



laetus in praesens

Alternative view of segmented documents via Kairos

13 April 2012 | Draft

Enabling Wisdom Dynamically within Intertwined Tori

Requisite resonance in global knowledge architecture

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Introduction

The theme emerged from consideration of how wisdom could be rendered into more compact form for dissemination on Twitter, constrained by the 140 character limitation on any tweet message. The example explored was the set of 48 Zen *koan* assembled in a classic collection compiled in 1228 by the Chinese Zen master [Wumen Hui-k'ai](#). The collection is known Mandarin as *Wúménguan* and in Japanese as *Mumonkan*. *Chan Zong Wumen Guan* commonly translated in English as *The Gateless Gate*, although the implications of this are contested -- as evident in the translation by [Robert Aitken](#) (*The Gateless Barrier*, 1991). A 49th *koan*, which appeared in a classic edition, has also been considered part of the set. Of particular interest was how the set could be configured and portrayed for greater comprehension and memorability, most notably using polyhedra. This was explored in an earlier document ([Configuring a Set of Zen Koan as a Wisdom Container: formatting the Gateless Gate for Twitter](#), 2012).

In this further development of that argument account is also taken of the wisdom traditionally associated with the set of 64 conditions denoted by the binary coding system of the *I Ching* as previously explored, especially in the light of its traditional importance to decision-making and governance within Chinese culture ([Transformation Metaphors -- derived experimentally from the Chinese Book of Changes \(I Ching\) for sustainable dialogue, vision, conferencing, policy, network, community and lifestyle](#), 1997). The two sets are seen as offering very convenient case studies of how a complex set of subtle insights can be "packaged" through forms which enhance the capacity to comprehend their integrity.

In considering the importance of "configuration" in relation to knowledge and insight, the current recognition of the need for a radically different computer architecture is noted with respect to 3D connectivity of memory through the form of a torus as now used in supercomputers. The reasons for this mode of organization bear a remarkable similarity to the issues in governance and decision-making now severely constrained by information overload and issues of connectivity within complex organizations and knowledge structures.

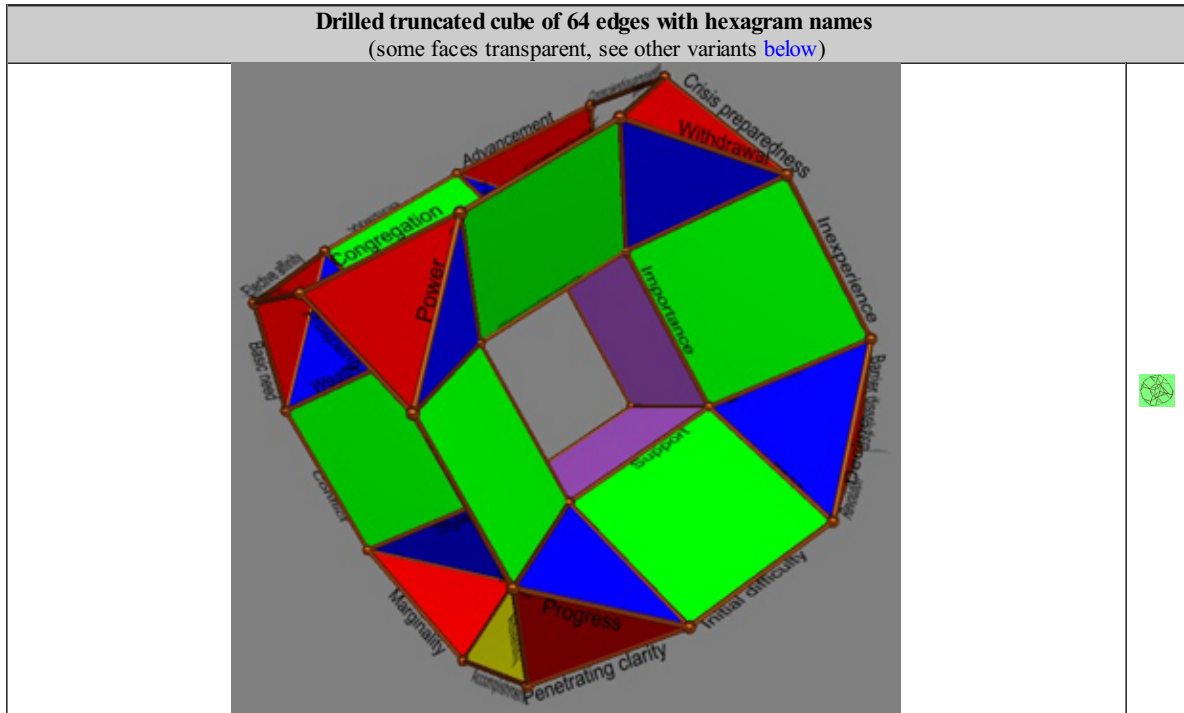
A further thread to this argument is the recognition that the most fundamental molecular structure essential to the biology of life -- the ring structure of the benzene molecule -- is recognized as misconceived when considered as a static configuration of bonds as so readily represented. An essential feature of the structure is the dynamics of the reconfiguration of its bonds -- from which its viability and integrity derives. The possibility that knowledge architecture -- and the emergence of sustaining wisdom -- may depend on a form of resonance is related to the above considerations in the following argument. "Wisdom" may then be fruitfully recognized as an emergent dynamic subsequent to that enabling "life".

As noted with respect to the [introductory paper](#), it might well be said that global governance could certainly do with a "gateless gate" through which to transcend the polarized thinking into which it so frequently sinks. The argument here is that, in order to hold coherently the pattern of insights on which survival depends, the challenge is how to "package wisdom" so that its implications for viable governance can be comprehended "at a glance".

Toroidal mappings of wisdom questions and answers

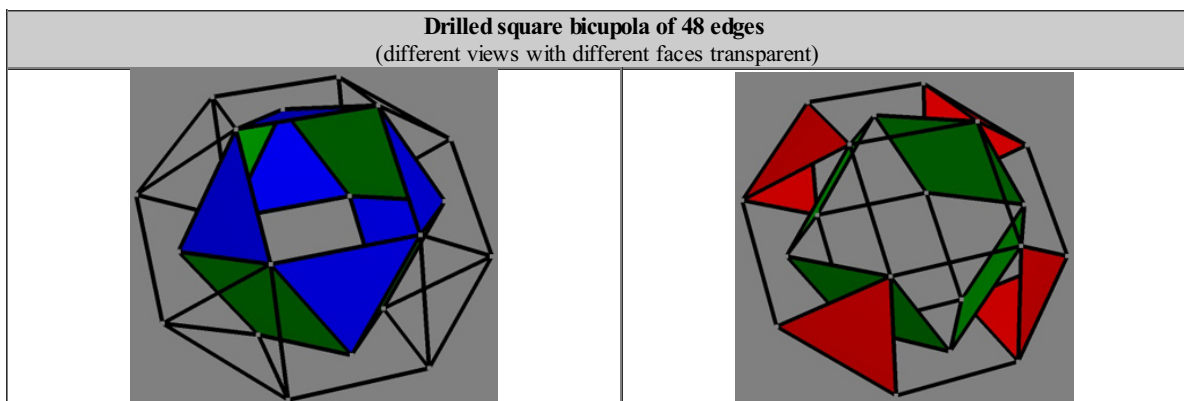
It is intriguing that engagement with "wisdom" can be explored through the **questions** which are the primary characteristic of each of the 48 *koan*. In that culture they can, alternatively, be explored through the nature of the **answers** which are a primary characteristic of decision-making in relation to the conditions indicated by the 64 hexagrams of the *I Ching*. There is of course a degree of debatable ambiguity in this distinction raising the issue of the nature of question and answer in relation to wisdom. Potentially interesting is then the possibility of relating the mapping of 48 koans to a mapping of the 64 hexagrams of the *I Ching*.

Unique amongst simpler polyhedra is the drilled truncated cube, a toroidal polyhedron with 64 edges (one of the [Stewart toroids](#)) onto which the 64 hexagrams can be mapped. There are of course various translations of the hexagram names (cf [List of hexagrams of the I Ching](#) in *Wikipedia*). The names mapped into the image below derive from an extensive adaptation identifying the "causal loops" by which the conditions indicated by the hexagrams are traditionally related (as noted above).



By contrast, but also unique amongst simpler polyhedra, is the **drilled square bicutola** of 48 edges, a toroidal polyhedron with 64 edges (another one of the [Stewart toroids](#)) onto which the 48 koan can be mapped as shown below. As with the drilled truncated cube, "drilled" implies a central hole -- as with any ring-shaped torus.

Curiously both structures, although complex to describe, are relatively easily to comprehend when viewed -- especially by rotation in three dimensions.



Torus as a mapping surface

The particular relevance of the torus as a mapping surface has been discussed separately ([Implication of Toroidal Transformation of the Crown of Thorns: design challenge to enable integrative comprehension of global dynamics](#), 2011; [Complexification of Globalization and Toroidal Transformation](#), 2010; [Comprehension of Requisite Variety for Sustainable Psychosocial Dynamics: Transforming a matrix classification onto intertwined tori](#), 2006).

Of potential significance in that connection is the assumed association between "thinking globally" and the apparently global form of the planet. The latter can of course be understood as a special kind of space-bound illusion. In orbiting around the sun in space-time it could be more fruitfully understood as a torus. With respect to the organization of cognition, there is now evidence to suggest that music is

organized toroidally within the brain (cf *Memorability: musical clues to psychosocial system sustainability*, 2006). The sense of a mental "hole in the head" recalls advocacy of *self-trepanation* (notably by *Bart Huges*) as a procedure towards some form of "enlightenment" (Charles G. Gross, *A Hole in the Head: more tales in the history of neuroscience*, 2009). A neat example of *misplaced concreteness*?. The toroidal *halo* in depictions of the "holy" and the "enlightened" offers other associations.

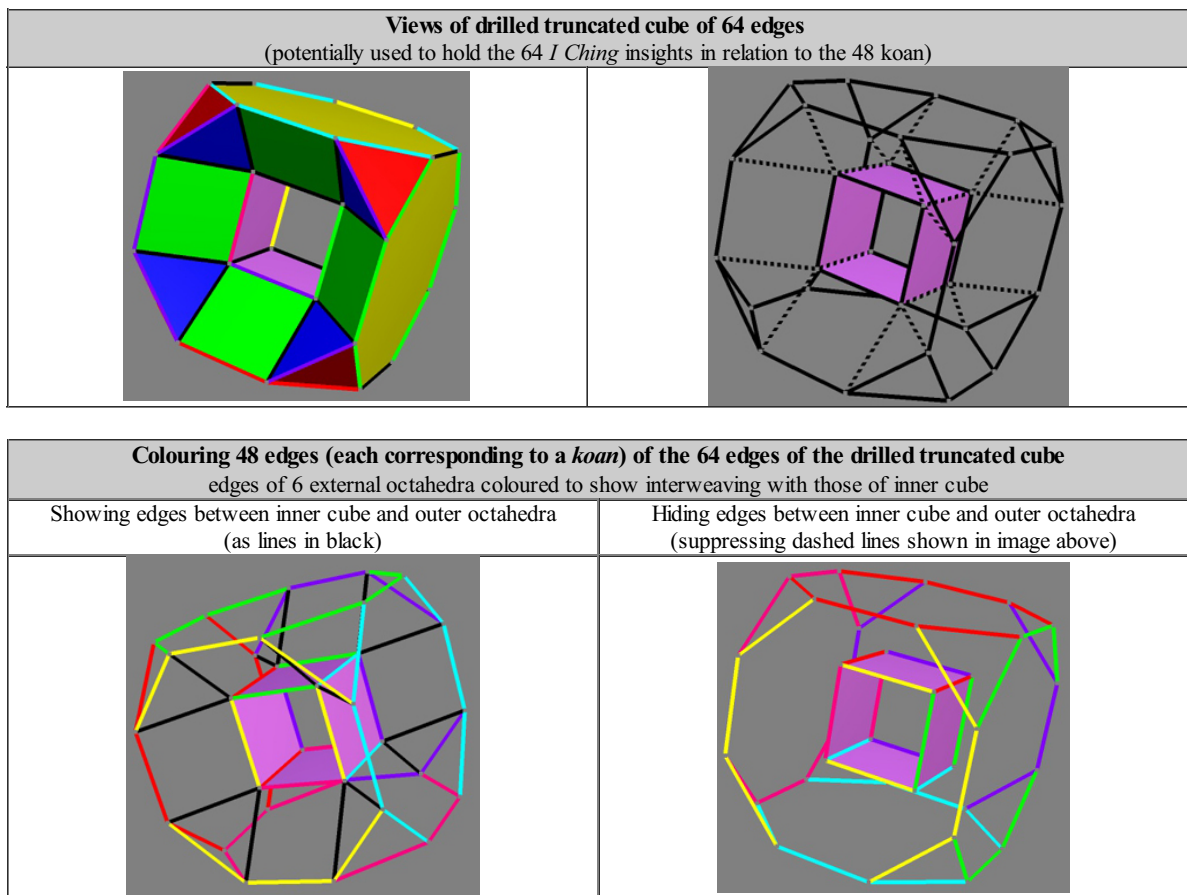
In terms of mappings however, it might be provocatively asked whether the *global brain* needs a (cognitive) "hole in the head" -- especially given the connectivity constraints on the efficient design of (distributed) computer memory and the comparative advantage of *3D torus interconnectivity*. As argued by Giovanbattista Mattiussi, et al. (*The 3D Torus architecture and the Eurotech approach*):

The ability of *supercomputers* to progressively run jobs faster meets the computational needs of both scientific research and an increasingly higher number of industry sectors.... Despite being available for quite a while, the torus architecture has now the potential to surge from niche application to mainstream. This is because, like never before, we face nowadays some severe challenges posed by a raising number of nodes. The problem, before being one of performance, is one of topology and scalability. The more a system grows, the more *fat tree switched topologies* show limits of cost, maintainability, consumption, reliability and, above all, scalability. Connecting nodes using a 3D Torus configuration means than each node in a cluster is connected to the adjacent ones via short cabling. The signal is routed directly from one node to the other with no need of switches. 3D means that the communication takes places in 6 different "directions"... In practical terms, each node can be connected to 6 other nodes: in this way, the graph of the connections resembles a tri-dimensional matrix.

The increasing importance attached to supercomputers, and such configuration. is unfortunately not matched with respect to global governance by the quality of what might be termed "superquestions" which might otherwise have been addressed to them (*Superquestions for Supercomputers: avoiding terra flops from misguided dependence on teraflops?* 2010).

Relating configurative mappings of 64 I Ching conditions and 48 koans

If it assumed that there is any relationship between the integrative nature of the cognitive insights of the 64 and the 48 as comprehensive sets, the question is how the two might be related. One preliminary approach is illustrated by considering the following variants of the *drilled truncated cube*.



Relating the mappings: The association between the two mappings is possible if the 16 edges linking the inner "box" to the outer "toroid" are excluded from the *koan* mapping. Then 12 of the *koan* can be mapped onto the inner "box" with the remaining 32 (4x8) mapped onto the "toroid" (as outlined by the 6 outer octahedra). Essentially a further degree of patterning is achieved by the distinct colouring of the octahedra (as shown in the images immediately above). These must necessarily "borrow" edges within the configuration to complete the pattern of 6 distinct colours -- borrowing edges from each other and from those of the central cube -- effectively an interweaving/interlocking pattern.

The central cube is then characterized by 6 sets of opposing "pillars", each set being uniquely associated with a corresponding

octahedron through which a degree of connectivity is achieved -- as indicated by their shared coloration in completion of the octahedron. However this connectivity is only possible through a form of alternation or resonance between coloration within the octahedron and in the polarization of 2 edges ("pillars") constituting the inner cube.

Cognitive modalities: An interesting question is whether the 6 octahedra (completed by their necessary borrowings from the central cube) can be associated with 6 cognitive modalities associated with the hexagram coding structure -- and distinct from the set of the 16 "excluded" hexagrams, presumably especially indicative of the transformative dynamic between "inner" and "outer". It is also interesting to speculate on the potential cognitive implications of the "suspension" of the cube within a cuboid form having octahedral faces -- achieved by "truncating" the outer cube. This encompassing context, "through" which the polarization of "in the box" cognition is "reframed", merits attention in relation to the question of Atkin (1981), in the light of his [q-analysis](#): *can man live in 3-dimensional space?*

Resonance as essential to both life and wisdom

As noted above, fundamental to understanding of the molecular structure by which organic life is enabled -- the ring-structured benzene molecule -- is recognition of the **dynamics** of resonance within the ring form of its bond structure, essential to its viability and integrity. It is not a **static** configuration as is so readily represented and understood.

Drilled truncated cube understood as a resonance hybrid: Of particular relevance in associating the mappings of 64 and 48 is the explicit recognition that the conditions denoted by the hexagrams are essentially dynamic, each potentially transforming variously into others as encoded by the particular hexagram (hence the alternative title of the *I Ching* as the *Book of Changes*). The set of 64 as a whole may then be understood as a form of "resonance hybrid". This molecular metaphor is used to describe situations when a molecule's electron pattern cannot be described by a single [Lewis structure](#) -- as with those basic to the chemistry of life. The molecule is then termed a resonance hybrid for which [resonance theory](#) offers especially valuable insights. These are then potentially indicative of the pattern of relationships between the *koan* insights, most notably where the mappings "overlap".

Especially significant to this is the [resonance energy](#). As noted by *Wikipedia*, the benzene molecule (as a resonance hybrid) has a structure that is intermediate between the contributing structures; the total quantity of potential energy, however, is lower than the intermediate. Hybrids are therefore always more stable than any of the contributing structures would be. The molecule is sometimes said to be "stabilized by resonance" or "resonance-stabilized," but the stabilization derives from electron delocalization, of which "resonance" is only a description.

The question is what "cognitive resonance" might imply with respect to the dynamics of the suggested mappings, and what implications might this have for any "Lewis structure" implied by conventional approaches to concept mapping and semantic maps.

Resonant intertwining of tori? Curiously, but especially suggestive in relation to this argument, is a degree of formal similarity between the benzene molecule and the drilled truncated cube. The essential [ring structure of the benzene molecule](#) -- effectively a form of torus -- may be understood as deriving from oscillating bonding between its 6 carbon atoms. Ironically, in relation to this argument regarding the conventional whole/broken line structure of the *I Ching* hexagram, the bonding between the carbon atoms oscillates between single and double bonds.

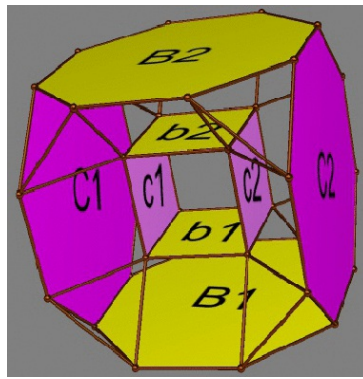
If those "atoms" are understood as nodal "points", however, it might be asked -- following a geometrical/topological transformation -- what would be the nature of a configurative structure in which the "points" were "planes" or surfaces, namely the "faces" of a polyhedron.

If life is enabled by the dynamics of which the benzene ring is indicative, of greater interest would then be the question of **what might be enabled by the resonant dynamics of a structure with 6 "surfaces"**. A cube may be understood as such a structure and could be understood to have enabled much of the tangible and intangible architecture of civilization. In the case of the drilled truncated cube, it too has 6 "sides", but "drilled" to form a torus -- a ring structure like that of the benzene molecule.

The question is then **what might be the possible resonant dynamics within such a form** -- following the argument that the "nodes" of the benzene molecule are now transformed into the "faces" of the cube -- whether inner or outer. It is especially interesting to note that, whilst allowing the skeletal structure to remain static, the faces could "flip" into other configurations. But the nature of such reconfiguration is that **the toroidal form of the drilled truncated cube is potentially three toroids** -- with minimal switching "on" and "off" of faces. Any two "open" octahedral faces could be closed, opening two others, as with the two "open" faces of the inner cube. No particular configuration/orientation of faces is then privileged.

This dynamic allows three toroidal forms to be based on the seemingly static structure -- through resonance, effectively a resonance hybrid. The (drilled) toroidal "hole" then switches between three mutually orthogonal directions -- effectively intertwining three tori. Whilst this switching can be considered abstract, it is ironically of considerable relevance to the switching and gating enabled within the toroidal connectivity of supercomputers. As noted above, the possible "intertwining" of tori has been discussed separately, but from another perspective (*Comprehension of Requisite Variety for Sustainable Psychosocial Dynamics: Transforming a matrix classification onto intertwined tori*, 2006).

Animation suggestive of resonance between three forms of the drilled truncated cube (A, B and C)
(missing letter/colour indicative of torus "hole"; unchanging faces left transparent)



Indicative representations of resonance using hexagram codes

Reproduced from *Animation of Classical BaGua Arrangements: a dynamic representation of Neti Neti* (2008)
 (note if the [SWF format](#) animations do not display automatically, they may do so more readily in Internet Explorer)

Dynamic representation of I Ching hexagram codes
 mapped onto the Star of David
 (of potential interest with respect to [polyhedral stellation](#))

BaGua Later Heaven Arrangement (static inner ring)
 with outer ring in same sequence rotated around it in a clockwise
 direction

(thereby expressing the total set of 64 hexagrams)

Such animations can be further developed experimentally [[SVG version](#); [SWF version](#)], as discussed in
Dynamic Exploration of Value Configurations: interrelating traditional cultural symbols through animation (2008)

If of relevance to the dynamics of computer memory connectivity, the question is how the dynamic changes of orientation of the torus are potentially characteristic of the mode of cognition enabling "wisdom" -- of the kind relevant to global governance. Also of interest is the manner in which "wisdom" is then "detached" from any particular configuration -- but is more significantly associated with the dynamics within a configuration, perhaps as implied by [epimemetics](#).

Framed in this way the question is reminiscent of the design of a "psychopter", by [Arthur M. Young](#) (*The Geometry of Meaning*, 1976) through endeavouring to generalize the principles inherent in the design of a helicopter -- as discussed separately (*Engendering a Psychopter through Biomimicry and Technomimicry*, 2011). The helicopter is of course required to navigate in three dimensions.

Use of understanding of the detailed design constraints of supercomputer operation -- in enabling the movement of electrons -- facilitates a more orderly consideration of the movement of what might be recognized as the "sparks" of insight fundamental to the emergence of "wisdom". Hence the argument for "technomimicry".

Embodying paradox

The toroidal hole in the drilled truncated cube of course offers interesting associations to the Zen understanding of "gateless gate", as well as to any intuitive sense of being trapped "in the box", even though it is "open". The inner cube also offers associations to the world of sensation, with the outer structure offering a larger (meta) sense of context ("out of the box") -- but variously linked and dependent (dynamically) on the inner structure.

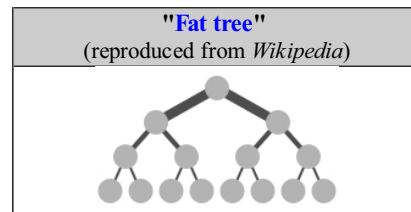
The necessarily paradoxical relationships between any such sense of "inner" and "outer", cognitively modelled by the [Klein bottle](#), are notably the theme explored by Steven Rosen (*Topologies of the Flesh: a multidimensional exploration of the lifeworld*, 2006; *Dimensions of Apeiron: a topological phenomenology of space, time, and individuation*, 2004).

As with the traditional alchemical challenge of containing [alkahest](#) -- the universal solvent dissolving any container -- that of "containing" wisdom can be usefully seen as under investigation in the containment of plasma by the toroidal design of nuclear fusion reactors, understood metaphorically (*Enactivating a Cognitive Fusion Reactor: Imaginal Transformation of Energy Resourcing (ITER-8)*, 2006). The containment capacity of a Klein bottle is a guide to reflection on the matter.

Rather than "intertwined" as suggested in the title, more fruitful would be the sense of in which the toris are "mutually entangled".

Beyond fat tree global knowledge management

As cited above with respect to supercomputer architecture, the more a system grows, the more fat tree switched topologies show limits of cost, maintainability, consumption, reliability and, above all, scalability. By contrast, connecting nodes using a 3D torus configuration means that each node in a cluster is connected to the adjacent ones via short cabling.



The *Wikipedia* entry comments on the above illustration to the effect that the links in a fat-tree become "fatter" as one moves up the tree towards the root. By judiciously choosing the fatness of links, the network can be tailored to efficiently use any bandwidth made available by packaging and communications technology (see also Robin Harris, *Fat trees and skinny switches*, *StorageMojo*, 24 August 2008).

The question is whether information overload, especially amongst those variously responsible for global governance, poses issues of knowledge organization and management analogous to the technicalities of "limits of cost, maintainability, consumption, reliability and, above all, scalability". Does global governance suffer from a "fat tree" crisis?

What is the nature of the cognitive "short cabling" it would appear is necessary to engage with the "adaptive hypercycle", as variously explored (*Adaptive Hypercycle of Sustainable Psychosocial Self-organization*, 2010; *Hyperaction through Hypercomprehension and Hyperdrive: necessary complement to hypertext proliferation in hypersociety*, 2006)?

How is it hoped that "wisdom" should emerge from plenary assemblies of global governance -- whose very seating arrangements and communication processes are so reminiscent of "fat trees" (as illustrated below)?



Image reproduced from discussion of *Considering All the Strategic Options: whilst ignoring alternatives and disclaiming cognitive protectionism* (2009)

The decade-long, trillion dollar expenditure on military intervention in Iraq-Afghanistan, with marginal benefit to all concerned, usefully reframes the concerns regarding "intelligence failure" prior to 9/11 -- as documented by a [US Senate inquiry](#) (cf Kjetil Anders Hatlebrekke and M. L.R. Smith, *Towards a New Theory of Intelligence Failure? The Impact of Cognitive Closure and Discourse Failure, Intelligence and National Security*, 2010).

The question is whether the remedy in its final stages of implementation is to be understood as vulnerable to the weaknesses of "fat tree knowledge management". The remedy takes the form of a massive surveillance centre under construction by the [National Security Agency](#) deep in the Utah desert, as described in an exclusive report by [James Bamford](#) (*The Black Box: inside America's massive new surveillance centre*, *Wired*, April 2012) under a cover title *Inside the Matrix*. Bamford notes that it is a project of immense secrecy: *the final piece in a complex puzzle assembled over the past decade*. Its purpose: to intercept, decipher, analyse and store vast amounts of the world's communications from satellites and underground and undersea cables of international, foreign and domestic networks.

The centre will of course feature any number of supercomputers, presumably benefitting from the latest in toroidal design. Expressed otherwise, the question is whether the remarkable capacity in information management will enable and enhance any capacity in interpretation and insight management, as separately discussed (*Incomprehension in the face of information overload*, 2012). There is a certain irony to the manner in which Bamford's report uses the geometrical metaphors of "box" and "matrix" in the light of the argument made above with respect to toroidal insight (*Comprehension of Requisite Variety for Sustainable Psychosocial Dynamics: transforming a matrix classification onto intertwined tori*, 2006).

Aside from the implications of its name, a profoundly significant symbolic irony may be recognized in the fact that Bamford reports that the NSA centre is located in [Bluffdale](#) -- in the heart of Mormon country: *where religious pioneers arrived more than 160 years ago. They came to escape the world, to understand the mysterious words sent from their god as revealed on golden plates, and to practise what has become known as "the principle", marriage to multiple wives*. The irony is nicely completed by the fact that the following paragraph in the printed version has been "redacted" from the online version cited above:

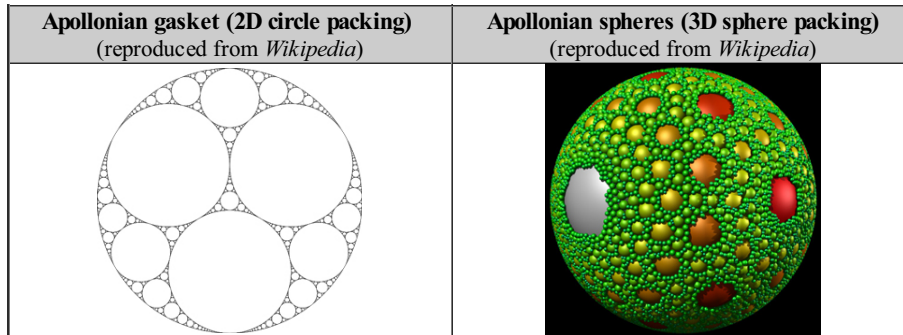
Today Bluffdale is home to one of the nation's largest sects of polygamists, the [Apostolic United Brethren](#)... Membership has doubled since 1978 -- and the number of plural marriages has tripled -- so the sect has recently been looking for ways to purchase more land and expand throughout the town.

Should Christian deprecation of Muslim preoccupation with [72 virgins](#) in the afterlife now be seen in a new light? Is there any doubt as to the probability of who will be the next President of the USA?

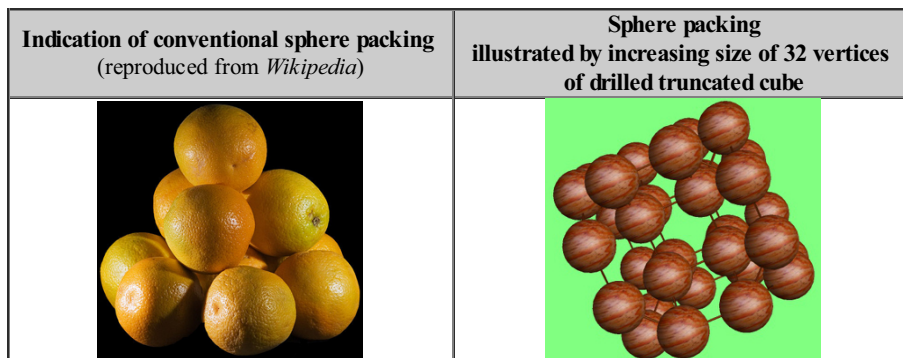
Packaging wisdom for global governance?

The economic importance of compact packaging is widely recognized. There is a degree of irony to the current need to be more "economic with the truth" where this relates to the presentation of wisdom relevant to governance. The question raised here is whether there are learnings from the science of packaging, as is most notably evident in the extensively explored geometry of [sphere packing](#) -- intimately related to the polyhedral argument above. To the extent that wisdom insights are fruitfully represented as distinct "spheres of truth", how can they best be "packed" together to constitute a meaningful whole? Beyond the possibility of packaging "spheres of influence", what are the possibilities of "packaging wisdom"?

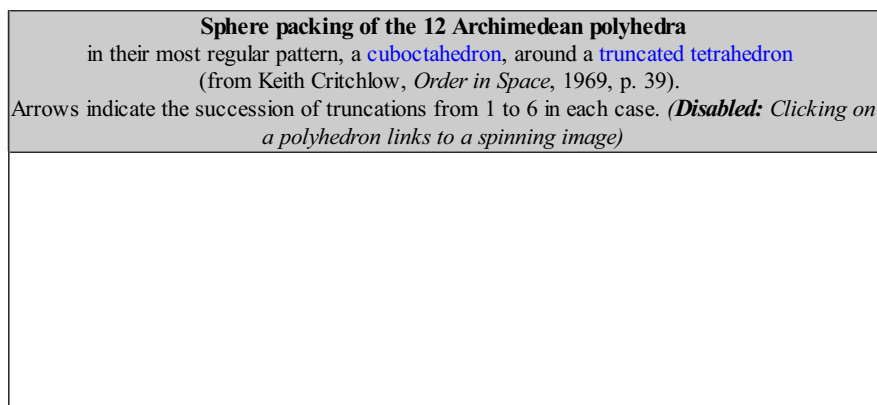
Absent from the above discussion is the content to be associated with relational edges and how which could be fruitfully related to what. This is of course a theme of the systemic explorations of causal loops by Yolles (2006, 2010) and Hays (2007, 2010) -- whether or not these can be usefully related to the above approach. There is a case, for example, of endeavouring to map such "loops" into the fractal organization of the "circles" in an [Apollonian gasket](#) as shown below in its 2D and 3D variants.

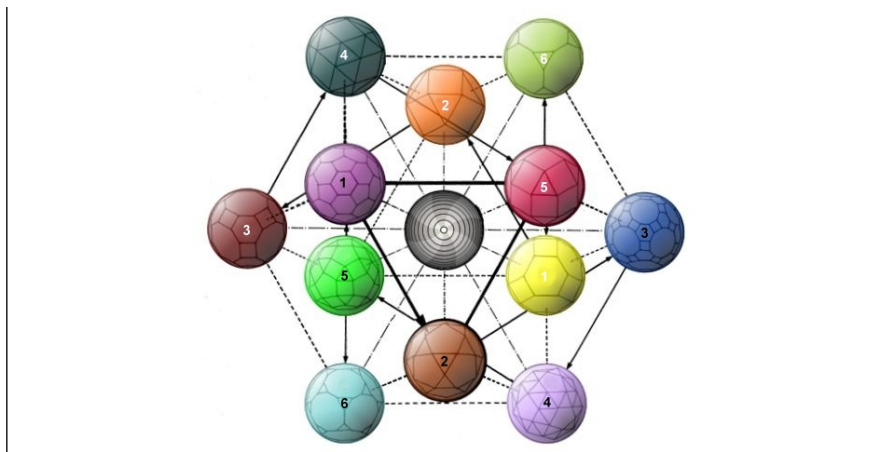


The challenge of packing in 3D is well-illustrated by the image on the left below. Some sense of the challenge in relation to "wisdom", as argued in relation to the hexagrams of the *I Ching*, can be recognized by increasing the diameter of the vertex spheres of the depictions of the drilled truncated cube (above) -- as shown in the image on the right below.



The argument for packaging wisdom may be framed more generally with respect to the desirability and possibilities of ordering knowledge according to different symmetrical configurations (*Spherical Configuration of Categories to Reflect Systemic Patterns of Environmental Checks and Balances*, 1994). An insightful illustration is offered by the depiction below which could be reframed as applying to "order in knowledge space".





Critchlow's work is consistent with that of Christopher Alexander (*The Nature of Order: an essay on the art of building and the nature of the universe*, 2003-4), as discussed separately (*Harmony-Comprehension and Wholeness-Engendering eliciting psychosocial transformational principles from design*, 2010).

Earth Summits: The forthcoming "Rio+20" Earth Summit -- the [United Nations Conference on Sustainable Development](#) (2012) -- will be the subject of extensive tweeting. However, will it engender a coherent strategic pattern which is comprehensible "at a glance" to those of constrained attention span (and in contrast to [Agenda 21](#), the outcome of its predecessor in 1992)? Or will it be reduced to failure by dependence on "fat tree" knowledge management and communication?

The outcome of the Earth Summit will pose a particular challenge in "packaging" its insights at a time when the tired formula of "declarations" has proven only too evidently "unfit for purpose" -- implying that exploration of new modes is appropriate (*Structure of Declarations: challenging traditional patterns*, 1992).

Transcending strategic dilemmas: Of relevance in relation to the first [Earth Summit](#) (Rio de Janeiro, 1992) was the effort to identify the "strategic dilemmas", with which global governance was faced, from the arguments of a range of constituencies. Six "functions" were identified as engendering such dilemmas (*Inter-sectoral Strategic Dilemmas of Sustainable Development*, 1992). These were then configured in the light of polyhedral tensegrity structures, as separately described (*Configuring Globally and Contending Locally: shaping the global network of local bargains by decoding and mapping Earth Summit inter-sectoral issues*, 1992).

A question for the future is whether and how such an approach might relate to the six facets of both the inner cube and the contextual framework of the drilled truncated cube -- with the polarizing "dilemmas" appropriately framed by the edges of the inner cube, emphasizing the challenge of "in the box" thinking by which the forthcoming Earth Summit may be characterized. The introduction of tensegrity, as an organizing principle for their transcendence on the occasion of the 1992 Summit, followed from the reflections of R. Buckminster Fuller (1975, 1979) and resulted in their subsequent development from a cybernetic perspective by [Stafford Beer](#) (*Beyond Dispute: the invention of team syntegrity*, 1994) and thereafter in relation to the [viable system model](#).

Enabling software for insight packaging

The exploration of cognitive possibilities and implications of "packaging wisdom" is enormously facilitated by the [Stella: Polyhedron Navigator](#) software application developed by Robert Webb, from which the above images were generated (as with many polyhedra in *Wikipedia*). Its potential relevance to structures of governance has been discussed separately (*Polyhedral Pattern Language: software facilitation of emergence, representation and transformation of psycho-social organization*, 2008).

However the static imagery reproduced here fails to convey its function as a catalyst to imaginative consideration of possibilities when interactive use is made of its many dynamic features and of the numerous possibilities for their export into other formats (video, 3D imagery, etc). Potentially of great significance is the transformative "morphing" between topologically related structures -- surely offering vital possibilities for the comprehension of transformations between psychosocial structures of great complexity. The application enables access to hundreds of such structures -- a cognitive resource as yet virtually unexplored. In a period when governance is faced with engaging with time in new ways, any application which explicitly offers access to 4D projections (such as some examples [above](#)) merits careful attention.

It is all too readily assumed that "we" are about to agree on a worldview and a course of action in response to the emerging crises of the times. There is little evidence that this will be the case, as discussed previously (*The Consensus Delusion: mysterious attractor undermining global civilization as currently imagined*, 2011). This raises the question of how to integrate or eliminate alternative (and mutually hostile) perspectives. The US has exemplified this cognitive stance, ironically articulated by the policy "you're either with us or against us" (*Us and Them: Relating to Challenging Others*, 2009).

Of greater potential is the ability to engage dynamically with the set of alternatives. This could be understood as the implicit ideal of "democracy" -- severely distorted by emphasis on the **static oversimplification of the singular perspective** resulting from a majority vote at a moment in time. This only offers the momentary illusion of unity -- consensus as a delusion.

The extensive range of variously interrelated polyhedra offers **a way of holding a wide range of alternatives -- dynamically**. The dynamics can be understood as alternation between disparate forms, as most obviously implied by the ideal of democracy in its richer sense. The range of possible geometrical transformations between alternative worldviews is what merits exploration.

Especially interesting in this respect is the distinction between:

- forms capable of holding distinct insights through resonance
- forms related by transformational morphing of their geometry, as containers for alternative worldviews
- alternative ways of understanding polyhedral features as cognitive templates for a set of insights.

Cognitive "feel": The last emphasizes the contrasting cognitive "feel" of an insight variously associated with:

- a **point** or vertex as a nexus of relationships, namely the fundamental sense of a "**crossroad**" between different ways, notably offering a point of view -- perhaps experienced as an advantageous overarching "overview". As a place, crossroads have always offered a focus as a gathering point around which communities formed -- often with protective fortification
- a **line** as a vital relationship between distant points or conditions, notably evident in strategic articulations of "My Way" -- the insight into the how of viable change from Condition A to Condition B. This has always been valued as a "way" of relating, as exemplified by the sense of "correspondence" and the dilemma of whether to move in one direction or the other. The protection of a "way" or "route" has long been a strategic preoccupation.
- an **area** defined by a set of intersecting lines as boundaries, and offering a stable sense of a protected territory. Insight is then more particularly associated with a "field" of action -- as a "face" turned to the world.

These associations offer the implication that the cognitive relationship between them might be fruitfully explored in terms of the **Euler characteristic**, which for any **convex polyhedron**'s surface has:

$$V - E + F = 2 \text{ (where } V = \text{ number of vertices, } E = \text{ number of edges, and } F = \text{ number of faces)}$$

The Euler characteristic for a sphere is also 2, as it is for **spherical polyhedra**.

Potentially this offers an unusual approach to the exploration of cognitive perspectives, worldviews and belief systems.

The software mentioned above enables selection and exploration of polyhedra based on any number of such elements. It also enables selection of polyhedra based on the number of internal "**cells**", namely three-dimensional elements which (as volumes) are part of a more complex polyhedron. This is indicative of a fourth mode of cognitive identification with an insight, as separately discussed (*Metaphorical Geometry in Quest of Globality*, 2009; *Geometry of Thinking for Sustainable Global Governance*, 2009; *Geometry, Topology and Dynamics of Identity*, 2009).

Conclusion

Mention was variously made of the separate approaches of Yolles (2006, 2010) and Hays (2007, 2010) to the cognitive, cybernetic and organizational implications of the sets of causal loops they variously distinguish and represent diagrammatically. Of interest is the extent to which these can be usefully mapped onto a form like the drilled truncated cube -- as being both of requisite complexity and in enabling comprehension. The approach would appear to be potentially fruitful in relation to the vexatious problematic of "global" governance and engagement with the **adaptive cycle**, as notably clarified by **Thomas Homer-Dixon** (*The Upside of Down: Catastrophe, Creativity, and the Renewal of Civilization*, 2006).

The challenge of governance is compounded by the issue of how many instances of causal relevance and feedback loops can the strategic mind handle coherently and communicate credibly. Familiarity with the zoom facility of Google Earth suggests the need for an analogous facility with respect to the sphere of knowledge.

The potential of polyhedral forms has been discussed separately (*Towards Polyhedral Global Governance: complexifying oversimplistic strategic metaphors*, 2008; *Coherent Value Frameworks: Pillar-ization, Polarization and Polyhedral frames of reference*, 2008; *Dynamic Exploration of Value Configurations: Interrelating traditional cultural symbols through animation*, 2008).

The argument was first made from a policy science perspective by **Harold Lasswell**, in an early discussion of the applications of computers to international relations:

Why do we put so much emphasis on audio-visual means of portraying goal, trend, condition, projection, and alternative? Partly because so many valuable participants in decision-making have dramatizing imaginations. They are not enamoured of numbers or of analytic abstractions. They are at their best in deliberations that encourage contextuality by a varied repertory of means and where an immediate sense of time, space and figure is retained (*The Transition towards more Sophisticated Procedures*, 1968, pp. 307-314).

"Compressing wisdom": The problematic technicality of "compressing" the indication of wisdom -- a *koan* commentary -- to the Twitter format of 140 characters makes an ironic point. The choice was made to use a proportion of those characters, perhaps 15 percent, to provide a link from the tweet (as posted) to the more ample commentary. A degree of context was implied by including the identifying number (from 1 to 49), thereby losing a few characters more -- but relatively meaningless in an isolated tweet. For space reasons, no characters were used up to tag the tweet as a *koan*, following the tweeting practice which would have provided a degree of connectivity.

The irony then lies in the manner in which any connectivity to the pattern was deliberately broken -- or only potentially enabled through the link, for those who chose to follow it. This is typical of the "laundry list" articulation of global strategic "to-do" items -- as with Agenda 21.

Metapattern of connectivity: Disrupting any sense of pattern in this way can readily be understood in the light of the classic remark of [Gregory Bateson](#), which should surely apply to the set of *koan* as a whole:

The pattern which connects is a metapattern. It is a pattern of patterns. It is that metapattern which defines the vast generalization that, indeed, it is patterns which connect. (*Mind and Nature: a necessary unity*, 1979, p.11)

To which he added: *Destroy the pattern which connects and you destroy all quality*. An extremely inadequate remedy can be achieved by posting the link to this explanatory commentary.

Essential dynamic: The compression of insight required by the Twitter format gives focus to the challenge of the degree of compression of text that is possible when seeking to convey insight -- and the manner in which dependence on the dynamics associated with that representation then increases, namely viewing a succession of tweets. There is a nice irony to the fact that the Twitter constraint derives from the line-based binary coding convention of the *I Ching* hexagrams, which was an inspiration to [Gottfried Leibniz](#) (*Explication de l'Arithmétique Binaire*, 1703). This subsequently enabled the development of modern computing. This makes the point that Chinese culture compressed its wisdom insights into a format far simpler than the 140 characters of Twitter -- but dependent on a dynamic which is also an essential feature of Twitter communication.

Poetic configuration: It is of course the case that Chinese and Japanese ideograms lend themselves to more compact expression of complex insights -- even within Twitter constraints. Of greater interest is the fact that the mnemonic expression of wisdom insight emphasized the poetic form to a high degree -- thereby achieving the memorable embodiment of a richer pattern of connotations, whether in the case of the *koan* commentary, the *I Ching*, or the related "wisdom classics". **This suggests the interesting sense in which the drilled truncated cube potentially constitutes a "cognitive container" for a set of dynamically related "poems" -- effectively about governance of the dynamics of change, whether with individual or collective implication.**

Curiously it might be appropriately said that Western culture has systematically designed the "poetry" out of the binary insights with which Eastern culture had so intimately associated their comprehension. It is in this sense that a case can be made for reassociating poetry and music with comprehensible articulation of the systemic challenges of radically polarized global governance, as separately argued (*A Singable Earth Charter, EU Constitution or Global Ethic?* 2006).

Enabling comprehension "at a glance"? The argument for exploring new ways to configure the set of 48 *koan* is surely consistent with taking advantage of the capacity of modern technology to process information better to enable comprehension. Hence the exploration of polyhedral configurations to imply a sense of the integration to which it is assumed that the *koan* variously point. A particular challenge of the set of *koan* and their commentaries is the time required to engage with them, if only momentarily, and beyond that the time for reflection on them. This demand is a severe challenge in the emerging "blip culture" -- as named by [Alvin Toffler](#) (*The Third Wave*, 1980). In relation to the wisdom necessary for survival and thrival, the requirement for new cognitive modalities for engaging with time can be variously argued (*The Isdom of the Wisdom Society: embodying time as the heartland of humanity*, 2003; *Engaging Macrohistory through the Present Moment*, 2004; *Ungovernability of Sustainable Global Democracy? Towards engaging appropriately with time*, 2011)

The possibility of polyhedral configuration of the facets of wisdom is delightfully reminiscent of the "illumination" and "enlightenment" to which the *koan* purportedly point. Understood as a set, the so-called "*Gateless Gate*" is indeed a form of "jewel" -- undeniably a cultural treasure. As a polyhedral configuration, successive attention to these facets is then reflected, refracted and focused within that configuration in a moment of time -- as with exposure to the highly-valued "sparkle" of any [precious stone](#), appropriately cut and polished (*Patterning Archetypal Templates of Emergent Order: implications of diamond faceting for enlightening dialogue*, 2002). The interactive engagement with polyhedral transformation (as suggested by the images above) then offers a powerful metaphor of a learning opportunity -- a "mnemonic catalyst" transcending the constraints of time and potentially with very personal implications (*In Quest of Mnemonic Catalysts -- for comprehension of complex psychosocial dynamics*, 2007).

Metaphors as transdisciplinary vehicles of the future: As teasingly remarked by [Kenneth Boulding](#) (*Ecodynamics; a new theory of societal evolution*, 1978):

Our consciousness of the unity of self in the middle of a vast complexity of images or material structures is at least a suitable metaphor for the unity of a group, organization, department, discipline, or science. If personification is only a metaphor, let us not despise metaphors -- we might be one ourselves. (p. 345).

This highlights the question of the kind of comprehensible form which can "carry" both the identity of a global civilization and the pattern of insights which constitute its wisdom. If Ancient Egypt invested so evidently in pyramids to that end, it might be asked whether more complex polyhedra are appropriate to the integrative insights of the present -- as might be expected to be engendered by an "Earth Summit".

The capacity to explore the dynamics potentially implied by such structures as resonance hybrids highlights the potential of what can be understood as "partial comprehension". This may be essential to survival under conditions in which it is inappropriate to depend on the possibility of closure on "complete" understanding (*Towards the Dynamic Art of Partial Comprehension*, 2012). There is an intriguing sense, in relation to metaphors as "vehicles", in which the case for "resonance hybrid" can be usefully understood as offering "multi-modal transport" -- with the "vehicles" being effectively different "models" from a cognitive perspective.

The sense of comprehension being "partial" is then neatly evident in the variety of modes of transport characteristic of a transportation system: pedestrian, horse/cart, bicycle, automobile, 4WD, truck, rail, boat, plane. With all such people may variously identify -- using

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