reference Type: Book
Record Number: 211
Author: Fodor, Jerry A.
Year: 1975
Title: The Language of Thought
City: New York
Publisher: Crowell

Reference Type: Book

Record Number: 124
Author: Forrester, Jay
Year: 1961
Title: Industrial Dynamics
City: Cambridge, MA
Publisher: MIT Press

Reference Type: Book
Record Number: 155
Author: Foucault, Michel
Year: 1970
Title: The Order of Things: An archaeology of the human sciences
City: New York
Publisher: Random House, Inc

Reference Type: Book
Record Number: 152
Author: Foucault, Michel
Year: 1972
Title: The Archeology of Knowledge
City: New York
Publisher: Pantheon Books
Translator: Smith, A.M. Sheridan
Keywords: grammar

Reference Type: Book Section
Record Number: 29
Author: Foucault, Michel
Year: 1980
Title: First Interview
Editor: Gordon, C.
Book Title: Power/Knowledge: Selected interviews and other writings 1972-1997
City: New York
Publisher: The Harvest Press

Reference Type: Book
Record Number: 176
Author: Foucault, Michel
Year: 2000
Title: Power
Series Editor: Faubion, James D.

Series Title: Essential Works of Foucault
City: New York
Publisher: Newpress
Volume: 3

Reference Type: Book
Record Number: 214
Author: Friedman, Maurice
Year: 1989
Title: ??

Reference Type: Book
Record Number: 227
Author: Garbourg, Paula
Year: 1994
Title: Self Healing: The secrety of the ring muscles
City: Fort Lauderdale,FL.
Publisher: Peleg, Publishers
Edition: 2nd

Reference Type: Book
Record Number: 224
Author: Garbourg, Paula
Year: 1997
Title: The Secret of the Ring Muscles
City: Garden City Park, NY
Publisher: Avery Publishing Group
Keywords: sphincter, coupling

Reference Type: Book
Record Number: 7
Author: Gebser, Jean
Year: 1985
Title: The Ever Present Origin
City: Athens, OH
Publisher: Ohio University Press
Number of Pages: 615
Translator: Michunas, Noel Barsted with Algis
Notes: originally published in German in 1949 & 1953.

Reference Type: Book

Record Number: 91
Author: Genova, Judith
Year: 1995
Title: Wittgenstein: A way of seeing CHECK - MAY BE OUT
City: London
Publisher: Routledge

Reference Type: Book
Record Number: 93
Author: Gibson, J. J.
Year: 1979
Title: The Ecological Approach to Visual Perception
City: Boston
Publisher: Houghton Miffin

Reference Type: Book
Record Number: 111
Author: Giddens, Anthony
Year: 1984
Title: The Constitution of Society: Outline of the theory of structuration
City: Cambridge
Publisher: Polity Press

Reference Type: Journal Article
Record Number: 80
Author: Gomatam, Ravi V.
Year: 1999
Title: Quantum theory and the observation problem
Journal: Journal of Consciousness Studies
Volume: 6
Issue: Nov./Dec.
Pages: 172-190
Keywords: Qualities, cauality

Reference Type: Book
Record Number: 212
Author: Grice, H. Paul
Year: 1989
Title: Studies in the Way of Words
City: Cambridge, MA
Publisher: Harvard University Press

Reference Type: Book
Record Number: 104
Author: Habermas, Jürgen
Year: 1984
Title: The Theory of Communicative Action
City: Cambridge
Publisher: Beacon Press
Volume: 1 and 2.
Number of Volumes: 2
Translator: McCarthy, Thomas

Reference Type: Book
Record Number: 103
Author: Habermas, Jürgen.
Year: 1990
Title: Moral Consciouness and Communicative Action
City: Cambridge
Publisher: Polity
Translator: Nicholsen, Christian Lenhardt & Shierry

Reference Type: Journal Article
Record Number: 209
Author: Haggard, Patrick & Benjamin Libet
Year: 2001
Title: Conscious activity and brain activity
Journal: Jour of Consciousness Studies
Volume: 8
Issue: 11
Pages: 47-64
Keywords: Inhibition

Reference Type: Book
Record Number: 181
Author: Hall, Edward T.
Year: 1976
Title: Beyond Culture
City: New York
Publisher: Doubleday
Keywords: action chain

Reference Type: Book

Record Number: 13
Author: Harmon, Willis
Year: 1994
Title: New Metaphysical Foundations of Modern Science
City: Sausalito, CA
Publisher: The Noetics Institute

Reference Type: Book
Record Number: 14
Author: Harré, Rom & Grant Gillett
Year: 1994
Title: The Discursive Mind
City: Thousand Oaks
Publisher: Sage Publications

Reference Type: Journal Article
Record Number: 41
Author: Harth, Erich
Year: 1999
Title: Art, language, and the human brain
Journal: Journal of Consciousness Studies
Volume: 6
Issue: 6-7
Pages: 97-115

Reference Type: Conference Proceedings
Record Number: 55
Author: Heiskanan, Heikki
Year of Conference: 1985
Title: Linguistical-mathematical systems theory
Editor: Banathy, Bela H.
Conference Name: Society for General Systems Research
Conference Location: Los Angeles
Publisher: Intersystems Publications
Volume: 1
Number of Volumes: 2
Pages: 127-135

Reference Type: Book
Record Number: 163
Author: Henne, Henry, Ole Bjørn Rongen & Lars Jul Hansen
Year: 1977

Title: A Handbook of Chinese Language Structure
City: Oslo
Publisher: Scandinavian University Books

Reference Type: Book
Record Number: 198
Author: Herbert, Frank
Year: 1965
Title: Dune
Publisher: Ace Books (1999)

Reference Type: Book
Record Number: 19
Author: Herrmann, Ned
Year: 1989
Title: The Creative Brain
Publisher: Brain Books

Reference Type: Book
Record Number: 24
Author: Hoffer, Eric
Year: 1951
Title: The True Believer
City: New York
Publisher: Harper & Row

Reference Type: Book
Record Number: 169
Author: Hoffman, Lynn
Year: 1981
Title: Foundations of Family Therapy: A conceptual framework for systems change
City: New York
Publisher: Basic Books
Keywords: Family therapy

Reference Type: Book
Record Number: 114
Author: Holland, John H.
Year: 1995
Title: Hidden Order: How adaptation builds complexity

City: Reading, MA
Publisher: Addison-Wesley Publishing Company

Reference Type: Journal Article
Record Number: 240
Author: Holland, Owen & R Goodman
Year: 2003
Title: "Robots with internal models: A route to machine consciousness?
Journal: Journal of Consciousness Studies
Volume: 10
Issue: 4-5
Pages: 77-110
Keywords: Grammar, simulation, models

Reference Type: Book
Record Number: 115
Author: Homans, George C.
Year: 1950
Title: The Human Group
City: New York
Publisher: Harcourt, Brace and World
Keywords: network

Reference Type: Newspaper Article
Record Number: 178
Reporter: Hopfield, John
Year: 2000
Newspaper: New York Times
City: New York
Issue Date: Dec. 19, 2000

Reference Type: Journal Article
Record Number: 121
Author: Howard, George S.
Year: 1991
Title: Culture Tales: A narrative approach to thinking, cross-cultural psychology and psychotherapy.
Journal: American Psychologist
Volume: 46
Issue: 3
Pages: 187-197
Keywords: stories

Reference Type: Book
Record Number: 189
Author: Isaacs, William
Year: 1999
Title: Dialogue and the Art of Thinking Together
City: New York
Publisher: Random House

Reference Type: Book Section
Record Number: 122
Author: Isnard, C. A. & E. C. Zeeman
Year: 1976
Title: Some models from catastrophe theory in the social sciences
Editor: Collins, Lyndhurst
Book Title: The Use of Models in the Social Sciences
City: London
Publisher: Tavistock Publications

Reference Type: Book
Record Number: 10
Author: James, William
Year: 1902
Title: The Varieties of Religious Experience
City: New York
Publisher: Simon & Schuster (1997)

Reference Type: Book
Record Number: 112
Author: Jantsch, Erich
Year: 1980
Title: The Self-Organizing Universe
City: New York
Publisher: Pergamon Press

Reference Type: Journal Article
Record Number: 218
Author: Jeannerod, Marc
Year: 2001
Title: Neural simulation in action: A unifying mechanism for motor cognition

Journal: Neuroimage
Volume: 14
Pages: S103-S109

Reference Type: Book
Record Number: 84
Author: Juarrero, Alicia
Year: 1999
Title: Dynamic in Action: Intentional behavior as a complex system
City: Cambridge, MA
Publisher: MIT Press
Keywords: Intentionality, Dynamics, Aristotle, Causality

Reference Type: Thesis
Record Number: 30
Author: Junge, Maxine
Year: 1992
Title: Creative Realities: the Search for Meaning
Academic Department: Human and Organizational Systems
City: Santa Barbara, CA
University: Fielding Institute
Keywords: Creativity, four realities, art

Reference Type: Book
Record Number: 78
Author: Kauffman, Stuart A.
Year: 1993
Title: The Origins of Order
City: Oxford
Publisher: Oxford University Press
Keywords: evolution, artifical life,

Reference Type: Book
Record Number: 38
Author: Kauffman, Stuart A.
Year: 1995
Title: At Home in the Universe: The search for the laws of self-organization and complexity
City: Oxford
Publisher: Oxford University Press
Number of Pages: 321
Keywords: evolution, self-organization, autocatalytic

Reference Type: Book
Record Number: 156
Author: Kelly, George
Year: 1955
Title: The Psychology of Personal Constructs: A theory of personality
City: New York
Publisher: Norton
Volume: 1.

Reference Type: Book
Record Number: 63
Author: Kittay, Eva Feder
Year: 1987
Title: Metaphor: Its cognitive force and linguistic structure
City: Oxford
Publisher: Oxford University Press

Reference Type: Book
Record Number: 56
Author: Klir, George J.
Year: 1969
Title: An Approach to General Systems Theory
City: New York
Publisher: Van Nostrand

Reference Type: Book
Record Number: 244
Author: Koestler, Arthur
Year: 1949
Title: Insight and Outlook
City: New York
Publisher: MacMillan Publishing

Reference Type: Book
Record Number: 47
Author: Korzybski, Alfred
Year: 1933
Title: Science and Sanity
City: Lakeville, CT
Publisher: The International Non-Aristotelian Library Publishing Company

Reference Type: Book
Record Number: 232
Author: Kruger, P
Year: 1982
Title: The Alchemy of Discourse: An archetypal approach to language
City: Lewisburg PA
Publisher: Bucknell Univeristy Press

Reference Type: Journal Article
Record Number: 26
Author: Lai, John
Year: 1996
Title: Worldviews in Collison: Understanding denominational conflict
Journal: Paper presented at Annual Meeting of Religious Research Assn

Reference Type: Book
Record Number: 59
Author: Lakoff, George & Mark Johnson
Year: 1980
Title: Metaphors We Live By
City: Chicago
Publisher: University of Chicago Press

Reference Type: Book
Record Number: 21
Author: Lakoff, George
Year: 1987
Title: Women, Fire and Dangerous Things: What categories reveal about the mind
City: Chicago
Publisher: University of Chicago Press

Reference Type: Book
Record Number: 88
Author: Lakoff, George & Mark Turner
Year: 1989
Title: More than Cool Reason: A field guide to poetic metaphor
City: Chicago
Publisher: University of Chicago Press
Keywords: Metaphor

Reference Type: Book
Record Number: 28
Author: Lakoff, George & Mark Johnson
Year: 1999
Title: Philosophy in the Flesh: The embodied mind and its challenge to western thought
City: New York
Publisher: Basic Books
Keywords: Metaphor

Reference Type: Book
Record Number: 228
Author: Langer, Suzanne
Year: 1948
Title: Philosophy in a New Key: A study of symbolism in reason, rite and art
City: Cambridge, MA
Publisher: Harvard Univeristy Press

Reference Type: Journal Article
Record Number: 148
Author: Langton, Chris G.
Year: 1986
Title: Studying artificial life with cellular automata
Journal: Physica
Issue: 22d
Pages: 120

Reference Type: Book
Record Number: 99
Author: Larmore, Robert
Year: 1987
Title: Patterns of Moral Complexity
City: Cambridge
Publisher: Cambridge University Press

Reference Type: Book
Record Number: 96
Author: Laszlo, Ervin
Year: 1996

Title: The Whispering Pond: A personal guide to the emerging vision of science
City: Rockport, MA
Publisher: Element

Reference Type: Book
Record Number: 102
Author: Laszlo, Ervin
Year: 2000
Title: Natural Coherence in Science and Society
Publisher: Not yet published

Reference Type: Book
Record Number: 192
Author: Latour, Bruno
Year: 1993
Title: We Have Never Been Modern
City: Cambridge
Publisher: Harvard University Press
Translator: Porter, Catherine
Keywords: hybrid

Reference Type: Book
Record Number: 180
Author: Leonard, George
Year: 1978
Title: The Silent Pulse: A search for the perfect rhythm that exists in each of us
City: New York
Publisher: E.P. Dutton

Reference Type: Book
Record Number: 15
Author: LeShan, Lawrence
Year: 1976
Title: Alternative Realities: The search for the full human being
City: New York
Publisher: Ballentine Books

Reference Type: Book
Record Number: 87

Author: Lewin, Kurt
Year: 1936
Title: Principles of Topological Psychology
City: New York
Publisher: McGraw-Hill Book Co.
Keywords: field theory

Reference Type: Book
Record Number: 71
Author: Lewin, Kurt
Year: 1951
Title: Field Theory in Social Science
City: New York
Publisher: Harper & Row

Reference Type: Journal Article
Record Number: 217
Author: Libet, Benjamin
Year: 1999
Title: Do we have free will?
Journal: Journal of Consciousness Studies
Volume: 6
Issue: 8-9
Pages: 47-57

Reference Type: Book
Record Number: 45
Author: Loewenstein, Werner R.
Year: 1999
Title: The Touchstone of Life
City: New York
Publisher: Oxford University Press
Keywords: Communication theory, evolution, entropy

Reference Type: Book
Record Number: 142
Author: Luhmann, Niklas
Year: 1987
Title: Love as Passion
City: Cambridge, MA
Publisher: Harvard University Press
Translator: Jones, Jeremy Gaines & Doris L.

Keywords: communications, reflexivity

Reference Type: Book
Record Number: 67
Author: Luhmann, Niklas
Year: 1995
Title: Social Systems
City: Stanford
Publisher: Stanford University Press
Translator: John Bednaz, Jr.
Notes: Initially published in German 1984

Reference Type: Book
Record Number: 219
Author: Lyons, John
Year: 1995
Title: Linguistic Semantics: an Introduction
City: Cambridge
Publisher: Cambridge University Press

Reference Type: Journal Article
Record Number: 215
Author: Maccoby, Michael
Year: 2000
Title: Narcissistic Leaders
Journal: Harvard Business Review
Issue: ??
Pages: ??

Reference Type: Book
Record Number: 195
Author: MacMurray, John
Title: Structure of Religious Experience

Reference Type: Book
Record Number: 27
Author: Mahoney, Michael
Year: 1991
Title: Human Change Processes
City: New York
Publisher: Basic Books

Number of Pages: 268
Keywords: Four types

Reference Type: Book
Record Number: 1
Author: Marr, David
Year: 1982
Title: Vision
City: San Francisco
Publisher: Freeman
Keywords: senses,

Reference Type: Journal Article
Record Number: 106
Author: Marshall, Stephanie Pace
Year: 1996
Title: Choas, Complexity, and Flocking Behavior: Metaphors for learning
Journal: Wingspread Journal
Issue: Summer

Reference Type: Book Section
Record Number: 116
Author: Maruyama, Magoroh
Year: 1968
Title: The second cybernetics; deviation amplifying mutual causal processes
Editor: Buckley, Walter
Book Title: Modern Systems Research for the Behavioral Scientist
City: Reading, MA
Publisher: Addison-Wesley

Reference Type: Journal Article
Record Number: 66
Author: Maturana, Humberto R.
Year: 1975
Title: The organization of the living: A theory of reality
Journal: International Journal of Man-Machine Studies
Volume: 7
Pages: 313-332

Reference Type: Book
Record Number: 69

Author: Maturana, Humberto R. & Francisco Valera
Year: 1980
Title: Autopoiesis and Cognition: The realization of the living
City: Boston
Publisher: Reidel

Reference Type: Book
Record Number: 61
Author: Maturana, Humberto R. & Francisco Varela
Year: 1987
Title: The Tree of Life
City: Boston
Publisher: Shambala

Reference Type: Journal Article
Record Number: 123
Author: Maturana, Humberto R.
Year: 2000
Title: The effectiveness of mathematical formalisms
Journal: Cybernetics and Human Knowing
Volume: 7
Issue: 2-3
Pages: 147-150
Keywords: autopoiesis

Reference Type: Journal Article
Record Number: 221
Author: McFadden, Johnjoe
Year: 2002
Title: Synchornous firing and its influence on the brain's electromagnetic field: Evidence for an electromagnetic field theory of consciousness
Journal: Journal of Consciousness Studies
Volume: 9
Issue: 4
Pages: 23-50
Keywords: coupling

Reference Type: Thesis
Record Number: 151
Author: McWhinney, Will(iam H.)
Year: 1964
Title: Self-Organizing Systems

Academic Department: Industrial Administration
City: Pittsburgh
University: Carnegie Mellon

Reference Type: Journal Article
Record Number: 74
Author: McWhinney, Will(iam H.)
Year: 1968
Title: Synthesizing a social interaction model
Journal: Sociometry
Volume: 31
Issue: Sept
Pages: 229-244
Keywords: model, small groups, mathematical dynamics
Abstract: Volterra-Lotka model developed via Simon et al to a three variable phase space.

Reference Type: Journal Article
Record Number: 20
Author: McWhinney, Will
Year: 1984
Title: Alternative realities
Journal: Journal of Humanistic Psychology
Pages: 7-38

Reference Type: Journal Article
Record Number: 193
Author: McWhinney, Will
Year: 1991
Title: Fractals cast no shadows
Journal: IS (International Synergy)
Issue: 9
Pages: 9-20

Reference Type: Journal Article
Record Number: 31
Author: McWhinney, Will
Year: 1993
Title: All creative people are not alike
Journal: Creativity and Innovation Management
Volume: 2
Issue: 2

Pages: 3-16

Reference Type: Journal Article
Record Number: 166
Author: McWhinney, Will
Year: 1995
Title: The matter of Einstein square dancing with Magritte
Journal: Cybernetics & Human Knowing
Volume: 3
Issue: 3

Reference Type: Generic
Record Number: 34
Author: McWhinney, Will
Year: 1997
Title: Formulating a conflict model in a space of alternative realities
Secondary Author: Price, Diana B.
Place Published: unpublished

Reference Type: Book
Record Number: 8
Author: McWhinney, Will
Year: 1997
Title: Paths of Change: Strategic Choices for Organizations and Society
City: Newbury Park, CA
Publisher: Sage Publications (1997)
Number of Pages: 273
Edition: Revised
Keywords: myth, logic, realities, stories
Abstract: &O

Reference Type: Book
Record Number: 168
Author: Miller, George A. & Philip N. Johnson-Laird
Year: 1976
Title: Language and Perception
City: Cambridge
Publisher: Harvard University Press
Keywords: Grammar

Reference Type: Book

Record Number: 139
Author: Mitroff, Ian & Ralph Kilmann
Year: 1978
Title: Methodological Approaches to Social Sciences: Integrating divergent concepts and theories
City: San Francisco
Publisher: Jossey-Bass
Keywords: Methodology

Reference Type: Book
Record Number: 164
Author: Morson, Gary Saul & Caryl Emerson
Year: 1990
Title: Mikhail Bakhtin: Creation of a prosaics
City: Palo Alto
Publisher: Stanford University Press
Keywords: Metalinguistic, grammar

Reference Type: Book
Record Number: 98
Author: Nachmanovitch, Stephan
Year: 1991
Title: Free Play: Improvisation in life and art.
City: Los Angeles
Publisher: Jeremy Tarcher
ISBN: 0874776317

Reference Type: Book
Record Number: 150
Author: Nicolis, Gregoire & Ilya Prigogine
Year: 1989
Title: Exploring Complexity: An introduction
City: New York
Publisher: W. H. Freeman & Company

Reference Type: Book
Record Number: 147
Author: Normann, Richard & Rafael Ramirez
Year: 1994
Title: Designing Interactive Strategy: From value chain to value constellation.
City: New York

Publisher: John Wiley & Sons

Reference Type: Edited Book
Record Number: 129
Editor: Ortony, Andrew
Year: 1992
Title: Metaphor and Thought
City: Cambridge
Publisher: Cambridge University Press

Reference Type: Book
Record Number: 64
Author: Ozick, Cynthia
Year: 1989
Title: Metaphors and Memory
City: New York
Publisher: Alfred A. Knopf
Keywords: METAPHORS

Reference Type: Journal Article
Record Number: 188
Author: Park, Peter
Year: 1999
Title: People, knowledge, and change in participatory research
Journal: Management Learning
Volume: 30
Issue: 2
Pages: 141-157
Keywords: discourse

Reference Type: Journal Article
Record Number: 196
Author: Pasermann, Frank & Thomas Wennekers
Year: 1999
Title: Complete synchronization in coupled neuromodules of different types
Journal: Theory in Biosciences
Issue: 118
Pages: 267-283

Reference Type: Book
Record Number: 223

Author: Pask, Gordon

Reference Type: Book
Record Number: 190
Author: Pearce, W. Barnett
Year: 1993
Title: Interpersonal Communication: Making social worlds
City: New York
Publisher: Harper Collins Publications

Reference Type: Electronic Source
Record Number: 173
Author: Pearce, W. Barnett
Year: 1999
Title: Using CCM: the coordinated management of meaning
Producer: A Peace Associates Seminar: www.pearceassociates.com
Last Update Date: 8/99

Reference Type: Book
Record Number: 25
Author: Pepper, Stephen C.
Year: 1942
Title: World Hypothesis
City: Los Angeles
Publisher: University of California Press

Reference Type: Book
Record Number: 161
Author: Pinker, Steven
Year: 1994
Title: The Language Instinct
City: New York
Publisher: Harper Collins Publications

Reference Type: Journal Article
Record Number: 238
Author: Poellner, Peter
Year: 2003
Title: Non-conceptual content, experience and self
Journal: Journal of Conscious Studies
Volume: 10

Issue: 2
Pages: 32-57

Reference Type: Book
Record Number: 158
Author: Polkinghorne, Donald
Year: 1983
Title: Methodology for the Social Sciences: Systems of inquiry
City: Albany, NY
Publisher: State University of New York Press

Reference Type: Book
Record Number: 35
Author: Popper, Karl R.
Year: 1935
Title: The Logic of Scientific Discovery
City: New York
Publisher: Basic Books
Keywords: Epistemology, measure theory

Reference Type: Book
Record Number: 113
Author: Prigogine, Ilya
Year: 1980
Title: From Being to Becoming: Time and complexity in the physical sciences.
City: San Francisco
Publisher: W. H. Freeman & Company

Reference Type: Book
Record Number: 89
Author: Prigogine, Ilya
Year: 1997
Title: The End of Certainty
City: New York
Publisher: Free Press
Keywords: Chaos, Coupling, probability

Reference Type: Journal Article
Record Number: 185
Author: Putnam, Robert D.

Year: 1993
Title: Social Capital and Public Affairs
Journal: The American Prospect
Issue: 13
Pages: 1-8

Reference Type: Journal Article
Record Number: 49
Author: Ramachandran, V. S. & William Hirstein
Year: 1997
Title: Three Laws of Qualia: What neurology tells us about the biological functions of consciousness
Journal: Journal of Consciousness Studies
Volume: 4
Issue: 5-6
Pages: 429-57

Reference Type: Book
Record Number: 68
Author: Richards, I.A.
Year: 1936
Title: The Philosophy of Rhetoric
City: London
Publisher: Oxford University Press

Reference Type: Book
Record Number: 43
Author: Ricoeur, Paul
Year: 1975
Title: The Rule of Metaphor
City: Toronto
Publisher: University of Toronto Press
Translator: R. Czerny, K. McLaughlin and J. Costello

Reference Type: Journal Article
Record Number: 230
Author: Rosch, Eleanor, (Heiden)
Year: 1973
Title: Natural Categories
Journal: Cognitive Psychology
Volume: 4
Pages: 328-50

Reference Type: Book
Record Number: 108
Author: Rosch, Eleanor & B. B. Lloyd
Year: 1978
Title: Cognition and Categorization
City: Hillsdale, NJ
Publisher: Erlbaum

Reference Type: Book Section
Record Number: 23
Author: Rosenthal, David M.
Year: 1991
Title: A Theory of Consciousness
Editor: Block, Ned, Owen Flanagan & Güven Guzeldere
Book Title: The Nature of Consciousness
City: Cambridge, MA
Publisher: MIT Press
Pages: 729-754
Keywords: Higher order thinking

Reference Type: Book Section
Record Number: 140
Author: Rowen, John & Peter Reason
Year: 1981
Title: On making sense
Editor: Rowan, Peter Reason & John
Book Title: Human Inquiry
City: New York
Publisher: John Wiley & Sons
Keywords: Methodology

Reference Type: Book
Record Number: 86
Author: Salthe, Stanley N.
Year: 1985
Title: Evolving Hierarchical Systems: Their structure and representation
City: New York
Publisher: Columbia University Press

Reference Type: Journal Article

Record Number: 17
Author: Sass, Louis A
Year: 1998
Title: Schizophrenia, self-consciousness and the modern mind
Journal: Joural of Consciousness Studies
Volume: 5
Issue: 5-6
Pages: 543-565
Keywords: mythic

Reference Type: Book
Record Number: 233
Author: Schank, Roger C
Year: 1990
Title: Tell Me a Story
City: New York
Publisher: Charles Scribner's Sons
Keywords: metaphor, indexing

Reference Type: Book
Record Number: 110
Author: Schrödinger, E
Year: 1945
Title: What is Life?
City: Cambridge
Publisher: Cambridge University Press

Reference Type: Book
Record Number: 201
Author: Searle, John R.
Year: 1992
Title: The Rediscovery of the Mind
City: Cambridge
Publisher: MIT Press

Reference Type: Journal Article
Record Number: 137
Author: Searle, John R.
Year: 2000
Title: Consciousness, free action and the brain
Journal: Jour of Consciousness Studies
Volume: 7

Issue: 10, October
Pages: 3-22
Keywords: Unified field

Reference Type: Edited Book
Record Number: 42
Editor: Sebeok, Thomas A.
Year: 1960
Title: Style and Language
City: Cambridge, MA
Publisher: MIT Press

Reference Type: Journal Article
Record Number: 126
Author: Shannon, Claude E.
Year: 1948
Title: A mathematical theory of communications
Journal: Bell System Technical Journal
Volume: 27
Issue: July, October
Pages: 379-423, 623-659

Reference Type: Journal Article
Record Number: 132
Author: Shannon, Claude E.
Year: 1951
Title: Prediction and entropy of printed English
Journal: Bell System Technical Journal
Volume: 30
Issue: January

Reference Type: Book
Record Number: 191
Author: Shotter, John
Year: 1993
Title: Conversational Realities: Constructing life through language
City: Thousand Oaks, CA
Publisher: Sage Publications

Reference Type: Journal Article
Record Number: 207

Author: Shotter, John & Arlene M. Katz
Year: 1999
Title: 'Living moments' in dialogical exchanges
Journal: Human Systems
Volume: 9
Pages: 81-93

Reference Type: Book
Record Number: 73
Author: Simon, Herbert A
Year: 1957
Title: Models of Man
City: New York
Publisher: John Wiley & Sons

Reference Type: Journal Article
Record Number: 81
Author: Skarda, Christine A.
Year: 1999
Title: The perceptual form of life
Journal: Journal of Consciousness Studies
Volume: 6
Issue: November/December
Pages: 79-93
Keywords: Shattering, percepts

Reference Type: Book
Record Number: 105
Author: Slattery, Dennis Patrick
Year: 2000
Title: The Wounded Body: Remembering the markings of the flesh
City: Albany
Publisher: State University of New York Press
Keywords: metaphor

Reference Type: Book
Record Number: 130
Author: Snow, Charles P.
Year: 1969
Title: The Two Cultures and a Second Look
City: Cambridge
Publisher: Cambridge University Press

Notes: Base on lectures in 1959 and 1964

Reference Type: Book
Record Number: 39
Author: Spencer-Brown, George
Year: 1994, earlier editions
Title: Laws of Form
Publisher: Cognizer Co
Notes: See Louis Kaufmann (?)

Reference Type: Book Section
Record Number: 210
Author: Sperber, Dan & Deirdre Wilson
Year: 1988
Title: The mapping between the mental and the public lexicon
Editor: Boucher, P. Carruthers & J.
Book Title: Thought and Language
City: Cambridge
Publisher: Cambridge University Press
Pages: 184-200

Reference Type: Book
Record Number: 213
Author: Sperber, Dan & Deirdre Wilson
Year: 1995
Title: Relevance: Communication and cognition
City: Oxford
Publisher: Blackwell
Edition: 2nd
Keywords: Grammar

Reference Type: Journal Article
Record Number: 182
Author: Spitz, René A.
Year: 1964
Title: The derailment of dialogue: stimulus overload, action cycles, and completion gradient
Journal: Journal of the American Psychoanalytic Association
Volume: 22
Issue: 4

Reference Type: Edited Book
Record Number: 131
Editor: Steier, Frederick
Year: 1991
Title: Research and Reflexivity
City: London
Publisher: Sage Publications

Reference Type: Book Section
Record Number: 118
Author: Steier, Frederick & Kenwyn K. Smith
Year: 1996
Title: The cybernetics of cybernetics and the organization of organization
Editor: Thayer, Lee
Book Title: Organization <---> Communication: Emerging perspectives III.
City: Norwood, New Jersey
Publisher: Ablex Publishing Corp.

Reference Type: Book
Record Number: 199
Author: Steiner, George
Year: 2001
Title: Grammar of Creation
City: New Haven, CT
Publisher: Yale University Press

Reference Type: Book
Record Number: 40
Author: Stern, David G.
Year: 1995
Title: Wittgenstein on Mind and Language
City: Oxford
Publisher: Oxford University Press

Reference Type: Book
Record Number: 239
Author: Strogatz, Steven
Year: 2003
Title: SYNC: The emerging science of spontaneous order
City: New York
Publisher: Hyperion

Reference Type: Book
Record Number: 234
Author: Sudnow, David
Year: 1978
Title: Ways of the Hand: The organization of improvised conduct.
City: London
Publisher: Routledge & Kegan Paul

Reference Type: Book
Record Number: 90
Author: Tufte, Edward R.
Year: 1983
Title: The Visual Display of Quantitative Information
City: Chesire, CT
Publisher: Graphics Press
Keywords: mapping, fields

Reference Type: Book
Record Number: 133
Author: Ulanowicz, Robert E.
Year: 1997
Title: Ecology, The Ascendent Perspective
City: New York
Publisher: Columbia University Press

Reference Type: Book
Record Number: 18
Author: Unamuno, Miguel de
Year: 1967
Title: Our Lord Don Quixote
Series Title: Bollingen Series
City: Princeton
Publisher: Princeton Unversity Press
Translator: Kerrigan, Anthony

Reference Type: Book
Record Number: 32
Author: Ury, William L, Jeanne M. Brett, & Stephen B. Goldberge
Year: 1988
Title: Getting Disputes Resolved
City: San Francisco

Publisher: Jossey-Bass
Notes: Harvard Prgram on Negotiation

Reference Type: Conference Proceedings
Record Number: 48
Author: Valentine, E. J.
Year of Conference: 1994
Title: Physical implications of coincident qualia
Conference Name: Consciousness at the Crossroads
Conference Location: Marobor, Slovenia
Publisher: Imprint Academic
Volume: Bojan Borstner & John Shawe-Taylor
Pages: 32-38

Reference Type: Book
Record Number: 236
Author: van Genep, Arnold
Year: 1969
Title: The Rites of Passage
City: Chicago
Publisher: Chicago University Press
Edition: Orignally published in 1909 ??

Reference Type: Journal Article
Record Number: 203
Author: Van Gulick, Robert
Year: 2001
Title: Reduction, emergence and other recent options on the mind-body problem: A philosophical overview
Journal: Journal of Consciousness Studies
Volume: 8
Issue: 9-10
Pages: 1-34

Reference Type: Book
Record Number: 9
Author: Varela, Francisco, J. Evan Thompson & Eleanor Rosch
Year: 1991
Title: The Embodied Mind: Cognitive science and human experience
City: Cambridge, MA
Publisher: MIT Press

Reference Type: Book
Record Number: 216
Author: Voloshinov
Year: 1986

Reference Type: Book
Record Number: 57
Author: von Bertalanffy, Ludwig
Year: 1968
Title: General Systems Theory
City: New York
Publisher: George Braziller
Number of Pages: 289

Reference Type: Book
Record Number: 44
Author: von Foerster, Heinz
Year: 1981
Title: Observing Systems
City: Seaside, CA
Publisher: Intersystems Publications
Edition: 2nd

Reference Type: Book Section
Record Number: 117
Author: von Glasersfeld, E.
Year: 1984
Title: An introduction to radical constructivism
Editor: Watzlawick, Paul
Book Title: The Invented Reality
City: New York
Publisher: Norton

Reference Type: Book
Record Number: 125
Author: von Neumann, John & Oscar Morgenstern
Year: 1944
Title: The Theory of Games and Economic Behavior
City: New York
Publisher: John Wiley & Sons

Reference Type: Book
Record Number: 226
Author: Wagner, Roy
Year: 1981
Title: The Invention of Culture; Revised
City: Chicago
Publisher: Univeristy of Chicago

Reference Type: Book
Record Number: 62
Author: Wartosky, M.W.
Year: 1979
Title: Models: Representation of scientific understanding
City: Dordrecht, Holland
Publisher: D. Reidel Publishing Company

Reference Type: Book
Record Number: 120
Author: Watts, Duncan, J
Year: 1999
Title: Small Worlds
City: Princeton
Publisher: Princeton University Press
Keywords: Networks,

Reference Type: Book
Record Number: 16
Author: Whitehead, Alfred North
Year: 1925
Title: Science and the Modern World
City: New York
Publisher: MacMillan Publishing Company

Reference Type: Book
Record Number: 146
Author: Whitehead, Alfred North
Year: 1978 (Corrected version of 1928)
Title: Process and Reality
City: New York
Publisher: Free Press

Reference Type: Book
Record Number: 36
Author: Wiener, Norbert
Year: 1948
Title: Cybernetic
City: New York
Publisher: John Wiley & Sons

Reference Type: Book
Record Number: 138
Author: Wilber, Ken
Year: 1995
Title: Sex, Ecology, Spirituality: The spirit of evolution
City: Boston
Publisher: Shambala Publications
Keywords: consciousness

Reference Type: Book
Record Number: 235
Author: Wittgenstein, Ludwig
Year: 1972
Title: On Certainty
Series Editor: Wright, G.E.M. Anscombe & G.H. von
City: New York
Publisher: Harper & Row

Reference Type: Book
Record Number: 220
Author: Wolfram, Steven
Year: 2002
Title: A New Kind of Science
City: Champaign, Ill
Publisher: Wolfram Media
Number of Pages: 1263
Keywords: iternative processes, cellular automata

Reference Type: Book
Record Number: 75
Author: Woodcock, Alexander & Monte Davis
Year: 1978
Title: Catastrophe Theory

City: New York
Publisher: Penguin Books.

Reference Type: Journal Article
Record Number: 186
Author: Yarian, Stanley O.
Year: 1983
Title: The twentieth-century role of the hell of St. Francis of Assisi and Dante
Journal: Soundings
Volume: 66
Issue: 3
Pages: 331-347

Reference Type: Book
Record Number: 183
Author: Young, Peter
Year: 2001
Title: Understanding NLP: Metaphors and patterns of change
City: Carmarthen, UK
Publisher: Crown House Publishing
Keywords: four realities

Reference Type: Edited Book
Record Number: 37
Editor: Yovits, Marshall C. & Scott Cameron
Year: 1960
Title: Self-Organizing Systems: Proceedings of an interdisciplinary conference
City: London
Publisher: Pergamon Press

Reference Type: Journal Article
Record Number: 51
Author: Zadeh, Lofti
Year: 1965
Title: Fuzzy Sets
Journal: Information and Control

Reference Type: Journal Article
Record Number: 101

Author: Zeeman, E. Christopher
Year: 1976
Title: Catastrophe theory
Journal: Scientific American
Issue: April

Reference Type: Book
Record Number: 205
Author: Zeldin, Theodore
Year: 1988
Title: Conversations
City: London
Publisher: Haverill Press
Keywords: Dialogue