



laetus in praesens

Alternative view of segmented documents via Kairos

16 May 2019 | Draft

Patterning Intuition with the Fifth Discipline

Critical review of the conclusion of the 5-fold Patterning Instinct

-- / --

Introduction

Patterns, their visualization and their comprehension

Possible cognitive implications of 5-foldness

Tracing complex feedback loops

Requisite fifth-order thinking?

Trajectories to our future -- and their recursive implication?

Clues to systemic implications of 5-fold cognitive organization?

Cognitive glass ceilings impeding integrative comprehension

Beyond the 4-fold cognitive modality: integrating the 5-fold, 6-fold and 7-fold?

Eliciting systemic answers from a 5-fold web of meaning?

Pattern spiralling challenge of biomimetics

Polyhedral possibilities of interrelating patterns comprehensibly: a "cognitive gearbox"?

Speculation regarding a requisite "sixth discipline" and more

References

Review of the concluding section of *The Patterning Instinct: a cultural history of man's search for meaning* (2017) by Jeremy Lent

Introduction

This book has been widely praised, as indicated by reviews such as the following (emphasis added):

- A tour de force on the biological and psychological background of the human predicament. *If you are concerned about our future*, you should know about our past. This amazing, well-documented book should be read by every college student and every congressman. (Paul R. Ehrlich, author of *Human Natures*)
- A brilliant deep dive into the history of human cultures that brings us to today's cultural dysfunctions that threaten the planet. Insight, illumination, and *potential ways out of the seeming dead end* that we've walked ourselves into. (Thom Hartmann, author of *The Last Hours of Agent Sunlight*)
- *The Patterning Instinct* is a must-read for anyone concerned about *the future of humanity*. (Atossa Soltani, Amazon Watch founder and president)
- To have any hope of transforming this perverse and potentially apocalyptic worldview, we will need to dig much deeper into our own history -- and this extraordinary book provides *an authoritative and inspirational guide*. (Jonathon Porritt, environmentalist and author)
- Now, thanks to *the most profound and far-reaching book I have ever read*, I feel I'm beginning to understand... almost every page caused me to rethink what I held to be true. Bringing together cultural history with neuroscience, Lent develops a new discipline he calls cognitive history. (George Monbiot, *Stepping Back from the Brink*, 31 January 2018)

The foreword concludes:

Cognition is embedded in matter at all levels of life... cognition is not a representation of an independently existing world but rather a "bringing forth" or "enacting" of a world through the process of living. Jeremy Lent applies this insight to history, recognizing the power of the human mind to construct its own reality and arguing that "the cognitive frames through which

different cultures perceive reality have had a profound effect on their historical direction"... From this perspective, Lent proposes new answers to some age-old questions of human history... In our time of global crisis, which desperately needs guidance through new and life-affirming metaphors, *the answers to these questions are more important than ever* (Fritjof Capra, author of *The Systems View of Life*)

The focus in the following review is on the potential implications for the future, as implied by the highlighted indications above. Given the framing offered by Fritjof Capra in the foreword, it is appropriate to note that his own recent study was subject to a separate critical review (*Transcending an Asystemic View of Life*, 2014). Many of the arguments made there are of some relevance to those made here with respect to *The Patterning Instinct*.

The book is organized into five parts, and it is in the final part that the highlighted implications should become most apparent. The parts are understood as a "cognitive history" -- a sequence corresponding to "the core pattern of meaning by which people made sense of their world":

- Part 1: Everything is Connected
- Part 2: Hierarchy of the Gods
- Part 3: The Patterns Diverge
- Part 4: Conquest of Nature
- Part 5: The Web of Meaning?

In considering *Trajectories to Our Future* (the chapter title of Part 5), it is appropriate to note that it mainly echoes speculation on [strategic scenarios](#) in other studies, notably by futurists. The valuable insights into patterns elicited in the other parts do not seem to carry over into any form of cognitive empowerment with regard to immediate challenges, or those to come.

In this sense, somewhat ironically, the book is best appreciated and deprecated for its [enthusiasm](#) -- given the shifting ambiguity with which that has been understood over the centuries and to this day (Susie Tucker, *Enthusiasm: A Study in Semantic Change*, 1972). More cautious in this respect is Brendan Montague (*Beating the system - metaphorically*, *The Ecologist*, 3 July 2018). It can be appreciated as a decorous progress through humanity's past, reminiscent of a [pavane](#) -- a stately dance in musical terms.

The concern with regard to Part 5, in a book which offers a remarkable historical survey of patterning, is what it enables with respect to the future at this time. Is consideration of the future thereby transformed into a "historical afterthought"? What is to be gleaned from cognitive history? What are the "take-away" insights for action now?

This critique raises the question as to whether patterning is instinctive (as implied by the title of the book) or whether it is better understood as intuitive (the implication of its organization into five parts). To the extent that humanity is held to be unconscious, patterning is necessarily instinctive (John Ralston Saul, *The Unconscious Civilization*, 1995). However, to the extent that a collectively self-conscious humanity is required to make conscious choices with respect to its future, survival may well depend upon intuitive patterning (*Post-Apocalyptic Renaissance of Global Civilization: engaging with otherness otherwise?* 2018).

Patterns, their visualization and their comprehension

Feedback loops: In the concluding paragraphs to the Preface of the book, Jeremy Lent notes:

Given that human societies are themselves complex systems, can we use this framework to understand the great critical transitions in our history? I believe we can, with the caveat that when we apply this framework to human society, there is yet another crucial feedback loop to consider. Because of our unique cognitive capacity, human social systems need to be understood as a pair of two tightly interconnected, coexisting complex systems: a tangible system and a cognitive system. The tangible system refers to everything that can be seen and touched.... The cognitive system refers to what can't be touched but exists in the cognitive network of the society's culture: its language, myths, core metaphors, know-how, hierarchy of values, and worldview. These coupled systems interact dynamically, creating their own feedback loops, which can profoundly affect each other and, consequently, the direction of society....**Much of the book is devoted to tracing these complex feedback loops.** (pp 24-25; referencing an extensive note, p. 459; emphasis added)

The emphasis on [feedback loops](#) in the book is consistent with a particular bias of this reviewer as instigator of the online [Encyclopedia of World Problems and Human Potential](#). That is especially focused on the feedback loops between thousands of problems, and between any corresponding strategies -- in the light of human values (*Feedback Loop Analysis in the Encyclopedia Project*, 2000). Considerable effort has been devoted to their visualization. It is therefore extremely surprising to note the absence in the book of any effort at depiction of the feedback loops that the book claims to trace. Most illustrations are of historical artefacts with the strange exception of the *I Ching* pattern of hexagrams -- ironically a notably focus in that *Encyclopedia* and in further commentary on it.

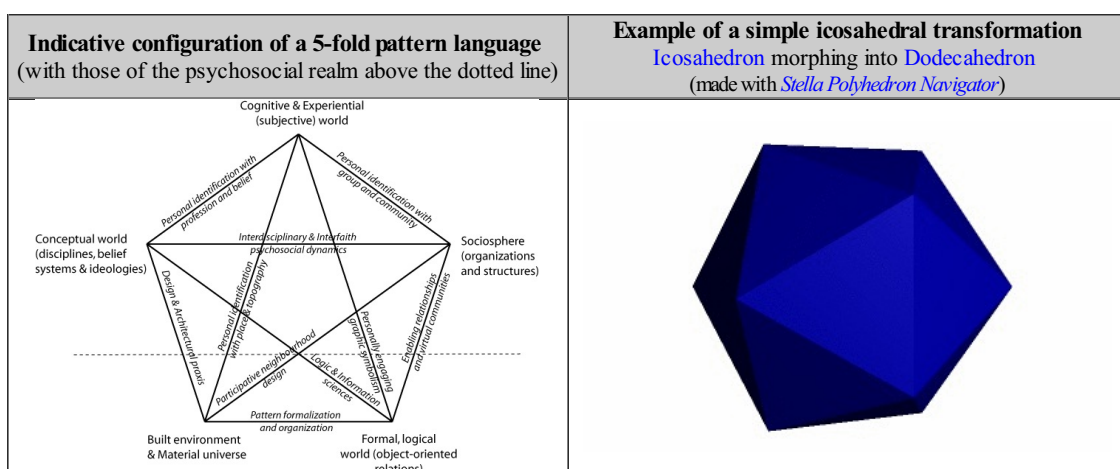
Pattern recognition: This frames a fundamental question as to the nature of patterns, how they are to be recognized, and how people might be expected to engage with them. There is a very strong argument that such processes are dependent to a considerable degree on representations in visual and other forms -- however these may be susceptible to textual commentary (*Metaphor and the Language of Futures*, 1992).

In these strange times it is appropriate to note both the tremendous importance of music of every kind to many and the value of [sonification](#) for [pattern recognition](#) in some sciences. As author of a study on *Tomorrow, Who Will Govern the World?* (2011), of some relevance in the latter respect is the insight of Jacques Attali that cultures articulate their social organization through the musical structure

favoured in their immediate past (*Noise: the political economy of music*, 1977). Thus he specifically relates the currently dominant pattern of organization to that of classical Western music. Any argument, with respect to "tomorrow", should then take account of the pattern of music currently favoured by the voters of today. The patterns of music can then be understood as "heralding" the future, suggesting the possibility of sonification of the succession of patterns in *The Patterning Instinct* (*Structuring Mnemonic Encoding of Development Plans and Ethical Charters using Musical Leitmotifs*, 2001)

Pattern language: In the case of the *Encyclopedia*, consideration was given to experimentation with various patterns, notably including the *I Ching* and those in the classic text by Christopher Alexander (*A Pattern Language*, 1977), and its possible (5-fold) elaboration (*Pattern Language Experiments: Metaphor Project; 5-fold Pattern Language*, 1984). Alexander's work has inspired much further consideration of the nature of **pattern language**. Despite its title, *The Patterning Instinct* includes no reference to the challenge of pattern recognition in general nor to the specific challenge of recognition of the "patterns of meaning" which are a key focus of the book. For a book whose concluding part is entitled *The Web of Meaning?*, its preoccupation with the connectivity of insights is implied rather than explicit.

For Alexander, a pattern has been intimately related to "a quality without a name", namely a place it was "good to be". Although his focus was on the external environment, the 5-fold experimental elaboration evokes the possibility that this might have a cognitive analogue of which the physical is a valuable metaphor. The visualization of such patterns was considered in a commentary on Alexander's subsequent reflection on his work on the nature of order (*Harmony-Comprehension and Wholeness-Engendering: eliciting psychosocial transformational principles from design*, 2010). The framework of the elaborated 5-fold pattern language was presented there as follows (below left) together with many examples of the dynamics of pattern transformation (exemplified by that below right):



From this perspective it is intriguing to note that *The Patterning Instinct* lacks explicit concern with how patterns are comprehended, whether by an individual or a culture -- surely to be recognized as a fundamental issue for the "cognitive history" it claims to be. This concern may be implied by the arguments made (and the praise for its "readability"), but "comprehension" is not considered worthy of an index reference. This criticism is especially relevant to the implications of that study for the future, namely the focus of Part 5. How indeed are individuals or cultures to learn from the patterns of a "cognitive history" and apply them to any framing of relevance to the future and the possibility of engaging with it? Also problematic is the absence any reference to "learning" in the index.

Omissions: Curiously the book includes no reference to the work of Christopher Alexander nor to the now well-explored theme of "pattern language" as enabling appropriate design. Commenting on the book, other authors have however mentioned that relationship (Helene Finidori, *Configuring patterns and pattern languages for systemic design*, PUARL Conference, 27 October 2018; *The Future of Patterns*, PUARL Conference, 27 October 2018). However those indications focused to a far greater degree on Alexander's work than on Lent's contribution. There are however multiple references to "patterns of meaning" in the book, indicated as associated with "root metaphors", but not to the seminal work of Donald Schön on generative metaphor (*Generative metaphor and policy-making*, 1979). *The Patterning Instinct* seemingly avoids the challenge of how the patterns recognized enable any design of humanity's future.

In skillfully framing a focus on cognitive history, why ignore the work on "big history" and macrohistory, given that *The Patterning Instinct* is an exercise in both, and that Lent has become a macrohistorian (Johan Galtung and Sohail Inayatullah, *Macrohistory and Macrohistorians: perspectives on individual, social and civilizational change*, 1997)?

The indexing of the book is strangely inadequate with respect to terms on which emphasis is placed or implied in the introduction, most notably "feedback loops" and everything with which they might be considered to be connected in systemic terms, such as "pattern recognition", "cybernetics", "self-reference", and "learning". By contrast the book has 84 pages of detailed bibliographical footnotes notes (ordered by chapter but not otherwise), whose authors (and themes) do not appear in the index. The book is therefore best studied in its electronic version in order to benefit from the search facilities to track what are to be understood as feedback loops.

Possible cognitive implications of 5-foldness

Patterns of N-foldness: In the Introduction, framed as *Shaping Our History*, the explanation by Jeremy Lent as to why the book is organized into five parts is given as follows -- without further justification:

The path from the earliest search for human meaning to our current precarious situation is what we'll be tracing in this book...

The path can be segmented into different periods, each characterized by the core pattern of meaning by which people made sense of their world. These periods, with their patterns of meaning, give the book its structure. (p. 32)

Why was a 5-fold articulation considered appropriate to the organization of the book -- to the "shaping" of the cognitive history of humanity? Given the cognitive hypothesis, Lent was clearly free to organize the flow of history as he saw fit. More intriguing is why 5-foldness "worked" for the author, rather than 6-foldness, or 12-foldness. One strange possibility, in the absence of any other explanation, is that Lent was overly influenced by the so-called Rule of Five which prevails to a curious degree in academic writing in the country of his adoption, as described by David Labaree (*The Five-Paragraph Fetish*, *Aeon*, 15 February 2018), noting:

The transition from the college research paper to the doctoral dissertation is not as big a jump as you might think. The Rule of Five lives on in the canonical structure for the dissertation.... Guides on dissertation-writing specify the content of each of the five chapters in detail, with this detail looking remarkably similar across guides.

In the light of any concern with the self-referential aspects of feedback loops, how does Lent see himself as positioned within the cognitive history he analyzes? Does the influence of "scholastic bias" merit consideration, as discussed separately?

This poorly researched question has been explored more generally (*Patterns of N-foldness: comparison of integrated multi-set concept schemes as forms of presentation*, 1980; *Comprehension of Numbers Challenging Global Civilization: number games people play for survival*, 2014). The mysteriously unquestioned process by which a pattern of a certain complexity is chosen is discussed with respect to 12-foldness and 20-foldness in the following, with many examples:

- *Checklist of 12-fold Principles, Plans, Symbols and Concepts: web resources* (2011)
- *Requisite 20-fold Articulation of Operative Insights? Checklist of web resources on 20 strategies, rules, methods and insights* (2018)

Is the choice of a particular pattern of N-foldness primarily intuitive rather than instinctive? This would suggest the need for exploration of "patterning intuition" (hence the title of this review).

Examples of 5-fold patterns: There are of course many concept schemes organized according to a 5-fold pattern, raising the question of their cognitive implications and how these might have influenced the organization of the book -- if only unconsciously. Examples include:

- *Five Principles of Peaceful Coexistence* (Wikipedia)
- *Five Pillars of Islam*
- *Do You Know Why Fivefold Ministry is Essential?* (*Generals*, 12 October 2015)
- *Reflecting on China's Five Principles, 60 Years Later* (*The Diplomat*, 26 June 2014)
- *The 5 Principles of Ethical Journalism* (*Ethical Journalism Network*)
- *The EU's Russia policy: five guiding principles* (*European Parliament Think Tank*, 2 August 2018)
- *Five Principles That Will Change Your Life* (*The Huffington Post*, 26 July 2012)
- *How to Improve Critical Thinking Using a Simple 5-Step Process* (*WabisLearning*, 4 January 2018)
- *Five Steps to a Strategic Plan* (*Forbes*, 25 October 2011)
- *5-fold strategy to deal with black money menace* (*The Hindu*, 28 February 2011)
- 5 Step Process (numerous references)
- *Fifth force*, a proposed force of nature in addition to the four known fundamental forces

Rather than consider the 5-fold organization of *The Patterning Instinct* as an arbitrary convenience, these suggest that it may have fundamental implications of significance to its theme. This is considered further below. The choice of any given number of patterns, for purposes of organization of the cognitive history of humanity, may be less than innocent.

Collective learning and a "5th discipline": Global civilization as a whole has long been framed as a [learning society](#), most notably in UNESCO programs where this is articulated in an extensive set of reports (*Lifelong Learning in a Learning Society*). How might the cognitive systemic pattern of 5-foldness relate to that dynamic, as suggested to some degree by the argument of Peter Senge (*The Fifth Discipline: The Art and Practice of the Learning Organization*, 1990)? That book was identified by the *Harvard Business Review* as one of the seminal management books of the previous 75 years.

The five parts of the book might be tentatively related to Senge's five disciplines (collectively understood), as suggested by the following table.

5 core patterns of meaning (Lent)	5 disciplines of a learning organization (Senge)
Part 1: Everything is Connected	"Personal mastery is a discipline of continually clarifying and deepening our personal vision, of focusing our energies, of developing patience, and of seeing reality objectively."
Part 2: Hierarchy of the Gods	" Mental models are deeply ingrained assumptions, generalizations, or even pictures of images that influence how we understand the world and how we take action."
Part 3: The Patterns Diverge	"Building shared vision - a practice of unearthing shared pictures of the future that foster genuine commitment and enrollment rather than compliance."
Part 4: Conquest of Nature	" Team learning starts with 'dialogue', the capacity of members of a team to suspend assumptions and enter into genuine 'thinking together'."

Tracing complex feedback loops

In addition to its emphasis on tracing feedback loops, the book emphasizes the insights to be derived from "complex systems" and "self-organization" (both indexed).

With respect to the N-foldness through which cognitive history might be understood, of particular relevance is the articulation of complex systems in the light of higher orders of cybernetics -- and issues relating to self-reflexivity. A separate discussion of the [cybernetics of cybernetics: complex adaptive systems?](#) (In: *Consciously Self-reflexive Global Initiatives: Renaissance zones, complex adaptive systems, and third order organizations*, 2007, developing that in *Interrelating Metaphors -- to enable a cycle of transformation between epistemological modes*, 2007) highlighted the following distinctions currently made:

- **First order cybernetics:** It is the systems sciences, and notably cybernetics, that explore negative feedback loops between the elements of well-bounded systems leading to an objectivist positivist approach. Cybernetics was initially the study of the "objective" control of machines (artificial and natural). [Heinz von Foerster](#) (*Ethics and Second-Order Cybernetics*, 1991) has suggested a form of "zero-order cybernetics" when activity becomes structured; when 'behaviour' emerges, but without reflection upon the 'why' and the 'how' of this behaviour. Cybernetics is then implicit
- **Second order cybernetics:** However, notably as a result of the work of Heinz von Foerster in the 1950s, the value became apparent of exploring the "[cybernetics of cybernetics](#)", the "cybernetics of observing systems", or "reflection on reflection on cybernetics" -- the observation of the observer observing his/her own observations. This was acknowledged in a phrase of von Foerster that is significant to any approach to knowledge organization: "*Objectivity is a subject's delusion that observing can be done without him*". In a keynote speech in 1972, [Margaret Mead](#) consecrated the field as "Second Order Cybernetics".
- **Third order cybernetics**, in principle represents the current state of the art. Here the observer is understood to be part of a coevolving system -- the focus is on how observers and systems co-evolve across different social systems. The dominant discourse is understood to be reproduced and transformed through local interactions. As noted by [Chris Lucas](#) (*Complexity Theory: Actions for a Better World*, 2001):

This is a more intrinsic (embodied) methodology and shows the ongoing convergence of all the various systemic disciplines, as part of the general world paradigm shift noticed recently towards more integrated approaches to science and life. In 21st Century systematics, boundaries between systems are only partial and this implies that we must evolve with our systems and cannot remain static outsiders. Thus our mental beliefs echo our systemic behaviours, we co-create our realities and therefore internal and external realities become one. Understanding this mutual control, exhibited by us on our world and our world on us, takes us into the metaview outlined here, where we can see ourselves as being part of the system under examination.

- **Fourth order cybernetics:** Helpfully summarizing the contrasts between the above, M. Zangeneh and E. Haydon (*The Psycho-Structural Cybernetic Model, Feedback, and Problem Gambling: a new theoretical approach*, *International Journal of Mental Health and Addiction*, 1, 2, 2004) propose a fourth order cybernetics as follows:

Central to this effort is the application of a unique, critical theory inspired by the works of Anthony Giddens (1971, 1990; see discussion on modernity and reflexivity) and John Francois Lyotard (1979; see discussion on postmodernity) to the cybernetic theoretical framework. The epistemological orientation of the theory proposed here is that of multiple realities shaped by social, cultural, economic, ethnic, gender and disability values, which centralize on the asymmetric power relations in society

Fourth order cybernetics is thus understood as concerned with how multiple realities are shaped by, and impinge upon, power relationships within society.

These considerations of orders of cybernetics are further clarified by Maurice Yolles and Gerhard Fink (*A General Theory of Generic Modelling and Paradigm Shifts (part 2): cybernetic orders*. *Kybernetes*, 2015). The self-referential nature of any model or meta-model can be explored otherwise through the work of [Douglas Hofstadter](#) (*Gödel, Escher, Bach: an Eternal Golden Braid*, 1979; *I Am a Strange Loop*, 2007; *Surfaces and Essences: Analogy as the Fuel and Fire of Thinking*, 2013).

A 5-fold interpretation of such distinctions is provided in the discussion of [Cadell Last](#) (*Towards a Big Historical Understanding of the Symbolic-Imaginary*, 2017), as noted in *Phases in the "re-cognition" of "bull" according to Zen?* (2017):

- externally observed objects are modelled with an observer's noumenal view and voice that is systematically excluded from the "objective" model of the world to create the effect that the "true natural world" in-itself is looking and speaking at the subject [eg science]
- observer's noumenal view and voice of externally observed objects is included in the model thus creatively relativizing the observer's "objective" world model to the subjective locus producing it in order to study its effects in the ideational field structuring the motion of subject-object [eg deconstruction]
- observer of externally observed objects reflectively incorporates its own and subjective-multiplicities as a (virtual, estimate) object of analysis structured by an a priori frame of desire that unconsciously filters orientation, intervention, and understanding of subject-object entanglement [eg psychoanalysis]
- observer reflectively incorporates noumenal view and voice model(s) structured by a priori frames of desire as capable of

overdetermining the virtually narrated images of externally observed objects ("the world") through transcendental reflection and creation [eg historical subjectivity]

- observer identifies the virtual ideational field composed of a multiplicity of self-relating and desiring world views and voice models as a universal agency ("scmiosphere") in-itself with asymmetrical and irreversible reflective and creative autonomy structuring the motion of subject-object entanglement [eg history itself]

Some of the confusion in relation to the above distinctions is helpfully clarified by [Chris Lucas](#) (personal communication, 2007):

I'm rather amazed that third-order cybernetics seems not to have 'taken-off' as it were, few people seem to mention it now.... It is interesting to note how much this unwillingness to recognise the 'outside influence' on self is based upon current scientific dogma, this is well illustrated by a [foreword](#) from Bruce Lipton [to Louise LeBrun, *Phoenix Rising! The Freeing of Human Potential*].

Yet the actual idea of co-evolution between system and its environment is very much to the fore today. I think perhaps the term 'cybernetics' has itself a poor, mechanical, feel to many people, so the term used in complexity theory for perhaps the same idea is '[Complex Adaptive Systems](#)' (CAS). This is frequently now used in organizational contexts (e.g. see my [review](#) of the book *Open Boundaries: creating business innovation through complexity* by Howard Sherman and Ron Schultz)

When I write on these themes nowadays I tend to use other terms, for example my 2006 essay "[Complex Living Tensegrities](#)" (2006) used "Complex Interacting Systems" (of which CAS was 1 of 4). In "[Integral Intersubjectivity](#)" (2006) I contrasted the third person (objective) view (1st order), with the first person (subjective) view (2nd order), to generate a middle way (intersubjective) which is close to 3rd order. Finally in... "[Qualitative Living and Thinking](#)" (2006) I brought in three forms of knowing, 'knowing how' (1st order), 'knowing that' (2nd order) and 'knowing from' (3rd order).

Whilst the terms aren't common perhaps the understanding is getting more so, the environmental crisis highlights the coevolution of people and planet in a way perhaps never before part of the public mind... I tend to stress recently the need to take three levels into account, these aren't the three cybernetic levels as such, but as Stan Salthe notes, our focus on one level cannot ignore the level below (N-1) which gives rise to level N, nor the level above (N+1) which constrains its behaviour. In human cultural terms the biosphere sustaining planet is N+1, the organizational greed is N and the genetically fear driven human is N-1. A potent mix !

To the extent that *The Patterning Instinct* traces how humanity has learned, these systemic perspectives merit consideration in terms of [double-loop learning](#), namely the modification of goals or decision-making rules in the light of experience. What feedback loops will the future consider to have been ignored?

Requisite fifth-order thinking?

For the purpose of this review, it could be argued that a mysterious "fifth order of cybernetics" and self-reflexivity is the cognitive challenge posed by Part 5 of *The Patterning Instinct*.

Cognitive development: This argument can be explored in the light of the cognitive focus of *The Patterning Instinct* -- necessarily on cognitive development as collectively understood. How indeed might the cognitive development of humanity be related to the "patterns of meaning" recognized through the sequence of stages in the first four parts of the book? There have been numerous attempts to identify such stages in individual cognitive development. It could be argued that the book has effectively attempted to apply such thinking to humanity as a whole -- especially since some authors offer that implication.

In any quest for the nature of fifth-order thinking, there is therefore a case for examining the "patterns of meaning" held to characterize individual cognitive development. There are many [cognitive development theories](#), [developmental stage theories](#), and many related understandings of [group development](#). As noted in *Wikipedia*, [stage theories](#) are based on the idea that elements in systems move through a pattern of distinct stages over time and that these stages can be described based on their distinguishing characteristics. Specifically, stages in individual cognitive development have a constant order of succession, later stages integrate the achievements of earlier stages, and each is characterized by a particular type of structure of mental processes which is specific to it. This understanding of stage theory would seem to describe the sequence of patterns of meaning recognized collectively in *The Patterning Instinct*.

The insights of [Robert Kegan](#) are especially relevant in this respect (*In Over Our Heads: the mental demands of modern life*, 1994), usefully summarized by Bernie Neville (*Out of Our Depth and Treading Water: reflections on consciousness, culture and new learning technologies*, 1998), by J. Berger, et al, (*How consciousness develops adequate complexity to deal with a complex world: the subject-object theory of Robert Kegan*. 2007), and by C. J. Cameron Johnson (*Kegan's 5 Stages of Development*, Prezi, 2014). The latter is remarkably indicative of the kind of visualization which would have rendered *The Patterning Instinct* more widely comprehensible.

For Neville, Kegan's approach is:

... the most coherent attempt to extend developmental theory into a consideration of adult experience. His theory is of particular interest because he is concerned not only with individual cognitive development but with the interaction between individual and culture. Kegan defines the stages of cognitive development in terms of increasingly complex subject-object differentiations.

From this perspective there are five distinct stages -- or orders of mind -- through which people may develop based on an understanding of "transformation" to qualitatively different stages of meaning making involving qualitatively different ways of constructing reality (none being inherently better than the other):

- **first order thinking (*impulsive mind*):** objects and persons are recognized as existing independently of the sensing of them. Identification is with that sensation, enabling action on the world as a collection of distinct objects.
- **second order thinking (*instrumental mind*):** Objects are understood to possess qualities of their own, regardless of our perceptions of them (Piaget's *concrete operations*). The immediate perception has moved from being the subject of experiencing to the object of experiencing.
- **third order thinking (*socialized mind*):** The adolescent becomes capable of thinking across categories by making a subject-object distinction not possible previously. Third order thinking rationalises a particular consensus view of reality, a particular way of imagining the world which is common to the family, tribe or culture.
- **fourth order thinking (*self-authoring mind*):** To stand outside the framework of third order thinking, the adolescent must "leave home", and experience the isolation and exhilaration of fourth order thinking. The shift from the third order consciousness characteristic of traditional cultures to the fourth order consciousness demanded by the modern world requires a further qualitative transformation reflecting critically on the mind's contents. These become the object of knowledge, and with the subject identifying with the the capacity to reflect on them. This is the kind of thinking capacity demanded of members of a modern, scientific society.
- **fifth order thinking (*self-transforming mind*):** a post modern society requires a higher order subject-object differentiation in which the capacity (of fourth order thinking) for critical reflection itself becomes the object of knowing.

Especially valuable is the systematic summary offered in the *Wikipedia* entry on Kegan is the comparison with other development stage theories, identified as "analogous". Those compared are [Jean Piaget](#), [Lawrence Kohlberg](#), [Jane Loevinger](#), [Abraham Maslow](#), [David McClelland](#), and [Erik Erikson](#). Curiously, and seemingly without question, these also identify five such stages (possibly with an additional stage zero).

A similar phenomenon is evident in the distinctive comparison made with respect to the [integral theory](#) of [Ken Wilber](#). The theories usefully compared are those of: [Aurobindo](#), [Jean Gebser](#), Jean Piaget, [James Fowler](#). In that case the number distinguished is seemingly related to the constraint long noted by [George Miller](#) (*The Magical Number Seven, Plus or Minus Two: some limits on our capacity for processing information*, *Psychological Review*. 63, 1956, 2). This is recognized as the most cited paper in psychology.

Although excluded from the *Wikipedia* comparison with integral theory, the latter has been closely related to the [spiral dynamics](#) model of human development of [Don Beck](#) and [Chris Cowan](#) (*Spiral Dynamics: mastering values, leadership, and change*, 1996). This distinguishes a first tier of 6 memes coded by colour: Beige, Purple, Red, Blue, Orange, Green. Followed by a second spiral tier coded: Yellow and Turquoise. Again it might be asked whether such distinctions are constrained by "plus or minus seven".

Recognizing the need for transition: From a cultural perspective, of particular interest is the "cognitive failure" implied in the four earlier "patterns of meaning" of *The Patterning Instinct* -- a failure occasioning the transition to a subsequent pattern. That failure is **the inability within any pattern to envisage or account for the desirability of such a transition**.

Why the disaffection in the prelude to collapse of the older order? Why the compensating "shifting baseline syndrome", to which reference is variously made in the book (p. 414, 419-420, 431, 539) and elsewhere (Masashi Soga and Kevin J Gaston, *Shifting Baseline Syndrome: causes, consequences, and implications*, *Frontiers in Ecology and the Environment*, 16, 2018, 4)? Valuable in the latter respect are the insights of [Karen Cerulo](#) (*Never Saw It Coming: cultural challenges to envisioning the worst*. 2006). Much is made in the book of possible parallels to the collapse of the Roman Empire, a theme of [Thomas Homer-Dixon](#) (*The Upside of Down: Catastrophe, Creativity, and the Renewal of Civilization*. 2006).

From a systemic learning perspective, four insights could be considered of particular relevance to any effort to "re-member" a pattern of coherence:

- *Those who cannot remember the past are condemned to repeat it* ([George Santayana](#), *Reason in Common Sense*, 1905). This is indicative of a cyclic process somehow centred on ignorance or inadequate comprehension.
- *A trap is a function of the nature of the trapped* ([Geoffrey Vickers](#), *Freedom in a Rocking Boat: changing values in an unstable society*, 1972). This is indicative of a form of knottedness in any topological comprehension of the system -- as with the Gordian Knot
- *We are our own metaphor* ([Gregory Bateson](#), *Our Own Metaphor*, 1972). This is indicative of a form of self-mirroring of system representation, namely a recursive patterning of the system implying the observer. The sense of "we" can be extended to include the environment, notably justifying the use of climate metaphors below as offering comprehensible systemic insights.
- *Embodiment of mind* ([George Lakoff](#) and Mark Johnson. *Philosophy in the Flesh: the embodied mind and its challenge to Western thought*, 1999)

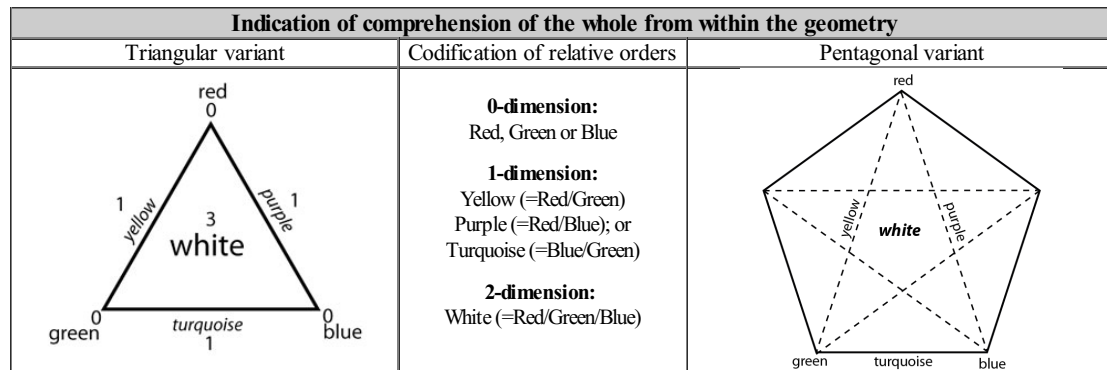
Beyond the 2-dimensional: It could be argued that the predilection for linear presentations -- of which the text of *The Patterning Instinct* is an example -- obscures the degree to which the requisite cognitive engagement with the future requires 3-dimensional thinking -- if not 4-dimensional or 5-dimensional -- whatever these may be held to imply. The popular enthusiasm for special effects in media has yet to be informed by its cognitive implications for governance -- which is seemingly happy to ignore such implications.

Notably in the light of the spiral dynamics model, the point can be made otherwise in the light of proposals for a "quintuple helix model", beyond the current focus on a [Triple Helix model of innovation](#) (Elias G Carayannis, Thorsten D Barth and David FJ Campbell, *The Quintuple Helix Innovation Model: global warming as a challenge and driver for innovation*, *Journal of Innovation and Entrepreneurship: a systems view across time and space*, 1, 2012, 2). *** other helix ***

Of potential relevance from the perspective of so-called kinetic intelligence, is the manner in which the quintuple jump is highlighted as an elusive goal of figure skating (*Will figure skating ever see a quintuple jump?* *NBC News*, 23 February 2018; *Is It Possible for Figure Skaters to Complete a Quintuple Jump?* *Olympic Channel*)

Comprehending the challenge to comprehension: The challenge of integration beyond any binary clash is admirably clarified using the mathematics of *q-analysis*, as developed by Ron Atkin (*Multidimensional Man; can man live in 3-dimensional space?*, 1981), as separately summarized (*Comprehension: Social organization determined by incommunicability of insights*). Atkin illustrates the challenge of comprehension in relation to experience from "within" the geometry of a triangle -- especially with regard to the perspective necessary to comprehend the geometry of the triangle as a whole when travelling from point to point.

The perceptual significance of this approach is well-illustrated by visual sensitivity to colours resulting from the three primary hues (red, green and blue). These may be represented on a simple triangle (below left). Here the vertices (0-simplexes) represent the primary hues, the sides are twofold combinations (1-simplexes), and the combination of the three hues makes the central white (2-simplex). A suggested equivalent of Atkin's triangle in terms of a pentagram is presented here (below right), using the colours of spiral dynamics with the suggestion that it is the final colour in that pattern whose recognition is the current challenge.



One merit of such arguments from geometry is the emphasis it gives to the constrained role of linear thinking in traversing the geometry of the pattern as a whole, and the difficulty of comprehending that pattern from within such "tunnel vision". Useful also is the abrupt transition from one linear orientation to another in order to "circumscribe" the whole and imply comprehension of a higher order.

Trajectories to our future -- and their recursive implication?

The focus of this review, Part 5 of the book, is entitled: *The Web of Meaning?*. It is composed of a single chapter entitled *Trajectories to Our Future*. In order to identify these trajectories, the chapter is divided into a number of sections. It is unfortunately less evident from their titles (or the content of those sections) how these are necessarily to be considered as framing "trajectories" -- and the linearity that that metaphor implies.

Scenarios: As noted earlier, approaches to futures studies have tended to identify a number of scenarios which merit reconciliation with the book's *Trajectories for Our Future*. Of relevance to a typically unstated constraint is the comment that:

A good set of scenarios will contain two to five different narratives. More than five scenarios tend to get confused with one another. Three scenarios run the danger that people will try to pick the most moderate or most apparently plausible and forget about the other two. Four is a good number -- neither too many nor too few. (*Scenario Planning and Strategic Forecasting*, *Forbes*, 8 January 2015)

Examples of four scenarios include:

- *Four Future Scenarios:* Continuation, business as usual, more of the status quo growth; Limits and Discipline, behaviors to adapt to growing internal or environmental limits; Decline and Collapse, system degradation or failure modes as crisis emerges; Transformation, new technology, business, or social factors that change the game. (Jim Dator, *Alternative Futures at the Manoa School*, *Journal of Futures Studies*, 14, 2009, 2, pp. 1-18)
- *Four Energy Futures: techno-explosion, techno-stability, energy descent, collapse* (*Future Scenarios: mapping the cultural implications of peak oil and climate change*)
- *Four scenarios towards more ethical futures: a case study in nanoscale science and technology* (*Foresight*, 8, 2008, 6)
- *Four Future Scenarios for Higher Education* (OECD Centre for Educational Research and Innovation)
- *4 scenarios for the future of civil society* (World Economic Forum, 2015)
- *Living in 2050: insights for four scenarios for Europe's future*
- *Our Biopolitical Future: Four Scenarios* (Worldwatch Institute)
- *4 radical, futuristic scenarios to steer your sustainability strategy* (*GreenBiz*, 9 November 2018)

Examples of five scenarios include

- *Five Archetypal Futures Scenarios:* "VUCA" world of rapidly increasing volatility, uncertainty, complexity, and ambiguity; Civilizational Disintegration - a "Challenging" or worst case future; Reformative Civilizational Recovery - An "Aspirational" (Visionary) future; Civilizational Enlightenment - An "Audaciously Aspirational" future; Singularity - A second "Audaciously Aspirational" future.
- *Five stylized scenarios* (UNESCO, 2012): Conventional World; Conflict-world; Techno-world; Global Consciousness; Conventional World Gone Sour
- *White Paper on the Future of Europe: five scenarios* (European Commission, 1 March 2017): Carrying On; Nothing but the

Single Market; Those Who Want More Do More; Doing Less More Efficiently; Doing Much More Together.

Worldviews: What is being framed in such cases, effectively as "patterns of meaning" comparable to those in *The Patterning Instinct*, are **worldviews**. As summarized by *Wikipedia*:

A worldview is the fundamental cognitive orientation of an individual or society encompassing the whole of the individual's or society's knowledge and point of view.... Worldview remains a confused and confusing concept... Worldviews are often taken to operate at a conscious level, directly accessible to articulation and discussion, as opposed to existing at a deeper, pre-conscious level, such as the idea of "ground" in Gestalt psychology and media analysis. However, core worldview beliefs are often deeply rooted, and so are only rarely reflected on by individuals, and are brought to the surface only in moments of crises of faith.

Of relevance to this argument are the similarly restricted number of worldviews in various comparisons:

- *The Six Major World Views* (Summit Ministries, 2006)
- *Comparison Chart of [7] Major Worldviews* (Norman Geisler, *Baker Encyclopedia of Christian Apologetics*, 1999, p. 787)
- *8 Major Worldviews* (*Cross Examined.org*, 8 January 2017; [Part I](#), [Part II](#))
- *Worldview Summary [14]* (FEVA Ministries,. 2011)

Of current relevance to the challenges of governance, the *Wikipedia* entry notes a clustering of American political worldviews into five categories: [Green Malthusianism](#), [Libertarian Isolationism](#), [Neoliberal Globalism](#), [Populist Nationalism](#), [Social Democracy](#). (Michael Lind, *The five worldviews that define American politics*, *Salon Magazine*. 12 January 2011).

Trajectories? The possibility with respect to the systemic organization of *The Patterning Instinct* is that the "patterns of meaning" of the first four parts function recursively in the organization of Part 5. This has the further implication that **the modalities they represent are effectively coexistent as much as sequential**. This could be tentatively presented as follows, raising questions about the implications of the requisite 5th-order thinking for the systemic part.

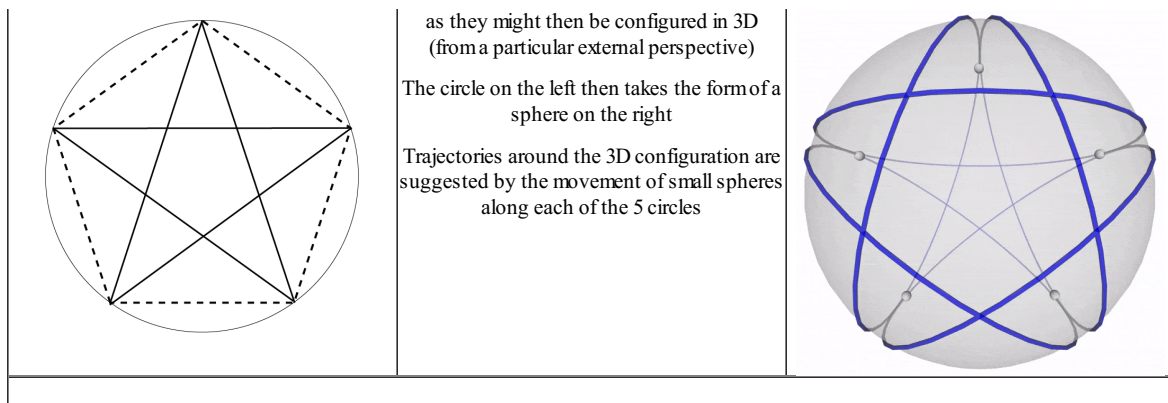
Clustering strategic trajectories		
<i>Trajectories to Our Future</i> (sections constituting Part 5)	Appropriately clustered? (given a degree of conflation in the arguments)	Fractal equivalence as patterns of core meaning (reflecting the pattern of the book)
1. Limits to Growth	1. Global collapse: Resilience in accordance with the adaptive cycle?	Part 1: Everything is Connected
2. Scenarios for Our Future		
3. Dinosaurs, Forest Fires, and Resilience		
4. How Societies Collapse		
5. Will Our Society Collapse Like Rome?		
6. Technology as Savior?	2. Techno-optimism -- "fix it" instrumentalism	Part 2: Hierarchy of the Gods
7. Engineering Our Planet		
9. Toward the Singularity?		
8. Transcending Our Humanity		
10. Pure Intelligence?	3. Cognitive adaptation and bifurcation	Part 3: The Patterns Diverge
11. Human Superorganism?		
12. Toward a Bifurcation of Humanity?		
13. What It Means to be Human		
14. The Great Transformation	4. Global dominance cognitively reframed	Part 4: Conquest of Nature
15. The Movement for a Shared Humanity		
16. Choosing Our Future	5. Engaging creatively with "otherness"	Part 5: The Web of Meaning?

How then to configure those trajectories in order to enable any choice? How to engage with that configuration as a form of psychoactive mandala?

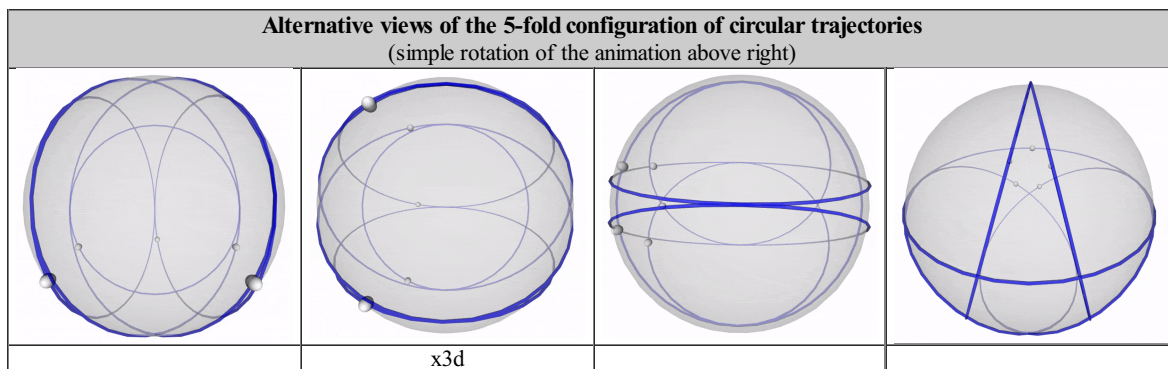
Mapping? One approach is simply to map the five trajectories onto the lines of a pentagram in order to be able to visualize the pattern of the whole -- effectively the pattern of *The Patterning Instinct* as a whole. The image on the left below could then be used -- whether the variant with lines crossing, or the dashed-line version in which they do not. An alternation between the two could even offer a helpful indication of the manner in which the two perspectives are confused in reality.

Potentially more interesting is a 3D form of the image on the left -- with each line (in the image on the left) considered as "hiding" the circularity of one trajectory. That would then give rise to the 3D image on the right.

Indicative transformation of a 2D pentagram of linear trajectories to form a 3D configuration of 5 circular trajectories		
2D Pentagram		2D Pentagram lines as circles in 3D
	Each line in the standard 2D depiction of a pentagram on the left can be assumed to be a circle (seen edge on).	
	The image on the right depicts those circles	



As a 3D form, the configuration on the right above can be rotated in virtual reality, offering the alternative perspectives below. The model could be enhanced by colouring each circle differently (and the moving spheres, in addition to changing the rates at which they move).



Implication of the observer? Missing from such depiction is consideration of the place of the observer, supposedly implicated in experiencing the possibility of each trajectory (in terms of 5th-order thinking), and confronted by the challenge of choosing between them -- whether as an individual or collectively. As is only too evident at this time, the confusion of the complex of trajectories, and the uncertainty with regard to the transition to the future, are a challenge to any neat mapping -- whether in 2D or 3D. Any such "neatness" distracts from the highly problematic nature of such a challenge, especially given the conflicting investments in each of them,

Use of a virtual reality browser offers the possibility of shifting the locus of the observer to the origin of the 3D sphere -- from which the circular trajectories can be variously experienced with a degree of confusion far more appropriate to comprehending the challenge of choice in the present time.

Catastrophic harmony? Greater complexity is however implied by the further work of Christopher Alexander on *The Nature of Order* (*Harmony-Seeking Computations: a science of non-classical dynamics based on the progressive evolution of the larger whole*, *International Journal for Unconventional Computing (IJUC)*, 5, 2009). Therein he detects 15 "transformations", as described separately (*Harmony-Comprehension and Wholeness-Engendering: eliciting psychosocial transformational principles from design*, 2010).

Are these transformations to be understood as subsumed in some way by the 5-fold cognitive pattern? From a mapping perspective, it is interesting to note that the spherical geometry of the model above is such that the 2 sets of 5 pentagons on the surface, one on each side of the sphere, could have their points linked across the sphere by parallel lines -- together forming 15 lines with which Alexander's transformations could potentially be associated (*Comprehending Alexander's transformation principles within the psychosocial realm*, 2010).

A further consideration in this regard is the manner in which that mapping facility might be of relevance to the 15 Global Challenges distinguished by the Millennium Project, as discussed separately (*From poster sessions to stellar futures via aesthetic visualizations*, 2015) with respect to their polyhedral mapping..

As discussed below, however, how do these relate to the seven elementary catastrophes of René Thom (*Structural Stability and Morphogenesis: an outline of a general theory of models*, 1972). Is harmony to be "quintessentially" associated with 5-foldness -- and the mythical [fifth element](#)?

Clues to systemic implications of 5-fold cognitive organization?

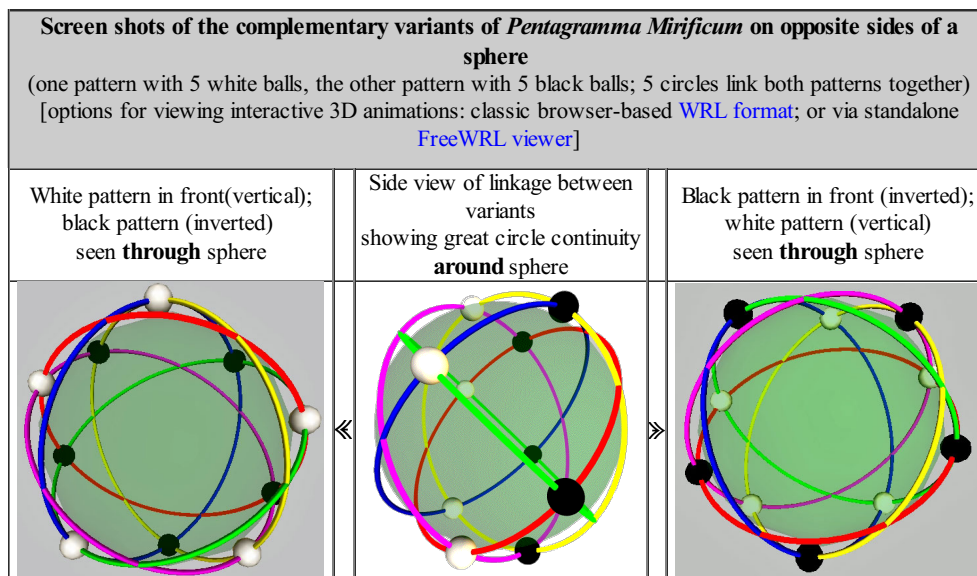
If the prevailing cognitive modality artfully embodies a process of avoidance in failing to recognize a fifth order of thinking -- or to comprehend its self-reflexive nature -- there is a case for provocative speculation towards such thinking. This could be understood as requiring a degree of engagement with what is variously rejected as reprehensible and inappropriate. Seemingly inherently incommensurable, each rejecting the other (and considered irrelevant for one reason or another), these might be configured as a pentagon of contrasting modes of thinking:

- articulations of 5 principles, notably the *Five Principles of Peaceful Coexistence* (as indicated above) -- typically seen as dogmatic injunctions (as with any set of 10 commandments)
- [The Pentagon](#), as the primary instrument of full-spectrum strategic dominance by the USA, potentially to be reframed in 3D and

4D (*Reframing NATO and The Pentagon?*, 2017). Perhaps not surprisingly, a 7-fold set of principles of war has been articulated: objective, offensive, mass, economy of force, maneuver, unity of command, security, surprise and simplicity (James Jay Carafano, *It's Time to Return to the Principles of War*, *The National Interest*, 4 May 2016; Lonnie R. Harrelson, *The Principles of War: valid yesterday, today, and tomorrow*, Joint Forces Staff College, 2005).

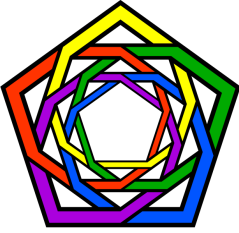

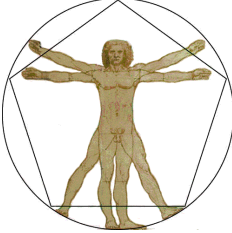

- the spherical geometry of the so-called **Pentagramma Mirificum**, which has proved to be so vital to navigation of the terrestrial globe (*Global Psychosocial Implication in the Pentagramma Mirificum: clues from spherical geometry to "getting around" and circumnavigating imaginatively*, 2015)
- the 5-phase pattern of the *Wu Xing* of Chinese culture -- readily recognized as the antithesis of the dominant pattern of Western understanding, although potentially implied in the *Hygeia* (*Hugieia*) pentagram of Pythagoreans who associated it with health (*Cycles of enstoring forming mnemonic pentagrams: Hygiea and Wu Xing*, 2012; *Interplay of cognitive patterns in discourse on systemic change*, 2015).
- the **pentacle** as used in magical evocation, notably as "natural magic" in the context of **Renaissance magic**, and in the neopagan magical religion of **Wicca** (*The Magic of the Pentacle: what is a pentacle?* *All Wicca*, 27 January 2017).

The 5-phase *Wu Xing* pattern is discussed further below. Potentially the least controversial pattern is that of the Pentagramma Mirificum, whose depiction in 3D helps to indicate the challenge to comprehension, even though it is fundamental to navigation around the globe. The mathematical form was discovered by John Napier, and named by Carl Friedrich Gauss.



Further (requisite) provocation regarding 5-fold thinking is offered by the following images, variously echoing the single pentagonal pattern discussed earlier. Each could be said to challenge the adequacy and convenience of a 2D representation.

- **Discordian mandala**: In making a case for a 5-fold "concordian mandala" in the current state of social chaos, a useful point of departure was the previous articulation of a 5-fold **Discordian Mandala** (*Con-quest Aesthetically Reframed via the Concordian Mandala*, 2016). The mandala is described in the controversial *Principia Discordia*, elaborated by **Greg Hill** with **Kerry Wendell**, as the provocative doctrinal manifesto of **Discordianism**. It was originally published under the title *Principia Discordia or How The West Was Lost* (1965). The name was intended to signify *The Principles of Strife*. Appropriately complex, that pattern enabled the exploration of dynamic variants in 3D (*Concordian Mandala as a Symbolic Nexus: insights from dynamics of a pentagonal configuration of nonagons in 3D*, 2016).
- **Interleaved pentagons**: As associated with the discussion of Borromean rings
- **Vitruvian animation**: A far more more classic evocation of 5-foldness is that of the so-called *Vitruvian Man*, a drawing made by the Italian polymath **Leonardo da Vinci** (ca. 1490) -- adapted here as an animation including a female figure.
- **Pentacle**: The continuity of the construction of this pentagram has long made it especially symbolic of the magical preoccupations of the neopagan tradition. It gives particular focus to the unconventional manner in which distinctive trajectories may be subtly related (as in the Chinese *Wu Xing* pattern discussed below).

Challenging insights into 5-foldness			
Discordian mandala	5 Interleaved pentagons	Vitruvian Animation -- man/woman (multi-coloured variant)	Pentacle
			

Cognitive glass ceilings impeding integrative comprehension

The Patterning Instinct offers a cognitive history of 4 patterns of meaning -- widely appreciated as noted. However it effectively shifts phase in raising the question as to the future, framed as a 5th pattern of meaning. The argument above is that comprehension of 5th-order thinking is necessarily a particular challenge with which humanity is confronted in the present. Arguably there are particular features to this challenge which could be usefully compared to confrontation with a puzzle or a riddle (*Global Governance as a Riddle: but is a solution the answer to the question?* 2018).

Understood metaphorically as the **Gordian Knot** faced by Alexander the Great, this continues to be cited with respect to the current issues of governance (*Mapping grossness: Gordian knot of governance as a Discordian mandala?* 2016). Commenting on a session of the World Economic Forum, **John Jullens** argues that: *It's as if the global economy is being strangled by a gigantic Gordian knot from which it cannot untangle itself* (*The Gordian Knot of Global Economic Growth, Strategy-Business*, 15 October 2013). "Cutting it" may not however be consistent with the ingenuity otherwise associated with solving riddles.

4-fold cognitive closure: There is a sense in which the ease of describing the four previous historical phases in *The Patterning Instinct* can be seen in terms of a form of (premature) cognitive closure in a mode of explanation which is unchallenged by the dilemmas of the present with regard to the future. This is only too obvious in the governance of major countries at this time, to say nothing about global governance. There is perhaps a case for recognizing a form of "cognitive glass ceiling" with which conventional thinking is faced.

Any intuitive recognition of the coherence of a 4-fold patterning merits consideration in the light of the work of **Marie-Louise von Franz** (*Number and Time: reflections leading toward a unification of depth psychology and physics*, 1974) a focus she inherited from **Carl Jung**. A chapter in that study is entitled: *The Number Four as the One-Continuum's Model of Wholeness in all Relatively Closed Structures of Human Consciousness and in the Body*. Therein it is noted that:

The number four thus signifies (as **Menninger** points out) a peculiar border number [*Zahlwort und Ziffer: Eine Kulturgeschichte der Zahl: Zählreihe und Zahlsprache. Zahlschrift und Rechnen*, 1957]. This boundary aspect of the number four is reflected in many figures of speech. Many languages, for instance, possess a trial and quaternary case beyond the dual, but never more. Also, in all languages the numerals up to four are etymologically formed as adjectives, but never higher ones... Only beginning with number five do we find, as Menninger states, genuine "empty" numbers, detached from their objects.... Since Jung devoted practically the whole of his life's work to demonstrating the vast psychological significance of the number four, I must refer the reader to his writings in this connection.... The fact that mankind's repeated attempts to establish an orientation toward wholeness possess a quaternary structure appears to correspond to an archetypal psychic structural disposition in man (pp. 114-115).

Further examples cited include:

- Minkowski's and Einstein's four-dimensional model of the universe in theoretical physics.
- the four distinct forces in nature: the nuclear, the electrical, the weak (beta decay) interaction, and the gravitational.
- the four dimensionless constants of nature assumed by Arthur Eddington
- in quantum mechanics and relativity, the electron must be described by a wave vector with four components -- explaining electron spin and the position.
- control by four is the sharp boundary for complete transmission of information.
- the triple codes of DNA and RNA are built up on a *quaternion* of bases which can be combined in $4^3 = 64$ variations.

Further insights are offered from a philosophical perspective by **Antonio de Nicolas** (*Four-dimensional Man: meditations through the Rg Veda*, 1978). In recognizing the limitations of a single language as offering a pattern of meaning, this focuses on the use of four complementary languages in the *Rg Veda*, as summarized separately (*Epistemological challenges: Language, Global Strategies Project*).

Appropriate to the central role of time in Part 5 of *The Patterning Instinct* -- in referring to the future -- is the manner in which this transcends the 4-fold quaternary pattern. With respect to the complex relation to the fivefold, von Franz notes:

In China the number five possesses the same significance as four does with us, because it is taken to represent the centered four... This concept is also found in the West, in the alchemical idea of the *quinta essentia*. The *quinta essentia* is not additively joined onto the first four as a fifth element. but represents the most refined, spiritually imaginable unity of the four elements. It is either initially present in and extracted from them or produced by the circulation of these elements among one another. (pp. 120-121)

There is however a challenge to comprehension of the 4-fold, especially evident in the continuing controversy associated with the various versions of the **Swastika**, as discussed separately (*Swastika as Dynamic Pattern Underlying Psychosocial Power Processes: implicate order of Knight's move game-playing sustaining creativity, exploitation and impunity*, 2012).

Cognitive "dilemmas": Potentially relevant, it is appropriate to note the understanding of currently recognized "dilemmas", and how these might relate to the pattern phases in the book.

no dilemma	Part 1: Everything is Connected	consensus; no conflict?
		conflict between two

dilemma	Part 2: Hierarchy of the Gods	requirements
trilemma	Part 3: The Patterns Diverge	conflict between three requirements
tetralemma / quadrilemma	Part 4: Conquest of Nature	conflict between four requirements
pentalemma	Part 5: The Web of Meaning?	conflict between five requirements

Whilst there is great familiarity with dilemmas and contradictions, there is far less recognition of a **trilemma** and a **tetralemma**. The latter is more commonly recognized in Eastern traditions and is notably featured in the work of **Kinhide Mushakoji** (*Global Issues and Interparadigmatic Dialogue: essays on multipolar politics*, 1988). The following examples, and the relations between the lemmas, are discussed separately (*Intuited complementarity: environmental cycles and learning cycles?* 2018).

Comparison of lemmas	
Trilemma (for example, as indicated by Wikipedia):	Quadrilemma (for example):
<ul style="list-style-type: none"> In religion: Epicurus' trilemma; Apologetic trilemma In law: The "cruel trilemma" In philosophy: The MÜnchhausen trilemma; The trilemma of censorship In economics: "The Uneasy Triangle"; The "Impossible trinity"; Wage policy trilemmas; The Pinker social trilemma; The political trilemma of the world economy In politics: The Zionist trilemma; "Žižek trilemma" (under Communism) In business: The project-management trilemma; The trilemma of an encyclopedia 	<ul style="list-style-type: none"> What is the energy quadrilemma? (<i>Amcham Belgium</i>, September 2015) Hao Jin: Quadrilemma not Trilemma: Fiscal Policy Matters (<i>Caep Working Papers</i>, 2016-003) Burton A. Weisbrod: The Health Care Quadrilemma: an essay on technological change, insurance, quality of care, and cost containment (<i>Journal of Economic Literature</i>, 29, 1991) A.G.Olabi: Energy quadrilemma and the future of renewable energy (<i>Energy</i>, 108, 2016) Eduardo Gudynas: Climate Change, the Quadrilemma of Globalization, and Other Politically Incorrect Reactions (<i>Globalizations</i>, 30, 2016, 6) Tom Gilson: Trilemma or Quadrilemma? Answering the "Legend" Critique of C.S. Lewis's Trilemma (<i>Christian Apologetics Alliance</i>, 3 January 2013)

Pentalemma: Appropriate to this argument is the rarity of a pentalemma, understood as implying a conflict between 5 separately undesirable alternatives. Cited indications of the implied challenge are offered by:

- Roger Hillsman to Rusk, *The Five-Fold Dilemma: The Implications of the Sino-Indian Conflict*, November 17, 1962,
- Solutions Online Think Tank-American Prisons: a Five Fold Dilemma (Drugs, Gangs, Juvenile Offenders, Me)*, 21 May 2010
- Russia and the World Energy Council* (2018): "Energy Minister Alexander Novak gave a keynote speech to delegates entitled 'Searching for a Balanced Solution to the Energy Trilemma'. He emphasised that when we look at issues of sustainable development in the context of long-term energy policy, we ought to expand the focus of our attention somewhat by adding two more prongs -- economic growth and energy efficiency -- to the trilemma, and that it would therefore be more accurate today to refer to a 'pentalemma'".

More substantive indications include:

- David Löwenstein (*A Uniform Account of Regress Problems*, *Acta Analytica*, 32, 2017, 3):
This paper presents a uniform general account of regress problems in the form of a pentalemma - i.e. a set of five mutually inconsistent claims. Specific regress problems can be analyzed as instances of such a general schema, and this Regress Pentalemma Schema can be employed to generate deductively valid arguments from the truth of a subset of four claims to the falsity of the fifth. Thus, a uniform account of the nature of regress problems allows for an improved understanding of specific regress objections or arguments, and, correspondingly, of the general logical geography of the debate about infinite regresses.
- Johan Galtung (*Toward a Conflictology: the quest for transdisciplinarity*, In: Dennis J.D. Sandole, et al, *Handbook of Conflict Analysis and Resolution*, 2008):

Expanding the conflict horizon from the *dilemma* to the *trilemma* yields compromise, a sometimes adequate way out; expanding to the Buddhist *tetralemma* yields the both-and and the neither-nor as ways out of a *dilemma* and can take the more advanced forms of creating new realities as negative or positive transcendencies. Combining the *trilemma* and the *tetralemma* we get the *pentalemma*, the five-point outcome horizon the present author uses often in theory and in the practice of mediation.... What happens if no such *dilemma* solution acceptable to the house -- divided against itself but still one house -- is found? The answer is that it continues as two houses, heading either for the *pentalemma* outcomes, or for apathy, a gradual outer or inner paralysis that takes the form of inaction or depression (unipolar), with occasional outbursts of manic behavior (bipolar), often violent.

These are discussed separately (*Decision-making capacity versus Distinction-making capacity: embodying whether as weather*, 2015) with respect to enhancing strategic discourse systematically using climate metaphors (*Five-fold ordering of strategic engagement with time; Five-fold cognitive dynamics of relevance to governance?*). That discussion mentions the even rarer use of hexalemma and heptalemma, although an octalemma is seemingly recognized by Edward Andersonto (*Problem of Time in Quantum Gravity*, 2012). The Euthyphro "dilemma" is restated as an octalemma by Richard Goode (*Nothing Is Permitted: an argument for moral eliminativism*). Consideration could therefore be given to *Strategic Octalemmas* (2009).

Beyond the 4-fold cognitive modality: integrating the 5-fold, 6-fold and 7-fold?

Just as the binary "dilemma" is a major constraint in any form of psychosocial organization and governance, it could be argued that any form of pentalemma is indicative of a constraint beyond the tetralemma. This suggests the distinctive challenges of articulating and comprehending Part 5 of *The Patterning Instinct*. It does not lend itself to the "comfortable" explanatory modality of the 4-fold historical articulation of patterns of meaning in the preceding parts. It necessarily constitutes a major **paradigm shift**, notably through the requirement to engage through choice with an uncertain future -- rather than simply to explain the pattern breaking of past transitions as a historical observer.

The systemic perspective requiring **5th-order thinking calls for the implication of the observer in a manner foreign to conventional systems thinking of a lower order** -- for which the dissociation of the observer is a natural characteristic of any explanation. Such considerations are evident in the case made for recognition of the insights of quantum mechanics -- most remarkably by [Alexander Wendt](#) (*Quantum Mind and Social Science: unifying physical and social ontology*, 2015). Discussion of **quantum mind** is now variously considered ([Arnold Mindell](#), *Quantum Mind: the edge between physics and psychology*, 2000).

There is therefore an argument for reviewing 4-fold sets of scenarios, patterns or worldviews in contrast with 5-fold or N-fold variants - especially in terms of their comprehensibility, credibility and how such patterns "work" in systemic terms. Obviously this cannot preclude the sets with higher numbers of patterns, but it does suggest that they may have a distinctive cognitive role. Also to be recognized is **the potential degree of conflation and confusion where the challenge of coherence and comprehensibility of the set as a systemic whole is avoided**.

Of potential relevance is the argument of [David R. Gibson](#) (*Marking the Turn: obligation, engagement, and alienation in group discussions*, *Social Psychology Quarterly*, 72. 201, 2). This concludes that those who contributed somewhat less recently remain engaged but have more latitude to take discordant positions; and those who have been quiet for longer periods are susceptible to "alienation from topic", as a result of which reentry is often accompanied by an attempt to change the topic.

Comprehension and ignorance of the whole: As stated with respect to quantum reality, and sometimes attributed to [Richard Feynman](#): *If you think you understand quantum mechanics, you don't understand quantum mechanics*. This cautionary note would seem to be especially relevant to imagining the systemic characteristics of the *Trajectories to Our Future* of Part 5 of *The Patterning Instinct*.

Just as there is a case for explicit consideration of comprehension, and the relative lack thereof in comprehending any system, so there is a case for associating this with an explicit recognition of ignorance. This is notably suggested by the triangular example of Ron Atkin (presented above). In that case comprehension (of "white") is usefully placed at the centre, with the implication that ignorance of the whole could be similarly located (as the alternative condition). It follows that the emptiness of the centre is therefore (elusively) significant in any pentagonal configuration of the whole.

With respect to ignorance, of considerable value are the arguments of [Nicholas Rescher](#) (*Ignorance: on the wider implications of deficient knowledge*, 2009; *The Strife of Systems: an essay on the grounds and implications of philosophical diversity*, 1985), or others ([Stuart Firestein](#), *Ignorance: How It Drives Science*, 2012; [Joseph Acquisto](#), *Poetry's Knowing Ignorance*, 2019). Some relevance is evident from more speculative explorations (*University of Ignorance: engaging with nothing, the unknown, the incomprehensible, and the unsaid*, 2013).

Another consideration is that any fruitfully meaningful philosophical language needs to encompass "something missing", as suggested by the arguments [Terrence Deacon](#) (*What's Missing from Theories of Information?* 2010). As discussed separately (*Necessary incompleteness*, 2014; *Cognitive mystery of holes, lacunae and incompleteness*, 2014), for Deacon:

The problem is this: *Such concepts as information, function, purpose, meaning, intention, significance, consciousness, and value are intrinsically defined by their fundamental incompleteness*. They exist only in relation to something they are not.... The "something" that each of these is not is precisely what matters most. But notice the paradox in this English turn of phrase. To "matter" is to be substantial, to resist modification, to be beyond creation or destruction -- and yet what matters about an idea or purpose is dependent on something that is not substantial in any obvious sense. So what is shared in common between all these phenomena? In a word, nothing -- or rather, something not present. (*Incomplete Nature: how mind emerged from matter*, 2011p. 23, *emphasis in original*)

A case for the relevance in this period of discourse of another kind is suggested by a traditional Daoist tale from [Zhuangzi](#), as quoted by [Ellen M. Chen](#) (*In Praise of Nothing: an exploration of Daoist fundamental ontology*. 2010, p. 114). They are psychodynamic tensions or dilemmas, experienced from within (or participated in). Chuang Tzu, in another Chinese classic, makes the point that:

The wise man therefore... sees that on both sides of every argument there is both right and wrong. He also sees that in the end they are reducible to the same thing, once they are related to the pivot of Tao. When the wise man grasps this pivot, he is the center of the circle, and there he stands while "Yes" and "No" pursue each other around the circumference (*The Way of Chuang Tzu*, interpreted by Thomas Merton, 1970)

6-fold, 7-fold, 8-fold, 9-fold? The existence of a succession of "glass-ceilings" can be considered in the light of sets of greater than 5 patterns of meaning:

- 6-fold: [Edward de Bono](#) (*Six Frames For Thinking About Information*, 2008); [Raymond Abellio](#) (*La Structure Absolue: essai de phénoménologie génétique*, 1965)

- 7-fold: *Seven Ages of Man*; Jacques Attali (*Survivre aux crises: 7 stratÉgies*, 2009)
- 8-fold: Chinese articulation of *BaGua*; Stephen Prothero (*God Is Not One: the eight rival religions that run the world -- and why their differences matter*, 2010)
- 9-fold: *9-fold Higher Order Patterning of Tao Te Ching Insights* (2003); *Speculation on Potential Symbolic Relevance of the Concordian Mandala* (2009)

Such distinctions are notably explored through **systematics**, namely as articulated by J. G. Bennett (*The Dramatic Universe*, 1956). Some may indeed be distinguished as stages explicitly associated with cognitive breakthroughs and reframings (*Varieties of Rebirth: distinguishing ways of being "born again"*, 2004):

The transition beyond the 4-fold articulation of the earlier patterns of meaning in *The Patterning Instinct*, could be explored through associating the 7 "elementary" distinctions of **catastrophe theory** with the classical 7 "WH questions" (*Conformality of 7 WH-questions to 7 Elementary Catastrophes: an exploration of potential psychosocial implications*, 2006; *WH-Questions as derivative psychosocial constructs*, 2010).

The argument would be that there are four simpler types of strategic question to be associated with the **four simpler types of catastrophe** which are recognized. There are a further three styles of question then to be associated with the **three more complex styles of catastrophe**, notably related to observer implication. Are the latter then effectively conflated and confused as trajectories within Part 5 of *The Patterning Instinct* -- if only as challenging questions for governance?

Whilst this is helpful in marking the boundary between 4 and 5, it raises the question as to the nature of the cognitive boundary between 7-fold and 8-fold patterns, and potentially the boundary implied by 12-fold and 20-fold articulations, as indicated above:

- *Checklist of 12-fold Principles, Plans, Symbols and Concepts: web resources* (2011)
- *Requisite 20-fold Articulation of Operative Insights? Checklist of web resources on 20 strategies, rules, methods and insights* (2018)

When 5-foldness is organized in three dimensions, it is fundamental to the integrity of the 12-fold organization of the dodecahedron with its pentagonal sides, as noted separately (*Time for Provocative Mnemonic Aids to Systemic Connectivity? Possibilities of reconciling the "headless hearts" to the "heartless heads"*, 2018). Is that 5-foldness somehow significant to the concluding Part 5 of the book, and its organization, themed as *The Web of Meaning*?

Eliciting systemic answers from a 5-fold web of meaning?

Beyond a web perspective? As the concluding part of *The Patterning Instinct*, Part 5 is entitled *The Web of Meaning?* -- appropriately framed by an interrogation mark. The implication is that there is a confluence of insights into patterning from which can be discerned a pattern of meaning for engaging with the future. Any such pattern is perhaps necessarily elusive, especially given the manner in which detection of that pattern implicates the collectivity in its recognition.

Unfortunately the condition of global civilization at this time is so unstable that there are few clues as to how any systemic insights are to be detected. The crisis of crises is only too evident:

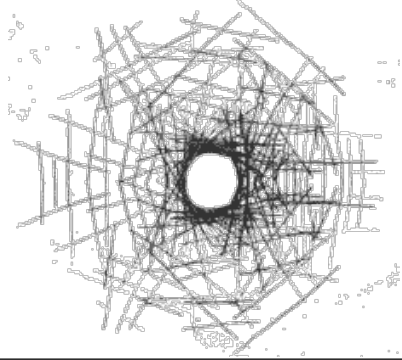
- increasing panic regarding the imminent consequences of climate change
- increasing concern at loss of biodiversity and extinction of species
- expressed concerns regarding the instability of the financial system
- dramatic erosion of trust in politicians and authorities
- social unrest framed as the threat of populism
- massive migration disrupting traditional life styles and quality of life
- ever greater invasion of privacy through systemic surveillance
- vulnerability of vital information systems to hacking
- regional violence, with the immediate threat of more widespread conflagration (using nuclear weapons)

The response in Europe to this complex of crises further exemplifies the challenge of eliciting insights into how to govern the emerging pattern. Poisonously divisive debates in the UK, Germany and France are indicative of the limited capacity for systemic thinking -- of a 5th order in the cybernetic terms (as indicated above). France has offered the most remarkable dynamics in the months past through the popular **Yellow Vest** challenge to conventional authoritarian governance. This has been complemented by a 3-month, country-wide debate, together with a **special TV channel** offering commentary on the crisis by panels of 4-6 people (*France's Great Debate - how it worked*, *OpenDemocracy*, 15 March 2019).

The TV panel discussions are especially remarkable in that the content, articulated from a variety of perspectives and levels of expertise, does not engender a higher level of insight. The volume of recorded discourse merits sophisticated **dialogical analysis** to detect the pattern of points made -- and the integrative failure. The content of the national debate in every region, and the thousands of written submissions elicited, has also failed to be processed in a manner commensurate with the investment in that process (*What will France do with 'National Debate' data?* *France24*, 3 March 2018). The challenge and the failure are discussed separately (*Multi-option Technical Facilitation of Public Debate: eliciting consensus nationally and internationally*, 2019).

More generally it can be argued that the title of Part 5 -- as *The Web of Meaning?* -- is a valuable metaphor for the dysfunctional dynamic of elicitation of **collective intelligence** towards **pattern recognition**. Ironically there is no lack of **expert elicitation** initiatives through which authoritative reports are engendered. Clearly the immense riches of the internet enable the "web of meaning" to be explored from multiple perspectives -- but with very little evidence of global coherence. There is large scale indulgence in eliciting meaning but limited capacity and motivation to interrelate the patterns assertively detected from any given perspective.

Ironically the cover illustration of *The Patterning Instinct* is a modest schematic depiction of a web of meaning inspired by standard depictions of networks. The irony is all the greater in that, in reviewing the earlier systemically focused study by the author of the foreword to that work, a similar point was made (*Transcending an Asystemic View of Life: review of The Systems View of Life: a unifying vision*, 2014). To a far greater degree than *The Patterning Instinct*, the cover implied a degree of coherence to life as a system, as reproduced below left. However the contents did not reflect that coherence to any degree, evoking the image on the right in the critical review -- as a systemic perspective.

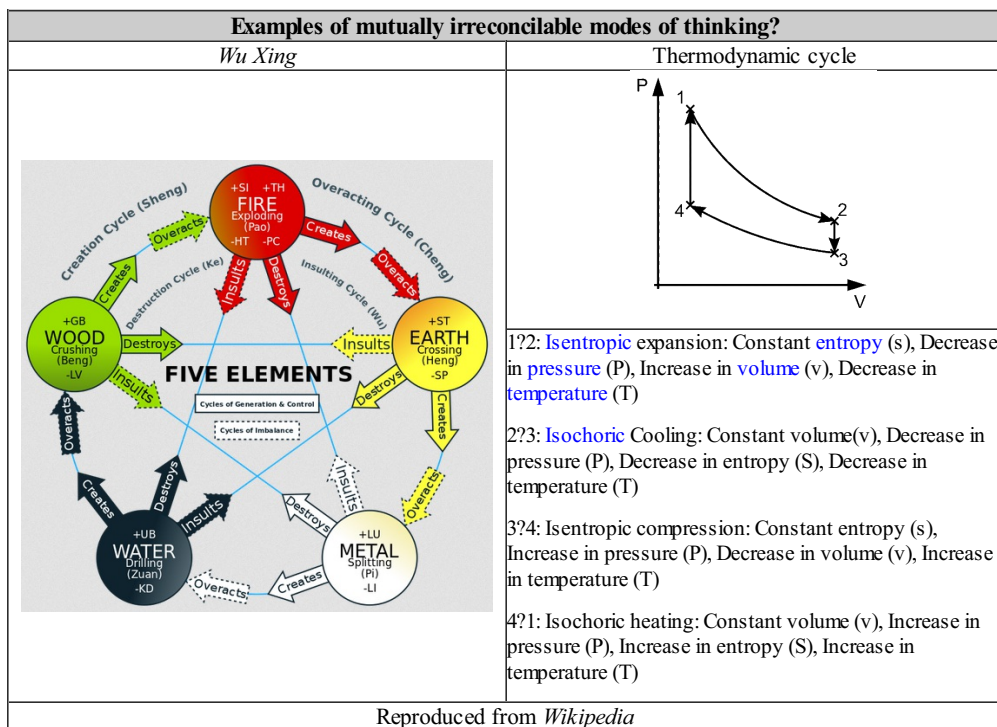
<i>The Systems View of Life: a unifying vision</i> (2014) by Fritjof Capra with Pier Luigi Luisi	
Cover imagery of the book (detail)	Organization of the contents (schematic representation by reviewer)
	

recognition" he has promulgated could not be accessed. The knowledge is effectively "incarcerated" -- presumably for the exclusive benefit of leaders. This could be understood as the problematic nature of the fifth discipline which is deprecated to a much higher degree in other contexts, especially when the pentagram is inverted.

It is appropriate to note that most of the references cited here are subject to intellectual property constraints and paywalls. More ironic, as noted below, it that articulations of disciplines may be further subject to trade-marking -- irrespective of the profundity of which they are held to be indicative.

Systemic psychosocial viability: In contrast to the 5-fold *Wu Xing* cyclic pattern of phases cited above, that of the **thermodynamic cycle** is understood to be composed of 4 phases. To a tantalizing degree, they might well be understood as referring to similar processes -- or to the capacity of the human mind in comprehending them individually and as a cycle. The question is how a system of pattern phases is to be understood as "working" -- especially that in which humanity is embedded, as discussed separately (*Psychosocial Energy from Polarization -- within a cyclic pattern of enantiodromia*, 2007; *Psychosocial Work Cycle: beyond the plane of Möbius*, 2007).

How is the pattern of trajectories in Part 5 of *The Patterning Instinct* to be understood as "working" systemically? As a characteristic of conventional 4-fold thinking, the thermodynamic cycle depicted below can be understood as missing an implicit dimension, namely the manner in which human intelligence has been able to frame and comprehend its cyclic nature. On the other hand, how are cognitive characteristics of relevance to this argument to be understood as associated with the 5-fold *Wu Xing* configuration?



With respect to the *Wu Xing* configuration, in Chinese culture the "elements" in the phase diagram have long had metaphoric interpretations rendering them variously comprehensible and meaningful. Of relevance to this argument, comprehension of the states of matter through metaphors with which they are often associated, lends itself to understanding in terms of the symbolism of the classical **four-element** Western pattern, with its implication of a fifth. Although this can be readily deprecated, it does however allow for representation in a **phase diagram** with plasma as a fifth state of matter (*Cognitive patterns of environmental significance*, 2010). Such distinctions might then correspond to the stages of reification as the quality of knowing in the moment "hardens" into objective reality -- passing through analogues to the states of matter (plasma -- gas -- liquid -- solid).

As stated in the foreword by Frijtof Capra (cited above): *Cognition is embedded in matter at all levels of life.*

Pattern spiralling challenge of biomimetics

Despite their implicit dynamic, arguably such representations might well be recognized as effectively a form of "standing wave". Missing is any sense of the spiral nature often associated with cognitive development. The **chambered nautilus** is valued as emblematic of desirable forms of growth and development. It is therefore useful to contrast two poems in which spiralling is a concern -- that by Yeats being characteristic of the condition of society a century ago, and a second indicative of potential at this time.

<i>The Second Coming</i> (1919) by W. B. Yeats (first verse)	<i>The Chambered Nautilus</i> by Oliver Wendell Holmes Sr. (second verse)
Turning and turning in the widening gyre The falcon cannot hear the falconer; Things fall apart; the centre cannot hold; Mere anarchy is loosed upon the world, The blood-dimmed tide is loosed, and everywhere The ceremony of innocence is drowned;	Its webs of living gauze no more unfurl; Wrecked is the ship of pearl! And every chambered cell, Where its dim dreaming life was wont to dwell, As the frail tenant shaped his growing shell, Before thee lies revealed, --


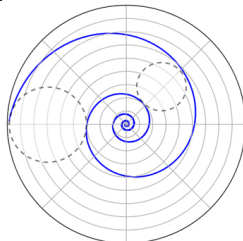
The best lack all conviction, while the worst Are full of passionate intensity.	Its irised ceiling rent, its sunless crypt unsealed!
--	--

The question is how to benefit from such a dynamic recognized intuitively, as discussed separately (*Enabling Governance through the Dynamics of Nature: exemplified by cognitive implication of vortices and helicoidal flow*, 2010). Given the association of *The Patterning Instinct* with a *Systems View of Life* through its forward, one key to any such possibility is through the **biomimetics** which has been so significant to the development of aerodynamics, as discussed separately with respect to *Technomimicry as analogous to biomimicry* (*Engendering a Psychopter through Biomimicry and Technomimicry: insights from the process of helicopter development*, 2011). Biomimetics could be recognized as pattern recognition *par excellence*. In such terms it could be argued that the challenge of Part 5 for humanity is one of "learning how to fly".

In this respect it is perhaps appropriate to discover the recognize importance of the chambered nautilus from a biomimetic perspective:

- As argued by Emily Barbara Kennedy and Thomas Andrew Marting in identifying frames of inquiry to identify relevant biological models for accomplishing a function of interest that has persisted over time, concluded that a strategy that has been conserved through evolution is likely to be effective and difficult for competitors to defeat -- noting that the underwater locomotion of the chambered nautilus has remained morphologically constant for some 400 million years (*Biomimicry: streamlining the front end of innovation for environmentally sustainable products, research, Technology Management*, 59, 2016, 4)
- Inspired by the efficiency and adaptability of natural organisms, a study of *Nature / Structure: structural efficiency through natural geometries* notes with respect to sustainable structural solutions for some of the world's tallest buildings that *Forms found in nature have superior engineering, inherent memory, and a great deal of elasticity*.

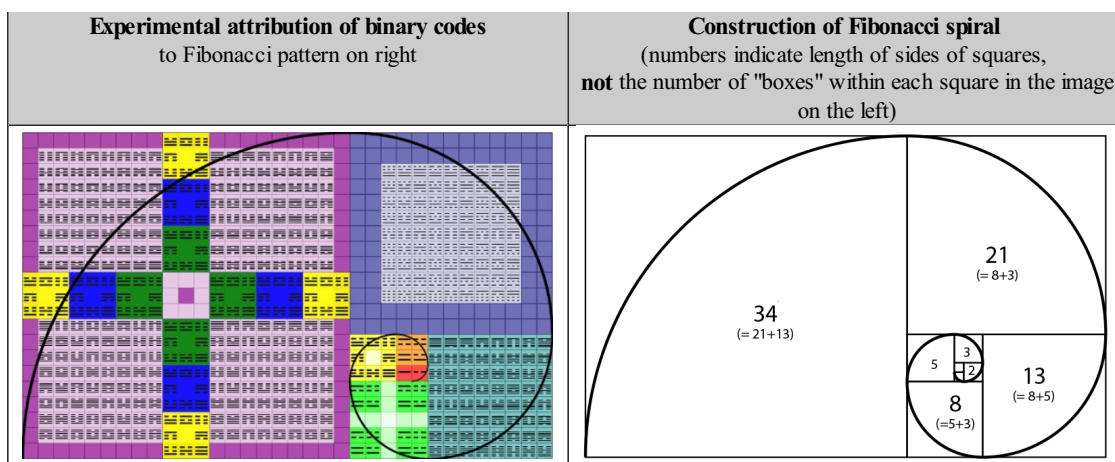
This gave rise to investigation of the cross-section of natural structures that exhibit an exponential growth pattern with mathematically predictable segmentations that brace the form, notably considering the growth patterns of bamboo and the fractal geometry of the chambered nautilus shell for clues about natural strength. From which it was concluded that: *The high-rise applications of these principles borrow specific sequences of the organic structures to replicate their most attractive attributes: a high strength-to-weight ratio, elasticity, long-term endurance, and a highly efficient form that resists loads and maximizes stability. As building structure, organic bracing is capable of fragmenting forces by sharing loads more uniformly within the structure and transferring them into the building foundation*. As applied to the design of a Hurricane Strength building, it is noted that: *Founded in the Fibonacci Sequence and proportional to the spiral patterns of a nautilus shell or a hurricane, the structural grid was developed with a scaling factor that is most concentrated at a point and spirals out, becoming less concentrated*.

Spiral forms	
Chambered Nautilus shell (cutaway)	Logarithmic spiral (with dashed circles to indicate the 3D "cognitive habitat" of the developing body within)
	
Adapted from image in Wikipedia profile	Adapted from image in Wikipedia profile

Relevance to psychosocial patterning? There is considerable knowledge of the **marine nautilus / chambered nautilus** (W. Bruce Saunders and Neil H. Landman, *Nautilus: The Biology and Paleobiology of a Living Fossil*, 2010). It is unclear whether insights from the application of its structure and development to the architecture of buildings have been considered with respect to psychosocial development, despite its value as a symbol of educational development and of strategic appropriateness (*New Zealand Curriculum Nautilus, Nautilus Institute for Security and Sustainable Development*). As has been argued in a journal of that name: *Science, too, builds then rebuilds as new evidence is accumulated. Theories are constructed, then subsumed, or even abandoned* (*Chambered Nautilus: a metaphor for science. Nautilus*, 22 April 2013).

With respect to such spiralling, an earlier document discusses the interplay between the **Fibonacci sequence**, aesthetics and the **golden ratio** symbolized by **phi** (*Spiralling around "nothingness" and "pointlessness": the implication of phi*, 2012). In mathematics, the ratio of sequential elements of the Fibonacci sequence approaches the golden ratio asymptotically. Much appreciated in design, that ratio has been recognized in the spiral **phyllotaxis** of plants. A **Fibonacci spiral**, based on that series, closely approximates the **golden spiral** -- a **logarithmic spiral** whose growth factor is the golden ratio.

The construction of the Fibonacci can be discussed separately as providing a framework to hold an evolving pattern of distinctions (*Construction of Fibonacci spiral as providing an open-ended integrative framework*, 2010). The image on the right below lends itself to experimental attribution of the Chinese encoding of patterns of systemic insights, as shown in the image on the left, derived separately (*Experimental attribution of binary codes to Fibonacci pattern*, 2010). This is as an exploration of the relevance of the pattern to sustainable governance (*Fibonacci's magic carpet of games to be played for sustainable global governance*, 2010).



From 4-fold to 5-fold: The image on the right is potentially especially suggestive with respect to the transition from 4-fold thinking to 5-fold thinking. The first four positions (marked 1, 2, 3, 5) complete one turn of the spiral curve. The curve marked 8 starts a new cycle (and is effectively parallel to the first). The next four positions (marked 8, 13, 21, 34) complete a second cycle -- which could be related to 5th-order, 6th-order, 7th-order, and 8th-order thinking.

The Chinese binary coding in the various squares (in the left-hand image) can be understood as a reflection of those different patterns of thinking, ranging from use of a single line (*yin* or *yang* notation), through a set of 4 double lines, a set of 8 triple lines, etc.

From a game-playing perspective, the pattern could be considered as corresponding to a 1-person, 2-person... up to an 8-person game. Each square requires that a more complex game be played (*Succession of dynamic "game-playing arenas"*, 2010) .

As noted above, the pathetic dynamics over centuries between the three Abrahamic religions is indicative of the difficulties of a game of "lower order", whereas that of a "higher order" is indicated by the relations between the set of religions identified by [Stephen Prothero](#) (*God Is Not One: the eight rival religions that run the world -- and why their differences matter*, 2010). Such dysfunctional dynamics exemplify the case for mathematical theology (*Mathematical Theology: Future Science of Confidence in Belief -- self-reflexive global reframing to enable faith-based governance*, 2011).

Each such game can be considered as a form of mirror, as specifically recognized with respect to the so-called "[BaGua mirror](#)", presenting the self-reflexive challenge of how to engage with it in the elaboration and embodiment of scenarios (*Stepping into, or through, the Mirror: embodying alternative scenario patterns*, 2008).

The spiral pattern above can be fruitfully extended into a reverse spiral, variously known as the [Euler spiral](#) or clothoid (*Design considerations and possible implications*, 2010). It is valued as the key to interrelating a linear trajectory with curvature. Given the degree to which *The Patterning Instinct* traces the **linear** progress of human history, the manner in which **curvature** figures in human development is of potential significance (*Clothoid as a psychosocial transition curve: from linear to circular*, 2012) . .

Polyhedral possibilities of interrelating patterns comprehensibly: a "cognitive gearbox"?

It is appropriate to note that patterns of distinctive N-foldness can be related in a memorable manner through the extensively studied sets of spherically symmetrical polyhedra, most notably the 5-fold [Platonic polyhedra](#) and the 13 [Archimedean polyhedra](#). These can each be understood as patterns or systems in their own right, especially as articulated by [Buckminster Fuller](#) (*Synergetics: Explorations in the Geometry of Thinking*, 1975; *Synergetics 2: Further Explorations in the Geometry of Thinking*, 1979). Beyond their use for the purposes of mapping distinctions, the question is how they could be understood as containers or vehicles for the comprehension of the various patterns of meaning in *The Patterning Instinct*, and especially the challenge of Part 5.

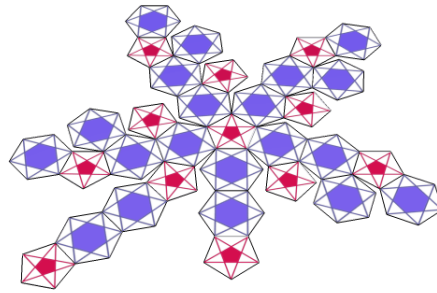
One approach to this possibility is through the complexification of the insight associated with the [Triple Helix model of innovation](#), and the integrative challenges it poses. As discussed separately, this specifically introduces the role of such polyhedra in extending insights to 4-fold, 5-fold, and higher patterns (*Framing Cyclic Revolutionary Emergence of Opposing Symbols of Identity -- Eppure si muove: Biomimetic embedding of N-tuple helices in spherical polyhedra*, 2017).

Specific possibilities. Of relevance to Part 5, these include:

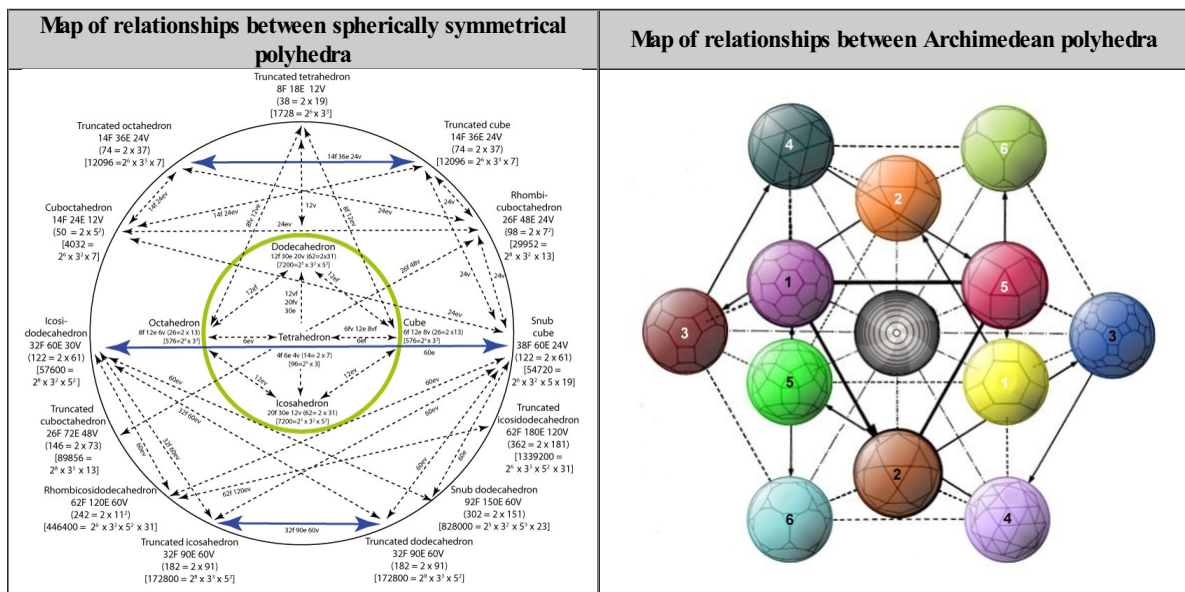
- **From 3-fold to 4-fold:** Irrespective of the sense in which *The Patterning Instinct* describes the 3-fold and 4-fold patterns of Part 3 (3-fold?) and Part 4 (4-fold) as susceptible to historical description, there is clearly a sense in which 3-fold patterns of meaning have yet to be reconciled in relation to 4-fold patterns. This suggests a mapping onto a [cuboctahedron](#). This has 6 square sides and 8 triangular sides (namely 14 sides, 24 edges and 12 vertices). Variant could be similarly used: the [rhombicuboctahedron](#) (12 square sides, 8 triangular sides); [snub cube](#) (6 square sides; 32 triangular sides)
- **From 4-fold to 5-fold:** The [rhombicosidodecahedron](#) can be similarly used to reconcile these patterns. It has 12 pentagonal sides and 30 square sides (namely 62 sides, 120 edges and 60 vertices).
- **From 5-fold to 6-fold:** There is huge global irony to the fact that reconciliation of these patterns is evident in the stitching pattern of the common [association football](#) -- patterned as a [truncated icosahedron](#) (as illustrated in the *Wikipedia* entry). This has 20 hexagonal sides and 12 pentagonal sides (namely 32 sides, 90 edges and 60 vertices).

The inability to think systemically about patterns is further exemplified to an even more dramatic degree by the situation in the Middle East. This can be understood in symbolic terms as a conflict between a 5-fold (Islamic) perspective and a 6-fold (Jewish) perspective -- in the light of the basic symbolism of each, the Islamic star and the Jewish star. The following animation is an experimental animation reconciling those two symbols in a truncated icosahedron (*Middle East Peace Potential through Dynamics in Spherical Geometry: engendering connectivity from incommensurable 5-fold and 6-fold conceptual frameworks*, 2012)

Animation of mapping of 5-fold and 6-fold symbols onto a truncated icosahedron
(generated using [Stella Polyhedron Navigator](#))



Transformational pathways between patterns of N-foldness: Rather than any necessary focus on transformation between **specific patternings of meaning**, the challenge of Part 5 can be reframed as that between distinctive **patterns of meaning more generally**. It is in this sense that the well-studied geometrical transformations between the 18 spherically symmetrical polyhedra (Platonic plus Archimedean) are of interest, especially since they can be variously mapped, with an indication of the variously viable transformations between them. The following schema are discussed separately in *Changing Patterns using Transformation Pathways* (2015). That on the right derives from the remarkable study by [Keith Critchlow](#) (*Order in Space*, 1969).

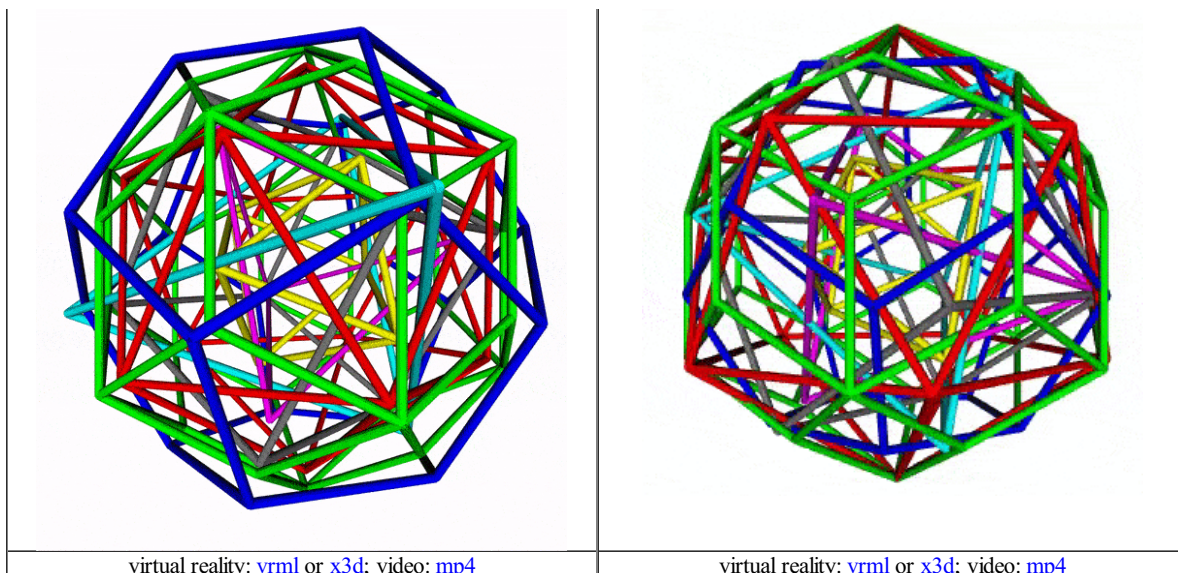


Rather than particular patterns of meaning, and any implied desirability of thinking of a "higher order", this reinforces the sense of the coexistence of distinctive patterns of meaning and the capacity to shift between them. Emerging from the challenge of Part 5, is then not just another pattern of meaning but rather the capacity to shift between a requisite diversity of patterns of meaning -- framing the capacity to encompass the disagreement between them.

Ironically this capacity has effectively been anticipated in the worldwide enthusiasm for [transformer toys](#) and the depiction of [transforming robots in movies](#). This familiarity is far greater than that with respect to tentative arguments for international organizations of "variable geometry".

As noted separately, **no questions seem to be asked as to why related polyhedra are not of significance** -- even when extensively studied by other disciplines, This is especially striking in the case of the [rhombic dodecahedron](#), favoured as a pattern in the study of logical connectivity (*Neglected recognition of logical patterns -- especially of opposition*, 2017). This polyhedron is a geometric dual of the [cuboctahedron](#) whose particular characteristics with respect to transformation between polyhedral forms have been highlighted by Buckminster Fuller.

Pattern transformation through a "cognitive gearbox"? A simpler metaphor is offered by the gearbox enabling the shift between



Speculation regarding a requisite "sixth discipline" and more

Beyond the five patterns of meaning, as identified by Jeremy Lent and associated with the organization of *The Patterning Instinct*, are there more to be identified -- perhaps from other perspectives? This review has taken advantage of the much-cited systemic "fifth discipline" articulated by Peter Senge (*The Fifth Discipline: The Art and Practice of the Learning Organization*, 1990). At that time he is reported to have suggested a "sixth discipline" whose nature is such that it could not be grasped at that time. In making that point in *The Seventh Discipline: the art and science of integrating multinational organizations*, [Michael Stankosky](#) argues:

In my thought-piece on the *Mosaic of Management*, I argued on the need for a framework to integrate all the past theories and practices on management. Events unfolded so rapidly [since 1990] that we need to leapfrog the thinking of an ungraspable 6th, and go to a 7th discipline. We need to come to grips with this if we are to advance in, and deal with, these major paradigm shifts in this 21st century. We cannot be stuck in the dark ages of management, nor the middle ages. We need to be in the age of a renaissance. (*21 for 21: Leading the 21st Century Global Enterprise*, Emerald Group Publishing, 2018, p. 102)

Nature of discipline: Before considering other disciplines variously understood as required to complement or compensate for the perceived inadequacies of the fifth, it is appropriate to note a reflection on disciplinarity as such by Wolff-Michel Roth (*Mathematics in the Everyday World and at Work; prolegomena for rethinking the concept of interdisciplinarity*, In: Bharath Sriraman and Viktor Freiman (Eds), *Interdisciplinarity for the 21st Century: symposium on mathematics and its connection to arts and sciences*, Moncton, 2009, pp. 67-108). Roth argues for the need to the etymological origins of the term in order to recapture the semantic field it now covers. Usage may then be distinguished as:

1. Denoting instruction imparted in a teaching/learning process
2. Denoting a branch of instruction or education
3. Indicative of the sense of formation or training to proper conduct and action
4. Denoting the orderly conduct and action which result from training, namely a trained condition.
5. The sense of order maintained and observed among pupils or others, namely a system of maintenance of order
6. The sense of the system regulating the practice of some institution, notably a church
7. Denoting penance, especially religious penance.
8. Denoting treatment for some special purpose, such as a medical regimen.
9. As used in compound nouns, as in discipline-master indicative of the process through order is kept (p. 104-105)

These overlapping senses help to indicate the prevailing confusion in the distinction between "disciplines", and especially any which may follow the Senge's "fifth" discipline.

Given that focus on "interdisciplinarity", this raises the question of how many "disciplines" (especially in the academic sense) are required to detect the patterns of meaning distinguished in each part of *The Patterning Instinct*? Here the sense of "discipline" is distinct from that of Senge's "fifth discipline", and any assumption that distinctive disciplines might be associated with the earlier parts of *The Patterning Instinct*. How many "disciplines" (in the academic sense) are required to detect an emergent pattern?

Sixth discipline: Reference to such a discipline has variously inspired a quest for a "sixth discipline" -- here to be understood as the emergence of a new pattern of meaning. It has been described as an integrative discipline, which combines all the domains into an integral theoretical and practical whole. (Peter Senge, *The Ecology of Leadership, Leader to Leader*, 1996, 2, p. 21)

Examples include:

- [Is decision making the Sixth Discipline?](#) (Baker Street Publications, 29 September 2013)
- Chuck Pezeshki: [What is the Sixth Discipline? Looking Back at Senge and Systems Thinking](#) (26 July 2015)
- Kate Andrews and Bethany Mickahail: [Business and Social Media: Collaboration for the Sixth Discipline](#) (*Social Media and the Transformation of Interaction in Society*, 2015)

- Harish Midha: *Spirituality in the Workplace: the sixth discipline of a learnig organization*
- David Grebow: *The Sixth Discipline: using learning technology to teach and support the other five disciplines* (Brandon Hall Group, 3 Decembr 2013)
- Godwin Osagie: *The Sixth Discipline: Culture* (31 December 2018)
- Alan Sieler: *Conversational Proficiency: the emergence of the sixth discipline* (Ontological Coaching Institute)
- Elaine Hall and Thomas Gorsuch: *A Sixth Discipline for Future Awareness* (INCOSE, 7, 1997, 1)
- W. Calhoun, et al: *The Six Disciplines of Breakthrough Learning: how to turn training and development into business results* (John Wiley, 2011)
- Tres Roeder: *A Sixth Sense for Project Management* (PMI Global Congress Proceedings, 2009)
- *Six-Discipline Model Tutorial and Course* (SEO University)
- Tamsyn Park: *A Sixth Discipline Senge, The Fifth Discipline*, Chapter 19
- *Operacy*, as the set of cognitive action skills, has been articulated by Edward de Bono in the light of his *Six Thinking Hats* and *Six Action Shoes*

There is some considerable irony to the fact that the most cited reference to a "sixth discipline" is to a work of science fiction (Carmen Webster Buxton, *The Sixth Discipline*, Cracked Mirror Press, 2011)

Other sets of disciplines: Following this pattern, examples of reference to a "seventh discipline", and more, include:

Secular disciplines ("outer-oriented")				
	Ford Motor Company	Vladimir Elie	Christopher Laszlo	
	<i>Eight disciplines problem-solving</i>	<i>Disciplines You Must Develop to Achieve Remarkable Results</i> (2018)	<i>Sustainable Value: How the World's Leading Companies are Doing Well by Doing Good</i> (Stanford University Press, 2008): The Eight Disciplines	<i>Studying of Discipline Learning from the Japanese Nation: Cultural disciplines</i>
1	Plan	Setting clear targets	Understand current value position	Bushido Principle
2	Create a team	Taking action.	Anticipate future expectations	Principle of Samurai Discipline
3	Define and describe the problem	Time management	Set sustainable value goals	Concept of Keishan Culture
4	Contain the problem	Finishing what you start	Design value creation initiatives	Kai Zen Principle
5	Choose corrective actions	Sharpening your skills.	Develop the business case	Positive attitude, morale, loyalty
6	Implement and validate corrective actions	Mastering your habits	Capture the value	Work and time spent in the workplace.
7	Take preventative measures	Associating with the right people.	Validate results and capture learning	Work
8	Congratulate your team	Thinking empowering thoughts	Develop the mind-set, management capability and skills needed to capture shareholder and stakeholder value	Discipline of small problems
9		Keeping your commitment		Work ethic

It is useful to contrast such conventional strategic disciplines with those articulated from a spiritual perspective. This is especially relevant given the increasing influence of religion, notably of a fundamentalist nature, on political processes.

Spiritual disciplines ("inner-oriented")					
	A. R. Weisser	Everett Fritz	Warren Ziegler	John Ortberg	Jack Hayford
	<i>Alaskan Job: the disciplined pursuit of greatness</i> (WestBow Press, 2015)	<i>Freedom: Battle Strategies for Conquering Temptation</i> (Ignatius Press, 2016) Disciplines for Battling toward Purity	<i>Ways of Enspiriting: transformative practices for the Twenty-First Century</i> (Spiritual Learning, 1995)	<i>The Life You've Always Wanted: Spiritual disciplines for ordinary people</i>	<i>Living the Spirit-Formed Life: Growing in the 10 Principles of Spirit-Filled Discipleship</i> (Chosen Books, 2017)
1	Walk with God's light	Prayer	Deep listening™: the empty vessel way	Joy and celebration	Committing to hear God's voice
2	Friendship with God	Writing	Deep questioning™	Solitude	Living in the power of baptism
3	Gather your family	Engaging the Holy Spirit in Prayer	Deep learning™	Prayer	Celebrating the Lord's table
4	Enjoy God's abundance	Protecting Your Eyes	Deep imaging™	Servanthood	Walking in the spirit of gorgiveness
5	Pursue honor	Fasting	Intentioning	Confession	Feeding on the word of God
6	Pursue mercy	Setting Boundaries	Discerning	Guidance from the Holy Spirit	Maintaining integrity of

					heart
7	Execute justice	Accountability	Dialogue	Practice of secrecy	Abiding in the fullness of the Spirit
8	Ready for rough times			Reflecting on Scripture	Living a life of submission
9	Speak wisdom				Practicing solitude
10	Fulfill the covenant				Living as a worshiper

Clarification: breadth vs depth? In a period in which appropriate discipline would appear to be necessary in response to emerging patterns of meaning, the confusion as to how many strategic and cognitive disciplines there are, and how they are organized, is clearly of concern. How are those cited to be distinguished in cognitive terms? As indicated above, how many academic disciplines are required to recognize the existence of a new pattern of meaning?

One approach is to argue that some disciplines are more fundamental in cognitive terms. From that perspective, by contrast, various listings of disciplines could be understood more as practices (even thinking habits), and steps (possibly as a form of checklist). The cognitive disciplines characteristic of the classic [12-step program](#) could be explored in this light. As steps in a checklist, they are readily understood as categories somewhat equivalent in nature.

Another approach is to see additional steps as an "extrapolation" of the logic of the 5-fold pattern previously articulated -- even one that is primarily opportunistic. It is profoundly sad to note that the names of some disciplines have even been made subject to trade-mark under intellectual copyright. Is this intended to limit the scope of those who might refer to them or practice them?

Yet another approach, as partially articulated with respect to the 5-fold ordering above, is to understand each additional discipline as more akin to a new dimension of complexification -- even involving [compactification](#) (analogous to that understood by physicists). This suggests that each then becomes an ever greater challenge to comprehension. The existence of patterns of higher order may be intuited or suggested but that does not mean that they are readily understood. As noted, Senge considered a sixth discipline to be ungraspable. They then become patterns which ought to be meaningful -- if one could but comprehend them. The point could be emphasized through juggling as a metaphor. Given the limited number of objects the average person can juggle (2, 3, 4?), what is the possibility of juggling 7, 8 or 9 disciplines in practice and collectively (*Governance as "juggling" -- Juggling as "governance": Dynamics of braiding incommensurable insights for sustainable governance*, 2018)?

This sense of complexification suggests that such disciplines, and the patterns of meaning they recognize, merit recognition in terms of "depth". Clearly spiritual disciplines may indeed be understood in this way. However there is a complementary sense in which a set of disciplines may be more closely associated with "breadth", namely as a variety of perspectives, even to be understood as practices without necessarily implying any particular depth of understanding. Clearly it may be a matter of debate whether a named discipline is primarily associated with depth or breadth.

A breadth perspective is consistent with [Team Role Inventories](#), as with that of [Meredith Belbin](#) who distinguishes the following "behavioural traits" valuable to a team (Plant, Resource Investigator, Co-ordinator, Shaper, Monitor Evaluator, Teamworker, Implementer, Completer Finisher, Specialist). Such distinctions are variously distinguished from personality types -- with both implying a form of discipline of whatever cognitive depth.

Missing is the systemic insight which would clarify these matters. In comparing the sets of disciplines in the tables, it would seem that the insights cultivated by the early [Society for General Systems Research](#) would be of benefit in exploring the isomorphy of systems -- in this case cognitive systems. The issue is how to compare the functional roles of each discipline independently of the terms in which they are articulated, whilst allowing for issues of conflation and extrapolation.

If patterning of meaning can be fruitfully understood as intuitive, the current confusion raises the question of whether reference should be made to "the" fifth discipline, or any other, rather than to "a" discipline as it is intuitively distinguished according to one's own light

Appreciation of music as a vital clue: Intriguingly it is music that provides a remarkable interface between patterning instinct and patterning intuition -- arguably between "elites" and "populists". Music brings together themes explored above whose connectivity can appear questionable, most notably patterns experienced as of an "inner" cognitive nature and those explicable as "outer". Especially intriguing is the emerging understanding of the cognitive organization of patterns, in the light of topology, the Fibonacci sequence, and the golden ratio. Music could be considered the pattern language *par excellence* -- especially given its widespread comprehensibility and appeal.

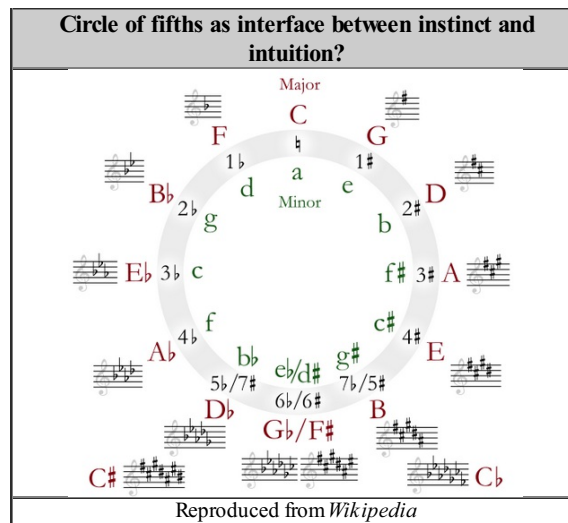
How the future may be apprehended more imaginatively and coherently may depend on such patterning insights. Relevant studies, citing many further references, include:

- [Dmitri Tymoczko](#): *The Geometry of Musical Chords* (2006); *The Geometry of Consonance: Music and Mathematics* (YouTube, 2009); *A Geometry of Music: harmony and counterpoint in the extended common practice* (Oxford University Press, 2011)
- [Diego L. Rapoport](#) and [Jean Claude Pérez](#): *Golden ratio and Klein bottle Logophysics: the keys of the codes of life and cognition* (*Quantum Biosystems*, 9, 2018, 2, pp. 8-76)
- [Julio Emilio Marco-Franco](#): *Art Music in Decline? Time for the Golden Ratio* (Thesis, 2018)

For Tymoczko, for example, a musical chord can be represented as a point in a geometrical space called an [orbifold](#). Line segments represent mappings from the notes of one chord to those of another. Western music lies at the intersection of two seemingly independent

disciplines: [harmony](#) and [counterpoint](#). Counterpoint (or [voice leading](#)) is the technique of connecting the individual notes in a series of chords so as to form simultaneous melodies. The [circle of fifths](#) depicts efficient voice leadings among the [twelve major scales](#).

With respect to the argument above, how might the organization of *The Patterning Instinct* be understood in the light of the circle of fifths? The term 'fifth' defines an interval or mathematical ratio which is the closest and most consonant non-octave interval. The circle of fifths is a sequence of pitches or key tonalities, represented as a circle, in which the next pitch (turning clockwise) is found seven semitones higher than the last.



Any further exploration of patterns in terms of meaning in the light of such configurations would benefit from consideration of the work of musicologist [Ernest McClain](#) (*The Myth of Invariance: the origins of the gods, mathematics and music from the Rg Veda to Plato*, 1978; *Meditations Through the Quran: tonal images in an oral culture*, 1981).

Given the current challenge of contrasting "voices" in society, how might "efficient voice leadings among the twelve major scales" then be comprehended? What indeed are the twelve major scales in global society, as speculatively explored (*Generic Reframing of the 12 Tribes of "Israel"*, 2009)? What part might in future be played by sonification of discourse (*Sonification for subtle pattern recognition*, 2018)? The argument has been development with respect to strategic declarations (*A Singable Earth Charter, EU Constitution or Global Ethic?* 2006).

References

Raymond Abellio. *La Structure Absolue: essai de phénoÉnologie génétique*. Gallimard, 1965

Christopher Alexander:

- *A Pattern Language*. Oxford University Press, 1977
- *The Nature of Order: an essay on the art of building and the nature of the universe*. Center for Environmental Structure, 2003-4. [\[summary\]](#)
- *New Concepts in Complexity Theory: an overview of the four books of the Nature of Order with emphasis on the scientific problems which are raised*. 2003 [\[text\]](#)
- *Harmony-Seeking Computations: a science of non-classical dynamics based on the progressive evolution of the larger whole*. *International Journal for Unconventional Computing (IJUC)*, 5, 2009 [\[text\]](#)

Ron Atkin:

- *Multidimensional Man; can man live in 3-dimensional space?* Penguin, 1981
- *Mathematical Structure in Human Affairs*. Heinemann, 1974

Jacques Attali:

- *Noise: the political economy of music*. University of Minnesota, 1985 (English translation of 1977 edition) [\[text\]](#)
- *Demain, Qui Gouvernera le Monde?* Fayard, 2011
- *A Brief History of the Future*. Arcade Publishing, 2006 [\[summary\]](#)
- *La crise, et après?* Fayard, 2008
- *Survivre aux crises: 7 stratÉgies*. Fayard, 2009

Don Beck and Chris Cowan. *Spiral Dynamics: mastering values, leadership, and change*. Wiley-Blackwell, 1996

John G. Bennett. *The Dramatic Universe*. Bennett Books, 1956 [\[summary\]](#)

J. Berger, B. Hasegawa, J. Hammerman, and R. Kegan. *How consciousness develops adequate complexity to deal with a complex world: the subject-object theory of Robert Kegan*. 2007 [\[text\]](#)

Karen Cerulo. *Never Saw It Coming: cultural challenges to envisioning the worst*. University of Chicago Press, 2006

Keith Critchlow. *Order in Space*. Thames and Hudson, 1969

Edward de Bono. *Six Frames For Thinking About Information*. Vermilion, 2008

Antonio de Nicolas:

- *Four-dimensional Man: meditations through the Rg Veda*. Nicholas Hays, 1978
- *Habits of Mind: an introduction to clinical philosophy*. Authors Choice Press, 2000

Terrence W. Deacon:

- *Incomplete Nature: how mind emerged from matter*. W. W. Norton, 2011
- *What's Missing from Theories of Information?* In: Paul Davies and Niels Henrik Gregersen (Eds.), *Information and the Nature of Reality: From Physics to Metaphysics*. Cambridge University Press, 2010, pp. 146-169 [\[text\]](#)

Johan Galtung and Sohail Inayatullah (Eds.). *Macrohistory and Macrohistorians: perspectives on individual, social and civilizational change*. Praeger, 1997 [\[text\]](#)

Thomas Homer-Dixon. *The Upside of Down: Catastrophe, Creativity, and the Renewal of Civilization*. Knopf. 2006

Robert Kegan:

- *In Over Our Heads: the mental demands of modern life*. Harvard University Press, 1994 [\[text\]](#)
- *What 'form' transforms? A constructive-developmental approach to transformative learning*. In: J. Mezirow (Ed.), *Learning as Transformation: critical perspectives on a theory in progress*. Jossey-Bass, 2000
- *The evolving self: problem and process in human development*. Harvard University Press, 1982 [\[text\]](#)

Mark E. Koltko-Rivera. *The Psychology of Worldviews*. *Review of General Psychology*, 8, 2004, 1, pp. 3-58 [\[text\]](#)

George Lakoff and Mark Johnson. *Philosophy in the Flesh: the embodied mind and its challenge to Western thought*. Basic Books, 1999

Michelle LeBaron. *Cultural and Worldview Frames*. *Beyond Intractability*, Ausut 2003 [\[text\]](#)

Jeremy Lent. *The Patterning Instinct: a cultural history of man's search for meaning*. Prometheus Books, 2017

Ernest G. McClain:

- *The Myth of Invariance: the origins of the gods, mathematics and music from the Rg Veda to Plato*. Shambhala, 1978
- *Meditations Through the Quran: tonal images in an oral culture*. Nicolas-Hays, 1981

Karl Menninger. *Zahlwort und Ziffer: Eine Kulturgeschichte der Zahl: ZÄhlreihe und Zahlsprache. Zahlschrift und Rechnen*. Vandenhoeck and Ruprecht, 1957

Kinhide Mushakoji. *Global Issues and Interparadigmatic Dialogue: essays on multipolar politics*. Meynier, 1988

Bernie Neville. *Out of Our Depth and Treading Water: reflections on consciousness, culture and new learning technologies*. New Learning Technologies Conference, 1998 [\[text\]](#)

Nicholas Rescher:

- *Ignorance: on the wider implications of deficient knowledge*. University of Pittsburgh Press, 2009
- *The Strife of Systems: an essay on the grounds and implications of philosophical diversity*. University of Pittsburgh Press, 1985

Wolff-Michel Roth. *Mathematics in the Everyday World and at Work; prolegomena for rethinking the concept of interdisciplinarity*. In: Bharath Sriraman and Viktor Freiman (Eds), *Interdisciplinarity for the 21st Century: symposium on mathematics and its connection to arts and sciences*, Moncton, 2009, pp. 67-108

Dennis J. D. Sandole, Sean Byrne, Ingrid Sandole-Staroste, Jessica Senehi (Eds.). *Handbook of Conflict Analysis and Resolution*. Routledge, 2008

John Ralston Saul. *The Unconscious Civilization*. Free Press, 1995 [\[summary\]](#)

Peter Senge. *The Fifth Discipline: The Art and Practice of the Learning Organization*. Doubleday, 1990

RenÉ Thom. *Structural Stability and Morphogenesis: an outline of a general theory of models*. W. A. Benjamin, 1972

Susie Tucker, *Enthusiasm: A Study in Semantic Change*. Cambridge University Press, 1972

Marie-Louise von Franz. *Number and Time: reflections leading toward a unification of depth psychology and physics*. Northwestern University Press, 1974

Alexander Wendt:

- *Quantum Mind and Social Science: unifying physical and social ontology*. Cambridge University Press, 2015
- *Social Theory of International Politics*. Cambridge University Press, 1999



This work is licensed under a [Creative Commons Attribution-NonCommercial 4.0 International License](#).

For further updates on this site, [subscribe here](#)