



laetus in praesens

Alternative view of segmented documents via Kairos

18th November 2003 | Draft

Hyperspace Clues to the Psychology of the Pattern that Connects in the light of the 81 *Tao Te Ching* insights

-- / --

This is part of a commentary on the *Tao Te Ching Interpreted Succinctly* ([original order](#)) and ([alternative order](#))
See also [Commentary on Tao Te Ching Interpretation: and the possibility of higher order patterning](#)
Patterning possibilities are presented separately in detail in [9-fold Higher Order Patterning of Tao Te Ching Insights](#)

Context

Field of consciousness and the *Tao Te Ching*

Experiencing the forces of unseen connectivity -- mathematically described

Possibility of nesting disparate systemic insight sets

Possible psychological implications of magic square ordering

Navigating the psychological forces of "communication space"

String theory and modular functions

Cosmology -- Big Bang to Big Crunch

Higher dimensionality as the prime characteristic of human consciousness?

Resonant pattern of associations

Creativity and originality: muses and rasas

Clues to navigation of semantic hyperspace

Cultivating the moment

En-minding the extended body?

Summary

References

Context

This is an exploration of the relevance to higher orderings of the insights of the *Tao Te Ching* of thinking with regard to what is termed hyperspace by mathematicians (understood here to include physicists).

This is necessarily a presumptuous, and possibly foolish, undertaking -- since, for mathematicians, hyperspace requires consideration of at least 10 dimensions and the arduous mathematical training to understand the relevant equations. This exploration must therefore be more of an intuitive, speculative exercise in pointing to suggestive possibilities. There is some consolation in that one renowned physicist, Edward Witten, argues that physics is not about complex calculations: "The essence of it is that physics is about concepts, wanting to understand the concepts, the principles by which the world works"

It is worth noting that several hundred international physics conferences have been convened to explore the consequences of the higher dimensionality associated with hyperspace.

Field of consciousness and the *Tao Te Ching*

The individual, in framing and dealing with reality, can be understood as being at the centre of a field of consciousness offering a range of possibilities. This field can be understood as organized in many ways. The *Tao Te Ching* has long provided a much respected pattern of insights -- possibly to be understood as a distillation of awareness about awareness. For the purposes of this exercise, the focus here is on how the 81 insights of the *Tao Te Ching* might be understood as ordering the range of potential modes of awareness -- both explicit and implicit.

In the accompanying exploration of the [9-fold Higher Order Patterning of Tao Te Ching Insights](#), much attention was given to their possible disposition in a 9x9 matrix -- as an array of insights (disposed in a peacock's tail in some cultural symbolism). Crudely this could then be seen as constituting a kind of setting for a children's game. As with hopscotch, for example, an individual might move from one

cell to another -- with each cell being associated with a different perspective, insight or mode of awareness. And with each cell offering different kinds of connectivity to other cells. The challenge in that exploration was to find more powerfully integrative ways of ordering such an array -- hence the exploration of magic squares, and the possible relevance of mathematical objects of higher dimensionality, such as hypercubes. The emphasis however was on how any such order was to be comprehended.

For mathematicians the exploration of hyperspace (according to the admirable description of Michio Kaku: *Hyperspace*, 1994) is based on the "field" theory originated by Faraday -- inspired by an agricultural metaphor. For him, a field occupies a region of three-dimensional space such that at any point in the space a collection of numbers can be assigned that describes the magnetic or electric force at that point. In its development by Georg Riemann (1854), a collection of numbers at every point could be introduced to indicate how much the space was bent or curved. On a two-dimensional surface, a collection of three numbers at every point completely described the bending of the surface -- whereas in four spatial dimensions a collection of 10 numbers was required at each point to describe its properties.

Riemann's metric tensor in 4 dimensions			
with the information necessary to describe a curved space. In this case, 16 numbers are required to describe each point. 6 of them are redundant (eg $g_{12} = g_{21}$) leaving 10 independent numbers. These can then be arranged in a square array			
g_{11}	g_{12}	g_{13}	g_{14}
g_{21}	g_{22}	g_{23}	g_{24}
g_{31}	g_{32}	g_{33}	g_{34}
g_{41}	g_{42}	g_{43}	g_{44}

With this device Riemann could then describe N-dimensional space with a metric tensor that would then resemble a chess board that was NxN in size. In the quest to provide a unified description, the metric tensor could be expanded to N-dimensional space then portions of it -- in the form of rectangular pieces -- could be identified as corresponding to different forces embodied in the unified description. Whereas Maxwell's classical field equations for electricity and magnetism are 8 in number, these collapse into a single relativistic equation when time is treated as the fourth dimension -- because they then possess a higher symmetry. The development of theoretical physics over the past century has essentially been based on the search for the field equations of the forces of nature.

Riemann's metric tensor in 5 dimensions				
as expanded by Kaluza (adding a fifth column and row) so that the 4-dimensional metric of Einstein could be unified with the electromagnetic field of Maxwell -- unifying the theory of gravity with that of light.				
g_{11}	g_{12}	g_{13}	g_{14}	g_{15}
g_{21}	g_{22}	g_{23}	g_{24}	g_{25}
g_{31}	g_{32}	g_{33}	g_{34}	g_{35}
g_{41}	g_{42}	g_{43}	g_{44}	g_{45}
g_{51}	g_{52}	g_{53}	g_{54}	g_{55}

This approach was then extended by Kaluza, as indicated above, to provide a basis for unifying Einstein's metric with that of Maxwell. Further expanding the metric tensor in this way subsequently allowed all known forces (gravity, electromagnetism, weak and strong nuclear forces, and most fundamental particles) to be integrated into the unified description. Note that by slicing the metric tensor into its rectangular components, these are respectively descriptive of particular forces.

Super Riemann tensor			
expanded with the addition to the fifth dimension of supersymmetry to deal with (some) fundamental particles (adapted from Kaku, 1994)			
Gravity (Einstein)	Light (Maxwell)	Weak+Strong nuclear force (Yang-Mills)	Quarks-leptons (Matter)
Light (Maxwell)	.		
Weak+Strong nuclear force (Yang-Mills)		.	Quarks-leptons (Matter)
Quarks-leptons (Matter)		.	

The question is whether it is fruitful to consider the magic square disposition of the 81 insights of the *Tao Te Ching* (in the accompanying paper) as in anyway corresponding to such a metric tensor. Each numbered insight would then hold an aspect of the information which -- with that associated with other numbers -- would define how much the "communication space" was bent or curved at that point. Recall that the geometry of such curvature in space-time had been determined by Riemann and Einstein to be indicative of the forces operating at that point.

Experiencing the forces of unseen connectivity -- mathematically described

The focus here is on comprehension by the individual in interacting with the contextual reality at any one moment. The question is whether there is any mathematically-based conceptual bridge that would clarify the relationship between "geometry" and "felt forces" in psychological and communication terms -- rather than in the material terms that are the focus of the metric tensor above.

One insightful approach is that of Arthur Young who was inspired by his experience in inventing the Bell helicopter, because of the need for the operator to control movement in three dimensions. His theory of process is a formal analytical model based on number theory,

geometry and topology -- which endeavoured to relate to psychologically-oriented modes of knowledge and insight. Young used this model to help comprehend and integrate a number of disciplines and areas of inquiry. His original study *Geometry of Meaning* (1976), derived from an ordering of 12 dimensionless physical constants, offers a useful basis for exploring a diversity of issues relating to [learning/action cycles](#), [dialogue](#), [sustainable development](#) and experience of [past-present-future complexes](#).

The mathematician who appears to have been most helpful in that respect is Ron Atkin (1972, 1974, 1976, 1977) -- whose ideas he has articulated more accessibly (*Multidimensional man: Can man live in 3-dimensional space?* 1981). Atkin proposed the use of simplicial complexes to analyze connectivity in social systems, like cities, committee structures, etc. Since then, Atkin's ideas have been developed further, resulting in a new combinatorial homotopy theory of simplicial complexes. In this setting, a graded group is associated to a simplicial complex, similar to the fundamental group of a topological space. However, the resulting theory is very different from classical combinatorial homotopy theory. Q-analysis is a combination of geometric and algebraic tools for studying relationships and connectivity among entities in a complex system. The research generalizes the idea of binary relation between two things, which underlies the highly successful theory of graphs and networks. Hypergraphs provide a first extension, allowing edges with more than two vertices. The methodology of q-analysis extends this by considering relational structure and multidimensional connectivity. Atkin was especially interested in traffic on hypergraphs.

A review of the relevance of insights from q-analysis to an understanding of the psychology of operating in complex communication spaces is given separately in *Comprehension: social organization determined by incommunicability of insights* (also in *Comprehension and Organization*). Peter Jackson explores Atkin's ideas on cover set geometry to education (*The Geometry of Intention: values in the creation of curriculae*)

Q-analysis has been used in the social sciences (Cullen, 1983; Macgill, 1985; Seidman, 1983), political science, industrial relations, community studies (Jacobson, 1998), planning (Johnson, 1981; Macgill, 1986), supply chain management (Rakotobe-Joel and Houshmand, 1999) and in organizational analysis [more]. It has been used to solve problems ranging from failure diagnosis in large-scale systems (Isida, 1985), traffic flows, organization of rule-based systems (Duckstein, 1988), multi-criteria decision-making (Chin, 1991). Q-analysis encourages inspection of data without distorting it -- contrasting with the conventional metric approach requiring manipulation of data involving some loss of information.

Using q-analysis for organizational analysis, in the Management of Technology Group of the Simon Fraser University (UK), the focus has been on change decisions and management, which are often the marking points in the life of manufacturing organizations where such analysis has been explored as a change management tool that allows the analysis of the change process. The task involved the analysis of the relationship between various organizational forms in the studied artefacts and their respective characteristics in order to unearth the connectivity between various forms. The result of the analysis was then used to assess the change from one organizational form to another. Keys to success were: (1) confirmation of groupings, (2) verification of evolutionary pattern, (3) exploration of the relationships between organizational forms and characteristics sets [more]. This preoccupation with change processes is of course the core focus of the "sister" classic to the *Tao Te Ching*, namely the *I Ching* (or *Book of Changes*).

Aron Katsenelinboigen (*The Concept of Indeterminism and its Applications: economics, social systems, ethics, artificial intelligence, and aesthetics*, 1997) says of Atkin:

I know of a single daring attempt (which is far from being completed) to formulate a rigorous mathematical procedure to compute predisposition. It was made by the British mathematician Ron Atkin (1972). He developed a concept of connectivity and applied it to such diverse fields as mathematics, politics, military strategy, chess, regional issues, family therapy, interaction of atoms and molecule, etc. (Atkin and Johnson, 1992). In the present context, the merit of Atkin's work is finding the formal language that adequately describes his concept. The formal constructs, borrowed from algebraic topology constitute an important step in the mathematical analysis of the problem, including its application to chess (Atkin, 1972, 1975).

Jacky Legrand (*How far can q-analysis go into social systems understanding?*) provides a detailed critical review of the applicability of q-analysis. She is concerned at the degree of "metaphorical discourse heavily flavoured by the methods of algebraic topology, abstract methodology, practical applications and their relationships" and the need to "separate the syntactic perspective from the semantic perspective". Her major conclusion is that "the gap between metaphorical discussion and woolliness is narrow. The understanding of some of Atkin's ideas has been too intuitive in the past. However the use of graphics as a language is a powerful thinking tool and Atkin has delivered a framework for thought".

Possibility of nesting disparate systemic insight sets

Using, by analogy, the method indicated above of expanding the metric tensor, it is interesting to reflect on the possibility that the psychological "forces" in "communication space" of which an individual might be consciously aware -- or be forced to respond to -- could be represented as nested (and "integrated") in the following way.

Nesting disparate systemic insight sets												
.	1 ²	2 ²	3 ²	4 ²	5 ²	6 ²	7 ²	8 ²	9 ²	10 ²	11 ²	12 ²
.	1	4	9	16	25	36	49	64	81	100	121	144
(Jung types)									/			
(Enneagram)									/			
Myers-Briggs									/			
.									/			

and cognitive unity and balanced simplicity. Influenced by Gestalt psychology, Kurt Lewin (1951) in his psychological field theory thought of psychic energy localized in systems of tension and forces. Needs generate the field within which our potential activities and goals become manifest. Following Lewin, Edward Tolman (1951) considered sensory and cognitive psychological elements as affected by need-push forces activated in an energy system. Sociologists also have used field in this meaning. B. F. Brown (1936), a student of Lewin's, considered social behavior a result of individual needs localized in energy systems of tension and forces [more].

Studies of the origins of chess-type games in different cultures, including 9x9 variants, emphasize the ways in which they reflect the psycho-social forces in play (see Pavle Bidev. *Chess: a mathematical model of the cosmos*, 1979; Ricardo Calvo. *Ancient Gnosis and Chess Evolution*, 1999 and *Continued Extracts on Gnostic Elements in Chess*, 1999). Ricardo Calvo concludes that "The movements of the pieces are based in mathematical considerations that are older than the game of chess itself" [more]. Of special interest are the cross-cultural anthropological studies of the phylogenetic relations between some 40 chess-type games, their connection with divination and the development of the magnetic compass, and the relationship between the current 8x8 variant and the 9x9 variants -- such as the extant **Xiangqi** (Chinese) and **Shogi** (Japanese) (see Gerhard Josten. *Chess: a living fossil*, 2001). It has been argued -- notably in the light of the jumping Rook, together with the movements of all pieces of **Chaturanga** as seen in the numerical arrangement of a magic square of 8x8 (the so-called **Safadi Board**) -- that the chess movements were historically deduced from a "genetic code" of arithmetical operations.

Knight's move: In chess, this is especially interesting given the potential significance of the moves of the knight -- as a "noble" rather than as a "commoner". The strangeness of the knight's move (a *keima* in the Japanese game of *go*), and its numerical symbolism, has traditionally been the focus of hypotheses connecting the origins and structure of chess with secret magical and religious rituals of ancient India.

In their study of its significance, James E. Loder and W. Jim Neidhardt (*The Knight's Move: the relational logic of the spirit in theology and science*, 1992) focus on the expression of complementary thinking that facilitates positive interaction between science and Christian theology. A reviewer, Richard H Bube (*The "Strange Loop" of Complementarity*) notes: "The symbol of 'the Knight's move' refers to the unique move of the chess piece that is the only one not moving in a straight line, as an indicator of a leap of insight or a leap of faith. The book also draws heavily on the symbolism of the Moebius strip, the two-dimensional 'strange loop' twisted in the middle, which has a two-dimensional surface that can be totally traversed with continuous motion along the strip".

The problem of the knight's tour [more] on traditional 64-board in chess was solved by Euler in 1759. Knight's tour and knight's path are special cases of Hamiltonian cycles and Hamiltonian paths in graph theory [In August 2003 it was announced that one of the classical unsolved problems of mathematics, concerning the existence of a path that could be traversed by a knight on an empty numbered 8 x 8 chessboard, had been proven to be without solution].

The move of the knight is used as a metaphor for the unexpected, and illogical, connections between ideas -- invisible to the "commoner". Sidney Cohen described LSD perception as a kind of knight's-move thinking which leaps over logical premises and formal syllogisms. "Knight's move thinking" is even considered a pathological condition of thought disorder denoting a lack of connection between ideas -- an illogicality of the loosening of associations (found in schizophrenia but to be contrasted with the flight of ideas which characterizes hypomania). Strategically it is appreciated as an out-flanking maneuver. [The knight is part of the emblem for the **US Psyops** as a traditional symbol of special operations signifying the ability to influence all types of warfare.]

The knight's move can be used to illustrate how "innovation" can emerge from a point W (below). Whereas the "logical", "linear" moves from W are along any of the grey pathways (whether horizontally, vertically, or diagonally), the knight can move outside this logical framework, first to X, then to Y. In a sense the originality or novelty associated with X is "birthed" by the vertical and diagonal pathways from W. What is "birthed" is in a sense hidden from the linear outlook along the grey pathways from the W perspective.

	Y		Y	
	X'		X'	
Z'				Z'
		W		

The mathematical concern with the knight's tour might perhaps be usefully explored in relation to the cultural Grand Tour considered appropriate to the education of nobility of the 18th century -- through which they learned about the politics, culture, and art of neighboring lands. Psychologically it was an exploration of different realms of "communication space" -- distinct from those accessible through the logical framework of the point of departure.

Other moves: One of the merits of board games, such as chess and *go*, is their capacity to give people a sense of the psychological significance of other moves. One of the merits of certain Eastern martial arts, such as *aikido*, is to extend this to more complex dimensions of communication space. As Clifford Pickover (*The Zen of Magic Squares, Circles, and Stars*, 2002) has noted, since the dawn of civilization humans have invoked such magical patterns to ward off evil and bring good fortune -- yet who would have guessed that in the twenty-first century, mathematicians would be studying magic squares so immense, and in so many dimensions, that the objects defy ordinary human contemplation and visualization?

String theory and modular functions

The scope of the unification in physics achieved by the above generalization of field theory proved inadequate (given the exclusion of certain fundamental particles) to the challenge of a complete "theory of everything" -- integrating space-time and matter. String theory, with its unusual geometry -- strings vibrating self-consistently in 10 or 26 dimensions -- proved to be the missing link. According to Michio Kaku (co-founder of string theory): "The distinguishing feature of a string is that it is one of the most compact ways of storing

vast amounts of data in a way in which information can be replicated" (p. 156). And: "The symmetries of the subatomic realm are but the remnants of the symmetry of higher-dimensional space" (p. 159). As remnants they emerge from the curling up of that space -- as with such visible symmetries as rainbows and crystals.

A major concern for physicists is why string theory is defined self-consistently in only 10 or 26 dimensions. The explanation is associated with the modular functions identified by [Srinivasa Ramanujan](#) (1887-1920) and named after him. As Michio Kaku explains:

When the Ramanujan function is generalized, the number 24 is replaced by the number 8. Thus the critical number for the superstring is 8+2 or 10 [adding two dimensions for the case of relativistic theory]. This is the origin of the tenth dimension. The string vibrates in ten dimensions because it requires these generalized Ramanujan functions in order to remain self-consistent. *In other words, physicists have not the slightest understanding of why ten and 26 dimensions are singled out as the dimension of the string.* It's as though there is some kind of deep numerology being manifested in these functions that no one understands. It is precisely these magic numbers appearing in the elliptic modular function that determines the dimension of space-time to be ten. (p. 173, italics in original).

Despite this, physicists remain mystified as to why such magic numbers emerge so definitively. The 10-dimensional theory of hyperspace remains untestable and Michio Kaku (p. 179) asks the question: "Is beauty, by itself, a physical principle that can be substituted for the lack of experimental verification?"

But, relevant to the possible higher integration within the *Tao Te Ching*, Michio Kaku (p. 172) acknowledges that as mysterious as are the modular functions was the self-taught Ramanujan: "...the strangest man in all of mathematics, probably in the entire history of science. He has been compared to a bursting supernova, illuminating the darkest, most profound corners of mathematics...". The incredible theorems in number theory that he exuded -- "half a dozen new ones, almost every day" -- have aroused wonder at the unconventionality of his thinking processes. He has been described as intuition incarnate (Robert Kanigel, 1991). He is estimated to have produced between three and four thousand theorems -- as many as two-thirds being new to mathematics [[more](#)].

For Jonathan Borwein (*Ramanujan and Pi. Scientific American*, February 1988, p. 112): "He seems to have functioned in a way unlike anybody else we know of. He had such a feel for things that they just flowed out of his brain. Perhaps he didn't see them in any way that's translatable." For Ramanujan, they emerged from his "dreams" inspired by the Hindu goddess Namakkal.

It is curious that, of the mathematicians acknowledged to be the greatest of all time (Archimedes, Euler, Gauss, Jacobi, Newton and Ramanujan), both Ramanujan and Newton were inspired in ways which are considered so irrational that they are an embarrassment to their professional peers. How did Ramanujan's "dreams" work -- given that he believed them to be the inspiration of a goddess? Why was the, spiritually inspired, Newton's work on alchemy -- that he believed to be fundamental to his understanding -- considered irrelevant to his mathematics? Are such eccentricities to be equated with substance abuse as incidental to mathematics -- or do they have a role in "Knight's move thinking"? How does intuition work?

Cosmology -- Big Bang to Big Crunch

As explained by Michio Kaku, introducing the higher dimensions of hyperspace may also be essential for prying loose the secrets of creation. For:

According to hyperspace theory, before the Big Bang, our cosmos was actually a perfect ten-dimensional universe, a world where interdimensional travel was possible. However, this ten-dimensional world was unstable, and eventually "cracked" in two, creating two separate universes: a four- and a six-dimensional universe. The universe in which we live was born in that cosmic cataclysm. Our four-dimensional universe expanded explosively, while our twin six-dimensional universe contracted violently, until it shrank to almost infinitesimal size...The energy that drives the observed expansion of the universe is then found in the collapse of ten-dimensional space and time. (*Hyperspace*, 1994, p. 27)

The current expansion of the four-dimensional universe is eventually expected to go into reverse -- leading to the Big Crunch. Physicist Gerald Feinberg speculated that the one way for intelligent life to avoid this final calamity would be through mastering the secrets of higher-dimensional space -- so that in the final moments of collapse, intelligent life forms may be able to tunnel into high-dimensional space or an alternative universe. The language recalls that of those focused on the rapture of the "end times" Biblical scenario.

From a psychological perspective this concept might be interpreted as an effort to project as far as possible from the present -- into the most inaccessibly distant past -- a "golden era" of integration. And as an effort to project into the inaccessibly distant future -- the possibility of re-integration. This may be consistent with the continuing depersonalized globalization of the world of material value according to a constrained logic -- as matched by the continuing collapse of individual spiritual life, forced to "curl up" into insignificance. It is perhaps no wonder that the importance of drugs and substance abuse is increasing explosively to offer individuals access to "knight's move thinking" (see above) with its more creative freedom of association.

But from a "psycho-spiritual" perspective, it is also interesting to speculate on the possibility that the "communication space" experienced by an individual is subject to an analogous explosive expansion at birth -- and to violent collapse at death. Or, even more intriguing, that such an analogous explosive expansion takes place in any significant moment of creativity in the life of an individual -- to be lost (or quashed) with any subsequent reversion to banality or loss of focus (or meditative concentration). This might accord with some existential and meditative experiences which -- as with many high-energy physical experiments -- would be difficult to demonstrate or replicate.

Higher dimensionality as the prime characteristic of human consciousness?

Physicists make much of how inaccessibly small (10^{-33} cm, the Planck length) is the curled up fifth-dimensional space from which humanity is divorced -- and of how much energy would be required to demonstrate its existence. There is an ultimate irony to the possibility that it is precisely this infinitely small high-dimensional space that is in some way the locus of what scientists have been unable to locate inside the body -- namely whatever constitutes "life" or, in its higher dimensions, "soul" or "spirit". Humans may have a much more intimate relation to such higher dimensions -- in fact this intimacy may be precisely what characterizes consciousness and the sense of selfhood.

It is curious that mathematicians do not wonder at their capacity to wonder at their understanding of such high dimensionality (Kaku, p. 214). Is it not possible that such understanding derives from a degree of correspondence (or resonance) between the dimensionality of the comprehending mindset and that of what it frames as comprehensible?

Is it possible that humans are essentially six-dimensional entities functioning within a four-dimensional space -- or trapped by a mistaken self-image as four-dimensional entities? (see *Metaphoric entrapment in time*, 2000). If light is indeed to be understood by physicists as a vibration in the fifth dimension (a warping of the geometry of higher-dimensional space), what of the sense that someone is "brilliant" (as many physicists are perceived to be, especially Ramanujan) or "enlightened" (as some gurus are perceived to be) or "charismatic" (as with some media personalities) -- others are perceived as "dead", or without a "spark of life". What is the dimensionality of the space within which "good vibes" are detected -- or the "*gravitas*" so important to political success? Such points would correspond to the argument of physicist Peter Freund that the reason the forces of nature appear so fragmented in three-dimensional laboratories is that, like a miserably caged cheetah unable to run, their true home is in higher-dimensional space-time (Kaku, p. 12).

However the concern is to be framed, there remains the possibility that exploration of higher dimensionality offers a means of "escaping" from the catastrophe towards which many perceive life on the planet to be heading in the not too distant future. The question is how to resolve dangerous incompatibilities of perspective driving this tendency by shifting to a perspective of higher dimensionality -- so as to integrate "differences" that manifest so disastrously at lower dimensionality. Not only may higher dimensionality be the ultimate source of unity in the universe (Kaku, p. 15), it may also offer the potential for unity in a globalized psycho-social system subject to self-destructive fragmentation.

Reflection on aspects of these possibilities has been effectively appropriated, and framed, to a large degree by the [Transcendental Meditation](#) movement (notably through research at the [Maharishi University of Management](#)) which argues that the quality of pure self-observation in turn means that the non-material, quantum-mechanical unified field can be identified as the field of pure self-referral consciousness [[more](#) | [more](#)]. Their political response to the problems of the world is articulated worldwide through the [Natural Law Party](#) as coordinated by the [Maharishi International Council of Natural Law Parties](#) and through the World Government for the Age of Enlightenment.

Resonant pattern of associations

As implied above, it would seem that the central psychological dimension of this argument can be developed through the notion of "associations", semantic or otherwise, whether seen in terms of the poetic beauty of their symmetry or through the connectivity that they mark. The emphasis to date appears to have been on simple, or first order, semantic associations which are the immediate priority in information retrieval in "[second generation knowledge management](#)" and the envisaged "[semantic web](#)" [[more](#) | [more](#) | [more](#) | [more](#)]. Higher order associations, as now explored by "[latent semantic analysis](#)" and "high dimensional conceptual space", are another matter [[more](#) | [more](#)].

But in the case of the subtleties of poetic associations, for example, Malcolm Hayward (*[Analysis of a Corpus of Poetry by a Connectionist Model of Poetic Meter](#)*) points out that:

In English poetry, the single most compelling discriminator of that genre -- that which defines a poem as a poem -- has traditionally been its meter. Meter defines the length of the line, and thus the distinctive look of a poem on the page, and it sets, for the hearer of a poem, the telling regularity of a rhythm. Whether this rhythm also carries the burden of some of a poem's meaning or whether it is used only for a conventional aesthetic effect that invites the reader to take pleasure in its regularity or variations, meter is one of the central attributes of the genre of poetry.

Magic numbers, or the symmetry of magic squares, point to degrees of organization of tantalizing significance. They may mark mnemonic highways -- like those described in the methods of calculating prodigies for whom numbers "call to one another" in unusual ways. They may be understood as the fine structure of what Gregory Bateson (*[Mind and Nature: a necessary unity](#)*, 1979) famously described as "the pattern that connects". The question of this paper is whether there is a higher order "pattern that connects" (possibly an "overtone") interweaving the 81 insights of the *Tao Te Ching*.

Static vs Dynamic: Associations may easily be understood in static terms only -- as networks of various kinds (kinship, information exchange, etc). But they may also be understood more fruitfully as dynamic relationships -- as "resonant" -- suggesting analysis in terms of vibrations, as in string theory. Again, if light can be understood as a vibration in a higher-dimensional space, then perhaps this is also the case with aesthetic and mytho-poetic associations. And, like beauty, perhaps humour is a vibration characteristic of certain symmetries in semantic hyperspace -- evoking laughter as a vibration at another level. This would be consistent with some Zen and Taoist "crazy wisdom" perspectives. It also points to the ambiguity of "a-musing" -- as an inhibitor of a muse or as a characteristic of its activity.

Sense of identity: It might be asked to what extent a sense of personal (or collective) identity can be understood as a pattern of

resonant associations. This possibility is indicated, for example, by the manner in which composers are recognized through their music (through their subtleties of "style") -- even in the case of unknown compositions. Would many musicians not prefer to be identified and remembered through the harmonies of their melodies and compositions -- a musical identity or creative style -- rather than through a name (see Raymond A. R. MacDonald, et al (Eds). *Musical Identities*, 2002 [extract])? This musical metaphor can be extended to the "composition" of a person's relationship with the world in daily life (see also Mary Catherine Bateson. *Composing a Life*. 1989) although the directive dimension of composition (by others in the future) needs to be complemented by "interpretation", "improvisation" and "performance" (play in the moment). Or, using a poetic metaphor, as indicated by Wallace Stevens:

"The subject matter of poetry is not that 'collection of solid, static objects extended in space' but the life that is lived in the scene that it composes; and so reality is not that external scene but the life that is lived in it." (*The Necessary Angel*, 1951)

Identity could indeed be understood in terms of self-consistency and degree of connectivity. What is lost when a person is described as "losing it"? How is the classical philosophical and spiritual question -- "who am I" -- to be understood in relation to identity established in terms of higher-dimensional connectivity?

Higher dimensional identity is not something reserved for mathematical or creative geniuses -- or for the spiritually enlightened. It manifests variously in maturity, gravitas, humour, charm, etc that are beyond the conventional socio-economic and psychological definitions of humans. It is only "distant" or "insignificant" to the extent that the focus is on the four-dimensional material reality of space-time. Why are some songs widely popular as carriers of the *Zeitgeist* of a period? Do they in some way sustain a pattern of identity? Can the personality type frameworks of Jung, through Myers-Briggs for example, be usefully reframed in terms of patterns of connectivity across a magic square as suggested by John C. Gonsowski (*Personality, Physics and Spirituality: a common geometry*, 2001)?

Creativity and originality: muses and rasas

The 9-fold organization of the *Tao Te Ching* was explored in terms of magic squares (in the [accompanying commentary](#)). It might be asked whether there is any possibility that it may also have a 9-fold organization, from an aesthetic perspective, that might in some way be consonant with the mathematical ordering. For a creative person, especially in the arts, the psychological significance of an inner "muse" may well be perceived as essential. A muse might be understood as a catalyst for the connectivity of the "pattern that connects". There is a case therefore for looking at the variety of muses -- presumably eliciting different kinds or qualities of connectivity. In classical Greece and Rome, 9 such goddesses were identified as sources of inspiration in the arts and sciences (see Angeles Arrien. *The Nine Muses: a mythological path to creativity*. 2000).

Muses and their domains	
Muse name	Muse domain
Calliope	Epic Poetry
Clio	History
Erato	Love Poetry
Euterpe	Music
Melpomene	Tragedy
Polyhymnia	Sacred Poetry
Terpsichore	Dancing
Thalia	Comedy
Urania	Astronomy

Whilst the nine muses are identified here in terms of aesthetic **form**, a classical Indian analogue, the *nava rasa* (or nine sentiments), emphasizes the aesthetic **quality** in the performing arts (music, dance, drama or poetry) that colour the mind with a particular feeling, sentiment, passion or emotion.

Nava rase and their domains	
Rasa name	Rasa domain
shringara	love, sensual, romantic, erotic
hasya	humour, happiness
karuna	sympathy, compassion, sadness
raudra / krodha	anger, fury
veera / viraam	heroism, courage, majesty
bhayanaka / bhaya	fear, terror
vibhatsaya / bhibasta	disgust
adabhuta	wonder, amazement, surprise
shanta	peace, serenity, tranquility

Presumably, in some way, such qualities are essential to the experience of the field of consciousness for which the *Tao Te Ching* supplies marker insights. In music, for example, the structure of each *raga* -- the main form of Indian classical music -- and the melodic movement within its framework, are governed by definite and extensive rules. The technique of a *raga* consists in the use of certain fixed notes and microtones to the deliberate exclusion of others. Within this fixed framework, however, there is unlimited scope for improvisation. *Rasa* literally means juice (recalling the concern with the flow of "creative juices" along certain pathways), but in a musical context, it refers to the mood or sentiment created by a *raga*. In theory, if every permissible permutation and combination of

notes was exploited, it would yield 38,000 ragas -- as it is only about 200 are common [more].

Ramanujan articulated the influences on his thinking explicitly in terms of a goddess, Namakkal, that was the source of his "dreams". Ramanujan's sense of self-identity cannot be usefully said to be centered in four-dimensional space, when his life's preoccupations were of higher dimensionality. In his case, the muse is the catalyst for access to the "music of the spheres". It is the artist's muse that sustains the pattern of connectivity -- the "semantic music" -- essential to creativity. In its absence, the artist is left bereft. Connectivity may in this sense be understood as coming and going -- rising and falling like a tide -- as access to higher dimensionality is gained or lost. One of the charms of learning is acquiring access to such connectivity -- enculturation -- later to be followed by the tragedy of its dissolution ("losing it") with loss of memory and senility.

What indeed is creativity in this context? How might it be defined in terms of mathematical discovery of new patterns of associations -- engendering "semantic flowers" as attractors? From where do they emerge? The term "originality" can also usefully imply a return to an "origin" -- suggesting a sense in which this might, in some measure, be a return to the perspective of 10-dimensional integrity from which perceptible patterns of symmetry emerged.

An aesthetic perspective opens the possibility of the different rasas (or muses) being evoked in various combinations. In the case of the Indian tradition -- through the legend of the [Vastu Purusha Mandala](#) -- the 9-fold organization of aesthetic quality is fundamental to marking out a space of 9x9 squares that is the basis of Vastu Vedic architecture and design, notably in defining a courtyard. This might be understood as the projection of a higher dimensional order onto a two-dimensional pattern open to experience. Other square patterns are also used [more] to optimize "energy" distribution according to what is effectively the Vedic equivalent of *feng shui* (see also B B Puri. *Vastu Science for 21 Century*, 2003). Such spaces may be walked and experienced in ways that recall early western use of mnemonic architecture (see Frances Yates. *The Art of Memory*, 1966).

Aesthetically, an individual ("X" in the table below) might then be understood as subject to a confluence (or configuration) of influences in exploring the squares of the space (as indicated, at one moment, by an assumed combination of *rasa* "mind colourings" in the table below). A given influence might be reinforced if it was conveyed directly through contiguous squares (whether vertically, horizontally, or along a diagonal) and inhibited in the absence of any such direct connectivity -- as illustrated by the coloured squares below. Any "magic square" properties to the confluence would then enhance such influences -- through bringing to bear secondary aesthetic associations (not shown). The space may of course be 2-dimensional in a physical walk, or multi-dimensional in the case of a mind-walk.

Speculative configuration of influences									
.	1	2	3	4	5	6	7	8	9
1
2
3
4
5
6	.	.	X
7
8
9

In David Engwicht's study of [The connection between religion and urban planning](#), he notes the recognition that in India:

...the vastu-purusha mandala is an image of the laws governing the cosmos, to which men are just as subject as is the earth on which they build. In their activities as builders men order their environment in the same way as once in the past Brahma forced the undefined purusha into a geometric form... building is an act of bringing disordered existence into conformity with the basic laws that govern it. This can only be achieved by making each monument, from the hermit's retreat to the layout of a city, follow exactly the magic diagram of the vastu-purusha mandala.

A pattern of associations, whether in a conceptual scheme alone or embodied in architecture, might usefully be understood as a receiver of energy -- functioning like an aerial array in response to vibrations of higher dimensionality -- whether spiritual inspiration or the insights received by Ramanujan. The vibrations of music and song may in this way act as a source of invigorating energy, nourishment and coherence.

Clues to navigation of semantic hyperspace

In the light of such possibilities, there is merit in considering whether it is not only mathematicians that have the capacity and the tools to reflect coherently on higher-dimensionality. Studies over recent years by physicists and others have explored the "physics of consciousness", notably in the light of insights from so-called mystics and from various spiritual traditions. Some of the frameworks integrating such insights have been reviewed in a separate paper: [Navigating Alternative Conceptual Realities: clues to the dynamics of enacting new paradigms through movement](#) (2002). There is also the intriguing isomorphism identified in another paper [Entering Alternative Realities -- Astronautics vs Noonautics: isomorphism between launching aerospace vehicles and launching vehicles of awareness](#) (2002).

Michio Kaku (p. 11) argues that the incapacity of humans to visualize four dimensions is due to lack of selection processes to develop such skills -- in the absence of people needing to respond to "lions and tigers" leaping at them out of the fourth dimension. It could however be argued that other responses have been developed to higher dimensional "wildlife" -- but these are not associated with the

sense of sight. He notes (p. 12) that the laws of nature become simpler and more elegant when expressed in higher dimensions, but it may also be the case that the appreciation of the wilder harmonies of nature -- by poets and deep ecologists, for example -- derive from senses unrelated to the three-dimensional world.

Interdimensional travel: Higher dimensionality may be evident in the resonant associations characteristic of a pattern of sustained and skillful repartee within a group -- beyond the formal, rule-bound constraints of verbal tennis. The thematic interplay on multiple semantic keyboards suggests a facility of transition -- through semantic wormholes -- beyond disparate semantic universes.

Michio Kaku explores the future possibility of inter-dimensional travel -- wormholes between parallel universes -- once facility with the six curled up dimensions is developed. How are the skills of transdisciplinarity -- and of a polymath -- to be compared with this? Might the challenge of interdisciplinary and intersectoral thinking be clarified if framed in terms of opening semantic wormholes? (see also *Transdisciplinarity-3 as the emergence of patterned experience* 1994). Is it possible that, in contrast to conventional text, knowledge will in future be organized and hyperlinked on the basis of some kind of higher dimensional "magic square" pattern enhanced mnemonically by aesthetic associations (see, for example, *Structuring Mnemonic Encoding of Development Plans and Ethical Charters using Musical Leitmotifs*, 2001)?

For those prepared to set aside physical attributes, social status and pheromones, how then to understand the nature of mutual attraction and love (or antipathy)? To what extent is it a form of higher dimensional pattern matching and "goodness of fit"? To what extent might people be understood to function as "stargates" -- pulling each other across semantic hyperspace (see *People as Stargates: an alternative perspective on human relationships in space-time*, 1997)?

Time travel: The possibility of time travel, in the light of hyperspace theory, is also explored by Michio Kaku. The nature of time travel from a psychological perspective is perhaps usefully indicated by the classic verse of the poet T S Eliot: "We shall not cease from exploration / And the end of all our exploring / Will be to arrive where we started / And know the place for the first time" (*Little Gidding*, 1943). A cyclic return to the point of origin.

As Kaku (p. 95) notes with reference to the experience of living in hyperspace: "The counterintuitive stunts that are possible in a hypersphere are physically interesting because many cosmologists believe that our universe is actually a large hypersphere." But Eliot's poetic account may apply even more appropriately to the six-dimensional "curled up" framework which may be the nature of the individual cognitive environment of humans.

Antonio de Nicolas offers a powerful insight into such time travel in his poetic exploration of *Remembering the God to Come* (2000) -- whose title emphasizes the cognitive role in (re)assembling a degree of integration in the light of implicit knowledge of its nature. Curiously, it is in an alternative community, *Damanhur*, that the most active experiments in time travel are undertaken -- in part dependent on appropriate psychological training (see *Timeship: Conception, Technology, Design, Embodiment and Operation*, 2003)

Cultivating the moment

As a philosopher, Antonio de Nicolas (1978) points to the role of music or song, embodied in the moment, to engender coherence in the present. He uses the non-Boolean logic of quantum mechanics of Patrick Heelan (*The logic of changing classificatory frameworks*, 1974) to explore the epistemological significance of cognitive experience grounded in tone and the shifting relationships between tone in the *Rg Veda*. For him, it is through the pattern of musical tones that the significance of the *Rg Veda* is to be found:

"Therefore, from a linguistic and cultural perspective, we have to be aware that we are dealing with a language where tonal and arithmetical relations establish the epistemological invariances... Language grounded in music is grounded thereby on context dependency; any tone can have any possible relation to other tones, and the shift from one tone to another, which alone makes melody possible, is a shift in perspective which the singer himself embodies. Any perspective (tone) must be "sacrificed" for a new one to come into being; the song is a radical activity which requires innovation while maintaining continuity, and the "world" is the creation of the singer, who shares its dimensions with the song." (1978, p. 57)

This offers new dimensions to sacrifice that contrast with those required by contemporary economics.

The physical effects of resonance from sound and vibration are well known (for example, Chladni patterns in [two](#) and [three](#) dimensions [[more](#)]). Can psychological analogues be set up to engender the future and exert a time-binding force? Meditation on yantras and mandalas would seem to have a related function -- traditionally linked to the magic squares discussed in the [accompanying paper](#). Within such a context, can analogues to overtones function as vehicles for particular forms of understanding? As indicated there, interesting [patterns](#) can be generated from magic squares when the numbers of the squares are replaced by symmetric symbols. These resemble Chladni patterns. Whether the magic square (or higher dimensional) patterns can be more readily comprehended through use of [auditory display](#) techniques (see NSF *The Sonification Report*), as seems highly probable, remains to be discovered. This could be a valuable way to explore and navigate comprehension of the relationships between the 81 insights of the *Tao Te Ching* -- especially in the light of any insights concerning Indian *rasas* (see above). Lars Kindermann's downloadable *MusiNum: The Music in the Numbers* software -- and its experimental use in the [Elenyscope](#) -- is an interesting step. [See very preliminary experiments in separate paper *Musical Articulation of Pattern of Tao Te Ching Insights: Experimental sonification based on magic square organization*, 2003]

There is a poetic irony to the manner in which this argument suggests that the appropriate relationship to experience in the moment is effectively through its "cultivation" as a field of consciousness -- given Faraday's original use of the agricultural "field" metaphor as a basis for the field theory that has been so fundamental to hyperspace theory. Other valuable insights may be associated with such metaphoric correspondence in exploring the psychological dimensions of the global concern with sustainability on a planet facing catastrophe (see *Psychology of Sustainability: Embodying cyclic environmental processes*, 2002).

En-minding the extended body?

From a cognitive perspective, the dynamic between the four-dimensional world of space-time and the six-dimensional world, within a ten-dimensional framework, can be usefully explored in the light of [enactivism](#), as developed by Francisco Varela and colleagues (Natalie Depraz et al. *On Becoming Aware: a pragmatics of experiencing*, 2003), notably (*Laying Down a Path in Walking*, 1987) and with others (*The Embodied Mind: cognitive science and human expression*, 1991). In this light, the question of how an individual might sustain a resonant pattern of associations in relation to a natural environment -- in whose (re)definition he or she is continually engaged -- is explored separately (*En-minding the Extended Body: Enactive engagement in conceptual shapeshifting and deep ecology*, 2003)

In the light of the above, Feinberg's speculation regarding the possibility of intelligent life surviving by tunnelling through to the six-dimensional context in the final phases of the Big Crunch (when such access becomes physically more feasible), can usefully be reframed as a far-from-distant possibility. Aside from the possibility of a purely religious framing (conversion, rapture, "end-times" scenarios, and the like), the analysis has the quality of a somewhat artificial polarization, or contradiction, recalling the centuries of "body vs mind" debate. It ignores other, and more intimate, ways of exploring the nature of death and the framework within which it is understood to take place.

The Romantic poet-philosopher [Novalis](#) (1772-1801) is merely one of many to argue that: "To annihilate the principle of contradiction is perhaps the supreme task of higher logic". But for Hegel: "...the life of the mind is not one that shuns death, and keeps clear of destruction; it endures its death and in death maintains its being. It only wins to its truth when it finds itself in utter contradiction".

Such perspectives could be considered natural within the field of insights of the *Tao Te Ching*, which -- at one level -- encourages an unseemly search by some Taoists for forms of immortality inconsistent with its own highest insights (as with the preoccupation of other religions with a "place in Heaven"). This ignores higher orderings of those insights that may legitimate the kinds of "crazy wisdom" perspective of Taoists and Zen (see, for example, Perle Besserman, Manfred Steger. *Crazy Clouds: Zen Radicals, Rebels and Reformers*, 1991). Physicists have their own take on the need for such "craziness", as illustrated by the much-quoted statement by Niels Bohr in response to Wolfgang Pauli: "We are all agreed that your theory is crazy. The question which divides us is whether it is crazy enough to have a chance of being correct. My own feeling is that is not crazy enough." To that Freeman Dyson added:

"When a great innovation appears, it will almost certainly be in a muddled, incomplete and confusing form. To the discoverer, himself, it will be only half understood; to everyone else, it will be a mystery. For any speculation which does not at first glance look crazy, there is no hope!" (Innovation in Physics, *Scientific American*, 199, No. 3, September 1958)

Again there may be a poetic irony to the secret of immortality buried (*à la* Umberto Eco) in the word itself -- whether "I'm-mortality", or the "I-mortality" for which many mystics quest. Within any more highly ordered array of insights marked out by the *Tao Te Ching*, for example, the key to such "I-mortality" is well put by Reshad Feild in Sufi terms as the cognitive challenge of "removing the point" from which one views. Higher mathematical orderings of the 81 insights of the *Tao Te Ching* are a powerful guide to doing so.

Summary

The argument in this paper may be understood as a succession of steps:

1. **Complete set of insights:** The 81 insights of the *Tao Te Ching* are considered as a complete and comprehensive set which is a challenge to comprehension.
2. **Classification:** Consideration of the possibility of the classification of such insights, notably in tabular or matrix form, to obtain some sense of pattern.
3. **Patterning across categories:** The possibility that relationships between insights may constitute a pattern of associations of higher order than the simpler implications of any matrix. Insights from the mathematics of magic squares can be used as one tool for suggesting a possible basis for such a pattern.
4. **Aesthetic image:** There is a real challenge to deriving integrative meaning from a pattern of association between seemingly disparate insights, especially if mnemonic qualities are required. The power of appropriate aesthetics may be used to enhance comprehension of complex patterns. Distinct semantic "threads" may then be fruitfully woven together -- perhaps a "magic carpet".
5. **System:** The operational significance of a pattern of associations also needs to be clarified as a system of interacting forces to which a person is subject -- or within which a person can act. This dynamic, interactive perspective can notably be explored through the sense of possible moves in games (as in chess).
6. **Resonance:** The systemic forces can be understood -- and even experienced -- as vibrations within some form of field which may have qualitative attributes. Such vibrations may interact to provide unexpected resonance effects that can also be appreciated aesthetically.
7. **Emergent order:** Resonance effects between insights can be understood as resulting in emergent forms of higher order ("overtones") -- namely semantically subtler forms of meaning.
8. **Enactivism:** The apparently external reality of any pattern of resonance amongst insights may be understood as engendered by the perceiver ("Laying down the path through walking"). A diversity of alternative patterns may be generated in this way.
9. **Identity:** Engagement with engendered patterns of order enables a new sense of identity -- subtler to the extent that the pattern is of higher order.

8: Enactivism	1: Insights	6: Resonance
3: Patterning	5: System	7: Emergence

It may that the distribution of the above steps within the framework of the Lo Shu magic square suggests clusters of meaning -- by row, by column or by diagonal.

References

(Additional references are provided in the text above and in the [associated commentary](#))

Ron Atkin:

- From cohomology in physics to q-connectivity in social science. *International Journal of Man-Machines Studies*, , 4, 1972, pp. 341-362.
- Mathematical Structure in Human Affairs. Heinemann, 1974
- An algebra for patterns on a complex II. *International Journal of Man-Machines Studies* vol. 8, 1976, pp. 483-498.
- Combinatorial Connectivities in Social Systems. Birkhäuser Verlag. 1977

Ron Atkin and J. Johnson. The Concept of Connectivity (Paper presented at the International Symposium Calculus of Predisposition, Philadelphia, Penn)., 1992.

Michel Bernard. Mesurer le mètre : poésie et statistiques. Actes de la 52e Session de l'Institut International de Statistique, 10-18 août 1999, Helsinki, *Bulletin de l'Institut International de Statistique*, Tome LVIII, 1999 [[bibliography](#)]

Paul Bourke. Chladni Plate Mathematics. 2003 [[text and diagrams](#)]

J. L. Casti. Topological methods for social and behavioural systems. *International Journal of General Systems* vol. 8(4), 1982, 187-210.

C. J. Colbourn, J. H. Dinitz and D. R. Stinson. Applications of Combinatorial Designs to Communications, Cryptography, and Networking. 1999 [[text](#)]

Philip J. Davis and Reuben Hersh. The Mathematical Experience. Houghton-Mifflin, 1998

Antonio de Nicolas. Meditations through the Rg Veda. Shambhala, 1978

Natalie Depraz, Francisco J. Varela and Pierre Vermersch. On Becoming Aware: a pragmatics of experiencing. (Advances in Consciousness Research, 43), John Benjamins, 2003

L. Duckstein, P. H. Bartels and J. E. Weber. Organization of a knowledge base by Q-analysis. *Applied Mathematics and Computation*, 26(4), 1988, pp. 289-301.

John Fudjack and Patricia Dinkelaker. The Enneagram as Classic 'Double Mandala': The 'I Ching' and other 'Divination Machines'. (Part I) March 1999 [[text](#)]

George Gadanidis and Cornelia Hoogland. Mathematics as story. 2002 [[text](#)]

Peter Gardenfors. Conceptual Spaces: the geometry of thought. MIT Press, 2000

John C Gonsowski. Personality, Physics and Spirituality: a common geometry, 2001 [[text](#)]

J. Hadamard. The Psychology of Invention in the Mathematical Field. Princeton University Press, 1984.

Malcolm Hayward. Analysis of a Corpus of Poetry by a Connectionist Model of Poetic Meter [[text](#)]

P. A. Heelan. The Logic of Changing Classificatory Frameworks. In: J A Wojciechowski (Ed). Conceptual Basis of the Classification of Knowledge. K G Saur, 1974, pp. 260-274

P. A. Heelan. Music as basic metaphor and deep structure in Plato and in ancient cultures. *Journal of Social and Biological Structures*, 2, 1979, 4, pp 279-291

Peter Jackson. The Geometry of Intention: values in the creation of curriculae [[text](#)]

Michio Kaku. Hyperspace: a scientific odyssey through the 10th dimension. Oxford University Press, 1994

Robert Kanigel. The Man Who Knew Infinity: a life of the genius Ramanujan. Charles Scribner, 1991.

Aron Katsenelinboigen and M. Mandelbaum (Eds.). An Aesthetic Approach to Life, History, Society, Business, Science, Art, and Literature. Pennsylvania Friends of Art, 1997

Aron Katsenelinboigen. The Concept of Indeterminism and its Applications: economics, social systems, ethics, artificial intelligence, and aesthetics. Praeger, 1997 [[text](#)]

Boicho Kokinov and Robert M. French. Computational Models of Analogy-Making. In: *The Macmillan Encyclopedia of the Cognitive Sciences* [[text](#)]

Jacky Legrand. How far can Q-analysis go into social systems understanding ? [[text](#)]

V. Lefebvre. The Structure of Awareness: toward a symbolic language of human reflexion. Sage Publications, 1977.

Kurt Lewin. Resolving Social Conflicts and Field Theory in Social Science. American Psychological Association, 1997

Chris Lucas. Evolving an Integral Ecology of Mind. 2002 [[text](#)]

Ernest G. McClain. The Pythagorean Plato: prelude to the song itself. Nicolas-Hays, 1978 [[texts](#)]

H. Meschkowski. Ways of Thought of Great Mathematicians. San Francisco, Holden-Day, 1964 (tr. John Dyer-Bennett)

Edwina R Michener. The Epistemology and Associative Representation of Mathematical Theories. MIT, Doctoral thesis, 1977

Jeffrey Mishlove. Consciousness and the New Physics [[text](#)]

V. V. Nalimov. Realms of the Unconscious: the enchanted frontier. Philadelphia, ISI Press, 1982 [[review](#)]

V. V. Nalimov. In the Labyrinths of Language: a mathematician's journey. Philadelphia, ISI Press, 1981 (Edited by Robert G Colodny)

Jonathan Opie. Consciousness: a connectionist perspective. University of Adelaide, 1998 [[text](#)]

Seymour Papert. The Mathematical Unconscious. In: Judith Wechsler (Ed.). On Aesthetics in Science. MIT Press, 1978, pp. 105-121

K. Srinivasa Rao and G Vanden Berghe. Gauss, Ramanujan and Hypergeometric Series Revisited, 1999 [[text](#)]

Mondo Sector. The 'Zhou Yi' Hexagram Sequence: an authentic, intended binary system discloses a rational, bilateral mathematical symmetry (Paper for the 8th International Conference on the History of Science in China) [[abstract](#)]

Mondo Sector. Locating the Self in the No-Self: The I-Ching as Metaphor for Six-Dimensional Reality. (Paper for the Society for the Conference on the Anthropology of Consciousness, 1997 Berkeley, California)

Bengt Sigurd. Computer simulation of word associations and crossword solving. Lund University, Dept. of Linguistics, 1 Working Papers 45 (1996), 157-166 [[text](#)]

B. Smith. Poetic Closure: a study of how poems end. University of Chicago Press, 1968.

M. Smithson. Ignorance and Uncertainty: emerging paradigms. Springer-Verlag, 1989.

Eugene Stivers and Susan A. Whellan (Eds.). The Lewin Legacy: Field Theory in Current Practice. Springer-Verlag, 1986 (Recent Research in Psychology)

Gabriel Stolzenberg. Can an inquiry into the foundation of mathematics tell us anything interesting about mind? In George Miller and E. Lenneberg (Eds). Psychology and Biology of Language and Thought. New York, Academic Press, 1978

Francisco Varela, Evan Thompson and Eleanor Roach. The Embodied Mind: cognitive science and human expression. MIT Press, 1991

Francisco Varela. Laying down a path in walking. In: W. Thompson (Ed.), Gaia: A way of knowing. (pp. 48-64). Lindisfarne Press, 1987

Ken Wilber (Ed.). Quantum Questions: mystical writings of the world's great physicists. Shambhala, 1984.

Arthur Young. The Geometry of Meaning. Robert Briggs Associates, 1976

V. Zubarev. Systems Approach and the Mytholiterary Continuum. Greenwood Press, 1997.



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

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