



# laetus in praesens

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## Metaphorical Insights from the Patterns of Academic Disciplines

### Learning from the Standard Model of Physics?

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Introduction

Patterns of abstraction

Semiophysics?

Pay-back time for free-riders?

Disciplines susceptible to fruitful "mining"

Confrontation of alternative mappings

Metaphorical interpretation

Magic square symmetry

Pattern reconciliation?

Archetypal morphologies

Catastrophic questions

Cognitive identification with boundary logic?

## Introduction

This document explores use of a particular metaphor from physics as a means of articulating understandings of openness and closedness in support of individual or collective identity. It follows from consideration of pattern language within the context of a more general argument, where relevant references are located (*Way Round Cognitive Ground Zero and Pointlessness: embodying the geometry of fundamental cognitive dynamics*, 2012; see alternative [table of contents](#)).

The argument is based on the assumption that there is a need to find ways to comprehend and engage with more complex patterns, as discussed previously (*In Quest of Mnemonic Catalysts -- for comprehension of complex psychosocial dynamics*, 2007; *Conditions of Objective, Subjective and Embodied Cognition: mnemonic systems for memetic coding of complexity*, 2007). From that perspective there is then a case for exploring the complexity as articulated and integrated within the [standard model of particle physics](#). It should be emphasized that **the concern here is with human capacity to think about complex intertwining patterns, not with what is thereby patterned** -- whatever the potential implications of isomorphism.

At the time of writing, for example, a seemingly extraordinary similarity has been shown to exist between electrons orbiting a nucleus and the asteroids orbiting Jupiter. As reported by Jade Boyd-Rice (*Replica of Trojan asteroids fits in single atom*, *Futurity*, 25 January 2012), a paper published in the journal *Physical Review Letters*, has demonstrated that electrons could be made to orbit the nucleus of an atom in precisely the same way that Jupiter's 4,000-plus Trojan asteroids orbit the sun.

The findings uphold a prediction made in 1920 by famed Danish physicist Niels Bohr about the relationship between the then-new science of quantum mechanics and Isaac Newton's tried-and-true laws of motion. "*Bohr predicted that quantum mechanical descriptions of the physical world would, for systems of sufficient size, match the classical descriptions provided by Newtonian mechanics,*" says lead researcher Barry Dunning... "*Bohr also described the conditions under which this correspondence could be observed. In particular, he says it should be seen in atoms with very high principal quantum numbers, which are exactly what we study in our laboratory.*"

It might be asked to what extent conceptual "objects" associated with a given worldview -- dynamically "orbiting" it in some manner -- could be similarly comprehended, if only as a source of mnemonic clues to the integrative nature of the comprehension of that worldview.

In a spirit of [technomimicry](#) (discussed separately), it is therefore interesting to explore how the standard model of particle physics -- the epitome of emergent closure -- might be used as a template through which to suggest a cognitive modality embodying both openness and closure. Is there scope for "new thinking" on the "standard model" of human cognition, as previously argued (*Beyond the Standard Model*

of *Universal Awareness*, 2010)?

Such an exercise could be understood as an exploration of patterns of cognitive significance, following the insights into "pattern language" in designing a desirable "place to be", as articulated by Christopher Alexander (*A Pattern Language*, 1977) and discussed separately (*5-fold Pattern Language*, 1984). In marketing parlance, such a place might be promoted as "heavenly" -- as discussed with respect to a requisite integrative mode of cognition (*Requisite Childlike Cognition for "Heavenly" Integration?* 2012).

## Patterns of abstraction

In developing the argument here it is useful to explore the implications of two recent texts.

**Economic abstractions:** With respect to the economic models current deployed, effectively as articles of faith, one valuable analysis is offered by John Kozy (*Abstractions Versus the "Real World": economic models and the apologetics of greed*, *Global Research*, 13 February 2012). He summarizes his argument as follows, in relation to the current global crises:

Economists build models by subtracting from reality the characteristics they deem unessential to the economic situations they model. The result is a bare bones description consisting of what economists deem economically essential. Everything that is discarded (not taken into consideration in the model) is called an "externality." So the models only work when the externalities that were in effect before the models are implemented do not change afterward. The realm of economic models can be likened to the realm of Platonic Ideas. Both realms are static and unchanging throughout all time. Unfortunately the real world constantly changes. Since externalities are excluded from all economic models and can be expected to change after any model is implemented, all economic models necessarily fail. Economists are frauds and economics amounts to nothing but an apologetics of greed.

**Dependence on abstractions:** The questionable dependency on such models has been dramatically demonstrated by the recent global financial crisis, triggered by risk-management dependency on the [Gaussian copula](#) (Felix Salmon, *Recipe for Disaster: the formula that killed Wall Street*, *Wired*, 17.03, March 2009).

Other such vulnerabilities have yet to be fully recognized, as discussed separately (*Uncritical Strategic Dependence on Little-known Metrics: the Gaussian Copula, the Kaya Identity, and what else?* 2009). Simplifying the framing of governance challenges through "externality" can be usefully seen as enabling a dangerous process of "remaindering" (*Reintegration of a Remaindered World: Cognitive recycling of objects of systemic neglect*, 2011).

**Learning from the "biggest problem in the universe":** A second recent text is the extensive summary in *The Economist* (*The Dark Side of the Universe: scientists are trying to understand why the universe is running away from them*, 18 February 2012) is introduced as follows [*added comments inset within quoted text*]:

At five tonnes and 520 megapixels, it is the biggest digital camera ever built -- which is fitting, because it is designed to tackle the biggest problem in the universe....

It is the context provided by *The Economist* that makes this statement so interesting -- in a journal issue which deals with global financial crisis, many regional conflicts, emerging resource challenges, various systemic inequities, and issues of corruption. But here we have an affirmation from the economic perspective of the editors of that prestigious journal as to the nature of the "biggest problem in the universe".

Of further interest, from any metaphorical perspective, is that it is hoped to resolve the biggest problem of the universe with the aid of a camera through which further data points can be collected. This could be construed as confirming the mindset of economists in relying on statistical data through which models are constructed (as criticized above by Kozy).

Reliance on this cognitive modality is confirmed by the exponential increase in satellite surveillance, now supplemented by that of unmanly aerial vehicles -- presumably all giving rise to an unimaginable quantity of data points for the perusal by analysts.

It is the centrepiece of the [Dark Energy Survey](#) (DES), the most ambitious attempt yet to understand a mystery as perplexing as any that faces physics: what is driving the universe to expand at an ever greater rate.

Set in an economic framework, where the "universe" of any data set is (at best) conventionally expanded to encompass the global economy, it might be asked whether the most perplexing mystery facing economists is what drives that economic universe to expand at an ever greater rate. Is this the question of explaining growth and the unthinking commitment to it as an unquestionable good?

It has been known since the late 1920s that the universe is getting bigger. But it was thought that the expansion was slowing. When in 1998 two independent studies reached the opposite conclusion, cosmology was knocked head over heels.

This statement raises the question of the nature of the "universe" on which economics focuses. Has the assumption been that it is the (global) market that has been getting ever larger? With reference to assumptions that the rate of expansion of

that "universe" was slowing, might this have been with respect to the global population with which that market is at present so closely associated? There are indeed "economic" models which suggest that global population might plateau within this century -- whatever confidence might be placed in their assumptions. Whilst studies may not be emerging to indicate how that might realistically happen, given the political and economic pressures to sustain growth at all costs, studies are indeed emerging to indicate that population levels are a major challenge to resources at least (Tom Levitt, *Population is 'our biggest challenge' says government chief scientist Sir John Beddington, Ecologist*, 14th February, 2012). A [major study](#) is to be published on the issue in April 2012 by the UK Royal Society.

The subtitle of *The Economist* article (*scientists are trying to understand why the universe is running away from them*) might well suggest the possibility that economists are currently trying to understand, through their conventional models, why their comprehension of the global economy would indeed seem to be "running away from them" -- if recent crises are considered a valid indicator. Current efforts to contain the global crisis could also be understood as a catch-cup effort in response to situations spinning out of control.

Since then, 5,000 papers have been written to try to explain (or explain away) this result.... Many of those 5,000 papers deal with something that has come to be known as [dark energy](#)....

It could well be argued that numerous papers have indeed been written regarding the phenomenon of expanding global population, most with the intention of demonstrating that it was indeed a non-issue, and that the planet (the "universe" of concern to economists), had more than adequate resources. However, with respect to anything corresponding to "dark energy", it might be better argued that this could be more readily recognized as the "negative" misrepresentation of the dramatic nature of the challenge by those who see it as such. More fruitful however would be to recognize the "dark energy" in the patterns of denial of the phenomenon, as reinforced by sectors variously interested in "growth" (religions with an eschatological focus, corporations with market growth dependencies, governments dependent on tax income, etc).

One reason for its popularity is that, at one fell swoop, it explains another big cosmological find of recent years. In the early 1990s studies of the [cosmic microwave background](#) (CMB), an all-pervading sea of microwaves which reveals what the universe looked like when it was just 380,000 years old, showed that the universe, then and now, was "flat". However big a triangle you draw on it -- the corners could be billions of light years apart -- the angles in it would add up to 180°, just as they do in a school exercise book. That might not surprise people whose geometrical endeavours have never gone beyond such books. But it surprised many physicists.... Cosmologists were quite prepared for it to be curved at the grandest of scales, and intrigued to discover that it was not.

This extraordinary discovery is curiously matched by that of the award-winning study by [Thomas Friedman](#) (*The World Is Flat: a brief history of the twenty-first century*, 2005) -- duly admired by *The Economist*. The book won the inaugural [Financial Times and Goldman Sachs Business Book of the Year Award](#) in 2005. Presumably economists were quite prepared for the globe to be curved and have indeed been intrigued to discover it was not. However, given the financial crisis subsequent to its publication (in which those lauding it were effectively implicated), the argument can be deemed irresponsible (*Irresponsible Dependence on a Flat Earth Mentality -- in response to global governance challenges*, 2008).

**Systemic neglect through dangerous abstraction:** The same issue of *The Economist* includes an advertisement by the prestigious [University of Cambridge General Management Programme](#), under the prominent quote: *The world can only be grasped by action, not by contemplation* ([Jacob Bronowski](#)). Given the recently evident consequences of "grasping", this would appear to confirm the concluding sentence of the quotation from Kozy: *Economists are frauds and economics amounts to nothing but an apologetics of greed*. In the absence of adequate "contemplation", little would seem to have been learned from the recent global financial crisis -- especially by those educating the next generation of those responsible for its governance. In the commitment to replicating a dysfunctional mindset, is this again a reminder of the insight of [George Santayana](#): *Those who cannot remember the past are condemned to repeat it* ?

More generally it might then be asked whether most academic disciplines engage in the forms of abstraction challenged by Kozy -- and are therefore dangerously inappropriate to the challenges of the times. As indicated by *The Economist* commentary, the "biggest problem of the universe" does not include the governance of Earth's challenges -- somehow "extracted" from the universe and understood as an "externality". Similarly, from the perspective of physics, the quest for the Theory of Everything (in which so much is invested) somehow "extracts" from the global lived reality the very processes by which the quest is enabled and conducted -- as yet another "externality".

Is a "discipline" a process of developing and using a language in which what is declared to be "true" or "false" is necessarily "true"? More problematic is the question of whether the "truth" revealed by research could have been presented "otherwise" had the funding had other "constraints" (*Canadian government is 'muzzling its scientists'*, *BBC News*, 17 February 2012; George Monbiot, *Plutocracy, Pure and Simple*, *The Guardian*, 21st February 2012).

Perhaps more systematic concern should be devoted to blindspots, holes, shadows, and the like (Roberto Casati, *The Shadow Club: the greatest mystery in the Universe -- Shadows -- and the thinkers who unlocked their secrets*, 2003; Roberto Casati and Achille C. Varzi, *Holes and Other Superficialities*, 1994; Alec A. Schaere, *A General Methodology for Reconciling Perspectivity and Universality*:

applied to the discrepancy between theoretical economics and eco-social reality, *International Journal of Transdisciplinary Research*, 2008).

Given the pattern of denial implied by every discipline, is there then a case for a discipline of the "unsaid" (*Global Strategic Implications of the Unsaid: from myth-making towards a wisdom society*, 2003; *Varieties of the Unsaid in sustaining psycho-social community*, 2003; *Lipoproblems: Developing a Strategy Omitting a Key Problem*, 2009).

## Semiophysics?

A degree of justification for an alternative approach is offered by the preoccupation of René Thom as a mathematician with "semiophysics", as the "physics of meaning" (*Esquisse d'une Sémiophysique*, 1988). For Jean Petitot (*La Sémiophysique: de la physique qualitative aux sciences cognitives*, 1994):

The *Esquisse d'une Sémiophysique* considerably extended some earlier philosophical positions of René Thom. Recall his final aphorism: *Only a metaphysical realist can give meaning to the world* (ESP, p. 225). As stated by the very term "semiophysics" -- corresponding to what we name as a "physics of meaning" -- this unifies two regional ontologies categorically separated since the Galilean rupture: that of objectivity and that of physical form of meaning. The sense discussed here is not one that subjugates hermeneutics. It is inherent in the phenomenal organization of the sensible world into form, things, qualities, processes, events, qualitatively structured and organized states of affairs, perceptually apprehendables and linguistically describable.

The realistic thesis of René Thom is that there are conditions of objective possibility of this intelligible structure of the macroscopic phenomenal world: *Intelligibility is a property of the phenomena (interpreted as Gestalten) before any conceptualization in the strict sense* (ESP, p. 31). .... The stakes are obviously considerable: unify a dynamic of forms and structures with a logic of cognition in the context of a realistic physical meaning. [translated from French]

As described by René Thom (*Colloque International de Cerisy: Logos et théorie des Catastrophes*, 1982):

Already in my book [*Structural Stability and Morphogenesis: an outline of a general theory of models*, 1972] I had considered possible geometrical interpretation of certain concepts, such as the concept of capture. Being able to somehow be achieved by relatively simple algebraic structures of a priori concepts semantically complex as those of "capture", "break", or "link" led me to propose a general theory for interactions spatial, spatio-temporal processes that can be described linguistically. (p. 592)

However the very possibility of such an enterprise merits consideration in the light of the remarks of Petitot in introducing his 1994 summary of the approach instigated by Thom:

It's been about 25 years since René Thom proposed use of qualitative dynamics, singularity theory and bifurcation theory as well as the physics of critical phenomena to analyze natural forms and forms of meaning, especially structures conceived in the structuralist sense of the term, whether perceptual, semio-linguistic or cognitive. The reception accorded the fundamental contributions of his research program -- now called "morphodynamics" -- to science and contemporary philosophy constitutes a fascinating problem in the history and sociology of science. Here we have one of the greatest mathematicians of the century, especially informed of the more technical aspects of mathematical physics. After having explored in depth (in contrast to others) past and current theoretical biology and semio-linguistic structuralism, he launched an inspired synthesis of the natural sciences, sciences of the mind and the philosophy of nature -- a synthesis of which the greatest philosophers have dreamed since the Galilean rupture (for example Kant, Peirce, Brentano, Husserl and Cassirer).

And what happened? On the one hand, these ideas were met with great interest by some of most distinguished contemporary scholars. On the other hand, the gap between science and philosophy had become so abysmal, with ignorance of each discipline of others becoming so complete, that the very meaning of such a project had become incomprehensible to most narrowly specialized researchers who had adopted the prejudices of their community. For once as objective allies, the positivist sciences and the negativist philosophies agreed to hinder, if not scientifically, at least sociologically, a powerful reflection which challenged the legitimacy of their shared history. [translated from French]

## Pay-back time for free-riders?

As indicated by the resources allocated to physics to resolve the "biggest problem in the universe", despite the apparent irrelevance of that problem to the global crises of the times, there would appear to be an abysmal disconnect between intellectual aspirations and fruitful addressing of these crises. A recent issue of the *New Scientist* (11 February 2012, p. 5) chose to quote the physicist Ernest Rutherford as having dismissed all of the science falling outside physics as mere "stamp collecting". This would be consistent with the mindset represented by physicist Alan Sokal -- in justifying his perpetration of the notorious Sokal Affair hoax. In framing the "biggest problem", is physics the victim of what might be termed a "Miss-Universe Syndrome" -- potentially the biggest joke on humanity from an extraterrestrial perspective, as with the "Universal Declaration of Human Rights"?

Clearly there has been miraculous progress in abstraction in the various disciplines. This has not however enabled fruitful abstraction of interdisciplinary relationships, as illustrated by the response to the integrative initiative of René Thom. By contrast, in the cited issue of the *New Scientist*, a full page advertisement raises the question that *If we never venture into the unknown, how do we get anywhere new?*

The advertisement was for a Honda Civic. On the other hand, an earlier special issue of the *New Scientist* (*Nothing: the intangible idea that rules the cosmos*, 19-23 November 2011) reviewed the extent to which the most fundamental insights of physics were now associated with the understanding of nothing -- as discussed separately (*Fundamental integrative role of nothing -- the ultimate remainder?* 2011).

There is thus an apparent failure to resolve the dysfunctional relationships between the disciplines (effectively lost in their particular abstractions), the inability to deal with the nothingness to which people are exposed by the variety of current crises (despite recognition of the fundamental importance of nothing), and the more general inability to respond to the challenges of global governance. Lacking all sense of wider social responsibility, this suggests that academic disciplines could be usefully characterized as "free riders" -- funded by those whose problems are not being effectively addressed. In this sense, like the religion science is wont to criticize, the sciences (as a mode of knowing) can be seen as adopting a pattern of "pontification" regarding what others should do -- whilst failing to address their own inadequacies.

Understood otherwise, what we now have is a rich panoply of **disparate patterns of abstraction** -- into the elaboration of which the brilliant and the creative have been encouraged to engage with funding from tax payers now widely in distress. **However the emphasis is on the content with which those patterns are associated and not on the cognitive implications of those patterns** -- as had been highlighted in the initial focus on **isomorphism** in the programme of the now-extinct **Society for General Systems Research**. and its annual journal *General Systems: Yearbook of the Society for General Systems Research*.

In such a context, there is therefore a case for arguing that it is "pay-back time" for disciplines blithely continuing their abstract agendas in circumstances which might benefit from the insights buried in their preoccupations. Whether most disciplines are to be characterized as "stamp collecting" or not, it is clear from the levels of social unrest that people themselves are starting collectively to "stamp" with impatience. Hence the appeal of *Time for Outrage! Indignez-vous!* (2010) by the French diplomat, member of the French Resistance and concentration camp survivor **Stéphane Hessel** -- recognized as a catalyst for the Occupy Movement (*Stéphane Hessel on Occupy Wall Street: find the Time for Outrage when your values are not respected*, *Democracy Now*, 10 October 2011)..

## Disciplines susceptible to fruitful "mining"

This quest for a systematic pattern of "resonant transformations", consistent with common (phatic) intuitions, could be "reversed" by identifying the pattern of disciplines which could be fruitfully "mined" for such metaphors in the light of the argument of Susantha Goonatilake (*Toward a Global Science: mining civilizational knowledge*, 1999) -- whether within one culture or across cultures, as separately discussed (*Enhancing the Quality of Knowing through Integration of East-West metaphors*, 2000).

This "reversal" could be justified by the case made for **"technomimicry"**, on the assumption that such disciplines reflect a degree of "misplaced concreteness" in effectively denying the relevance of their articulation to the "reality" of the psychosocial "universe" -- as discussed separately (*Engendering a Psychopter through Biomimicry and Technomimicry*, 2011).

**The question is then how to "mine" the patterns of abstraction articulated by disciplines in order to extract insights of relevance to the challenges of a world in crisis -- with billions of people faced existentially with "nothing" in various forms.**

In the case of physics, the question is given particular focus by the amazing irony of the times, namely the publicity given to the extremes of abstraction which are a preoccupation of physics, namely:

- **astrophysics**: with credibility given to assertions concerning processes in billions of distant stars and those a fraction of a second after the creation of the universe from a point billions of years ago -- assertions made as though to ensure that scientists of the future will be unable to reframe the relevance of the speculations
- **particle physics**: with credibility given to unproven (and seemingly unprovable) speculations regarding the 10-dimensional nature of matter -- beyond any possibility of comprehensible cognitive engagement. As has been noted, the current status of these recalls the deprecated medieval speculation framed by the question *How many angels can dance on the head of a pin?*

The irony derives from the total lack of relevance of these speculations to any reframing of the challenges of the current global crisis -- exacerbated by academic arrogance regarding that lack of relevance. Are these extremes of preoccupation to be construed as remarkable exercises in escapism by the "best and the brightest" -- fearful of the greater complexity of the psychosocial reality of real people? And yet, as noted above, physics is creatively speculating on the "nothingness" fundamental to these phenomena -- when those speculations might be of relevance to the lives of many faced with "nothing". Is there not a possibility that the patterns of abstraction of astrophysics might in some way inform insight into the "universe of knowledge", as separately explored (*Towards an Astrophysics of the Knowledge Universe? from astronautics to noonautics*, 2006)? In the case of fundamental physics, might those patterns, as applied to development of fusion energy, be of relevance to psychosocial energy (*Enactivating a Cognitive Fusion Reactor: Imaginal Transformation of Energy Resourcing*, 2006)?

Does the nature of the "belief" in the credibility of the speculations of physics offer insights into the nature of "belief" associated with faith-based governance, and the challenges it poses to global governance? Is there a case for a "theology" to encompass all such belief (*Mathematical Theology: Future Science of Confidence in Belief*, 2011)? Do the patterns of abstraction of astrophysics regarding the **evolution of stars** (as mapped by the **Hertzsprung-Russell diagram**) suggest insights into the evolution of belief systems and civilizations - - as well as the eventual demise of "physics"?

A possible set of relevant conceptual disciplines offering ways of "linguaging" such intuitions might then include:

- **optics / electromagnetism**: These could offer means of enhancing and enriching discourse on strategic "vision" and the means of giving it sharper "focus" through more insightful "resolution". With respect to the "vibrations" and "waves" noted in (phatic) discourse, whether felt to be "positive" or "negative", many possibilities are offered, especially in the "light" of widespread insight

into the operation of electronic devices.

A new discipline of [transformation optics](#) has been proposed as an advance in the design of optical devices. It is the basis for conceptualizing complex tools in the electromagnetic regime -- allowing for novel control of light (understood as [electromagnetic waves](#)). The mathematics underpinning transformation optics is similar to the equations that describe how gravity warps space and time, in general relativity. Instead of space and time, however, these equations show how light can be directed in a chosen manner, analogous to warping space.

- **hydrodynamics:** Considerable attention has been given to the [psychology of "flow"](#) as a means of referring to a subtler cognitive engagement with action in many fields of activity -- as notably explored by [Mihály Csikszentmihályi](#) (*Creativity: Flow and the Psychology of Discovery and Invention*, 1996; *Finding Flow: the psychology of engagement with everyday life*, 1996; *Good Business: leadership, flow, and the making of meaning*, 2003; *Flow in Sports: the keys to optimal experiences and performances*, 1999). Arguments of relevance to strategic management have been developed by [Edward de Bono](#) (*From Rock Logic to Water Logic*, 1992). Also of relevance are the explorations of [Douglas Hofstadter](#) (*Fluid Concepts and Creative Analogies: computer models of the fundamental mechanisms of thought*, 1995) and those of [Viktor Schauberger](#) as discussed separately (*Enabling Governance through the Dynamics of Nature: exemplified by cognitive implication of vortices and helicoidal flow*, 2010). What further insights might [fluid dynamics](#) offer -- especially in the light of those of [magneto-hydrodynamics](#) as the multi-disciplinary study of the flow of electrically conducting fluids in electromagnetic fields (as with [plasma](#) in fusion reactors)?
- **thermodynamics:** Widespread metaphoric use of "heat" is employed to frame insight into psychosocial relations. This was most evident in the case of the Cold War, but continues to be used to refer to the "cooling" of relationships between individuals or countries. Corresponding use is made of "heat" -- even to the "boiling point" associated with social unrest. The metaphor was used by [Marshal McLuhan](#) in distinguishing "hot" and "cool" media. Welcoming relationships and contexts are commonly described as "warm". Despite the importance of engendering "warmth" in many settings, little attention has been given to the insights which [thermodynamics](#) may offer to that end through [social thermodynamics](#) -- especially in the light of the fundamental laws of thermodynamics.

Such possibilities are a primary concern of the online [Encyclopedia of Human Thermodynamics, Human Chemistry and Human Physics](#), which includes a number of references to metaphorical usage ([Metaphor Project](#)) -- but without any emphasis on the implied cognitive engagement of concern to this argument. As the scope of that Encyclopedia indicates, disciplines such as physics (notably in the form of quantum mechanics) and chemistry can be "mined" for fruitful metaphors.

In the case of the former, this is evident in explorations of [quantum consciousness](#), whilst in the latter it is evident in frequent allusions to the "chemistry" of relationships, including references to "bond" and occasionally to "valency". A case can even be made for exploring the [periodic table of chemical elements](#) as a complex metaphor in its own right (*Periodic Pattern of Human Knowing*, 2009; *Periodic Pattern of Human Life*, 2009; *Tuning a Periodic Table of Religions, Epistemologies and Spirituality: including the sciences and other belief systems*, 2007).

Another approach to "mining" is to identify and compare contrasting patterns of concepts (*Patterns of Conceptual Integration*, 1984; *Examples of Integrated, Multi-set Concept Schemes*, 1984).

## Confrontation of alternative mappings

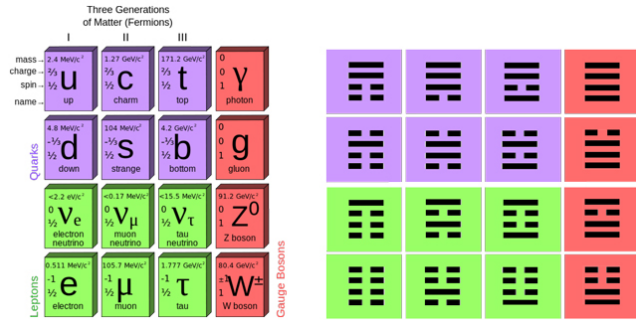
As noted above, with respect to the argument in the paper of which this is effectively an annex (*Way Round Cognitive Ground Zero and Pointlessness: embodying the geometry of fundamental cognitive dynamics*, 2012), the quest is for richer ways of handling the contrasts between openness and closedness in a context in which global strategy is being determined and undermined by the logic of "you're either with us, or against us", as discussed separately (*Us and Them: Relating to Challenging Others*, 2009).

Denoting the distinction between closedness and openness by the "full" and "broken" line structure of the encoding in the Chinese classics, combinations of such lines could be used to reflect the pattern of distinctions of the standard model. This offers a means of associating a pre-eminently Western pattern with one central to an Eastern tradition, embodied by a culture of increasing global significance.

Of relevance to this discussion is the extent to which metaphor is explicitly associated with the Chinese encoding -- as with the 64 hexagrams of the *I Ching*, and the 81 tetragrams of the *Tao Te Ching* and of the *T'ai Hsüan Ching* (*T'ai Xuán Jing*). Such metaphor is evident in the effort to associate a comprehensive integrative engagement with features of familiar experience by which global governance is notably challenged, whether psychosocial relationships, environmental categories ("earth", "air", "fire" and "water"), or especially their interrelationships. The approach is also relevant to the above argument in that traditionally such patterns are associated with clarifying the relationship between "Earth" and "Heaven". Such a speculative venture follows from a separate argument (*Beyond the Standard Model of Universal Awareness*, 2010). Meriting careful attention are the many correspondences explored in the work of [Frank Dodd Smith, Jr.](#) (*McKay Correspondence between Physical World and Mental World* 2010)

The following figure positions a complete set of tetragrams such as to correspond to the pattern of the standard model of particle physics -- notably presented as a simple "box", in the light of the concern here with geometrical metaphors. Although the pattern of tetragrams has a degree of internal coherence corresponding to that of the standard model, as a tentative exercise it is merely designed to encourage reflection on any more appropriate ordering. The order of rows and/or columns could be changed -- as was done in a second iteration, when columns 2 and 4 were switched to approximately more closely to the criterion of a magic square (as discussed below).

**Fig. 1: Correspondence between distinctions of the standard model and a pattern of tetragrams**



There are six **quarks** (up, down, charm, strange, top, bottom), and six **leptons** (electron, electron neutrino, muon, muon neutrino, tau, tau neutrino). Pairs from each classification are grouped together to form a **generation**, with corresponding particles exhibiting similar physical behaviour. The **gauge bosons** are defined as **force carriers** that mediate the strong, weak, and electromagnetic **fundamental interactions**. What might such distinctions, and their powerful integration, then suggest with respect to the configuration of psychosocial patterns?

The different types of gauge bosons include:

- **photons** mediate the electromagnetic force between electrically charged particles. The photon is massless and is well-described by the theory of **quantum electrodynamics**.
- the **W<sup>+</sup>, W<sup>-</sup>, and Z** gauge bosons mediate the **weak interactions** between particles of different flavours (all **quarks** and leptons). They are massive, with the Z being more massive than the W<sup>±</sup>. The weak interactions involving the W<sup>±</sup> exclusively act on *left-handed* particles and *right-handed* antiparticles only. Furthermore, the W<sup>±</sup> carries an electric charge of +1 and -1 and couples to the electromagnetic interaction. The electrically neutral Z boson interacts with both left-handed particles and antiparticles. These three gauge bosons along with the photons are grouped together, as collectively mediating the **electroweak** interaction.
- the eight **gluons** mediate the **strong interactions** between **color charged** particles (the quarks). Gluons are massless. The eightfold multiplicity of gluons is labeled by a combination of color and anticolor charge (e.g. red-antigreen). Because the gluon has an effective color charge, they can also interact among themselves. The gluons and their interactions are described by the theory of quantum chromodynamics.

## Metaphorical interpretation

The tetragrams presented above constitute an abstract encoding of distinctions in their own right, independent of any metaphoric interpretations which could be associated with them. The experiment can however be extended by noting the metaphors used in commentaries on the implications of the tetragrams in the larger sets from which they are derived, notably the *T'ai Hsüan Ching (T'ai Xuán Jing)*. Only the 16 tetragrams with complete lines, or lines with a single gap, were included (omitting the 65 in the set with a double gap).

<b>Fig. 2: Association of names and commentary with the pattern of tetragrams above</b> Names of the numbered tetragrams in the sequence of the <i>T'ai Hsüan Ching</i> are given with a line of commentary, as separately discussed ( <i>9-fold Magic Square Pattern of Tao Te Ching Insights</i> , 2006).								
84	<b>Differences</b> between the numbers in the neighbouring coloured cells in the table are given in the intervening rows and columns. <b>Totals</b> of the numbers in the coloured cells are given on the right and below. The totals for the coloured cells on the <b>diagonal</b> are given in the top right and left hand corners of the table.					84		
	Lessening: Engendering through complementarity <b>(keeping small)</b> (5)	3	Surrounding: Engaging without engaging <b>(full circle)</b> (2)	2	Obstructing: Having been there; having done that <b>(barrier)</b> (4)	3	Centering: Journeying through unnamings the myriad patterns of the past <b>(center)</b> (1)	12
	27		27		27		27	108
	Multiplying: Knowing when to cease making essential distinctions <b>(legion)</b> (32)	3	Severing: Doing "nothing" to the world <b>(decisiveness)</b> (29)	2	Pretending: Using weapons, when there is no choice, with a calm, still mind <b>(packing)</b> (31)	3	Changing: Knowing the other, and retaining one's identity and quality <b>(change)</b> (28)	120
	18		18		18		18	72
	Focusing: Living the present <b>(penetration)</b> (14)	3	Mistaking: Benefiting from what is not <b>(divergence)</b> (11)	2	Increasing: Governing others appropriately <b>(increase)</b> (13)	3	Praising: Centering through learning <b>(defectiveness / distortion)</b> (10)	48

	27		27		27		27	108
	Befitting: Understanding appropriateness (response) (41)	3	Abounding: Abiding in letting go and doing nothing (fullness) (38)	2	Regulating: Returning from weakness (law / model) (40)	3	Encycling: Self-organizing of myriad things (purity) (37)	156
	92	12	80	8	88	12	76	336

## Magic square symmetry

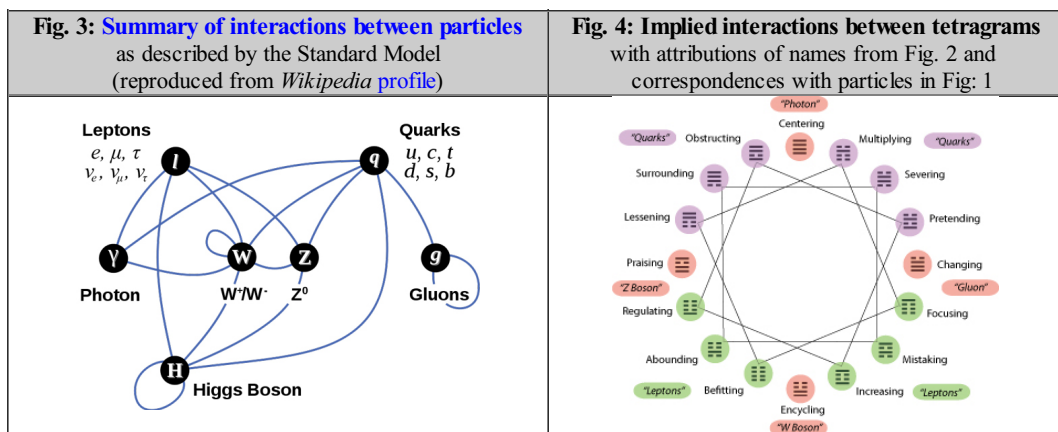
Use is made of the pattern of numbers to ensure an enhanced connectivity and integration to that pattern -- consistent with that sought through the [mathematics of the standard model for physics](#). The pattern conforms only partially to the mathematical requirements for a so-called [magic square](#). However the above pattern does have features of interest in relation to the more extensive consideration of all 81 tetragram encoded insights (*9-fold Magic Square Pattern of Tao Te Ching Insights -- experimentally associated with the 81 insights of the Tai Hsüan Ching*, 2006). Specifically, the set of cells in each row occupies a unique position in a [magic square presentation](#) (made up of 9 nested tables, each of 9 cells) in the latter document.

The relevant question however is whether the above pattern of "metaphors", or its nesting within a larger pattern, is suggestive of meaningful "stories" and learning pathways of relevance to real-world decision-making. The classic Chinese texts from which it is derived are esteemed for that reason. Treated as patterns enabling comprehension, the standard model offers a detailed description whose meaning in practice is elusive.

It is however ironic that the quarks are currently distinguished metaphorically by so-called [flavors](#) (including [charm](#) and [strange](#)), with some originally named "[beauty](#)" and "[truth](#)". Due to a phenomenon known as [color confinement](#), quarks are never directly observed or found in isolation. The aspiration of physics is effectively to enclose these subtle patterns within a cognitive "box". This avoids consideration of the openness with which people are able to "resonate". No proposal was made to name a quark "freedom". The effort to relate real-world language to fundamental patterns of relevance to psychosocial processes, through extensive use of metaphor, therefore merits consideration.

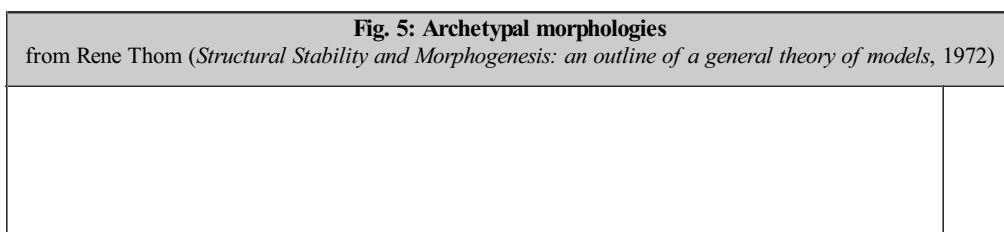
## Pattern reconciliation?

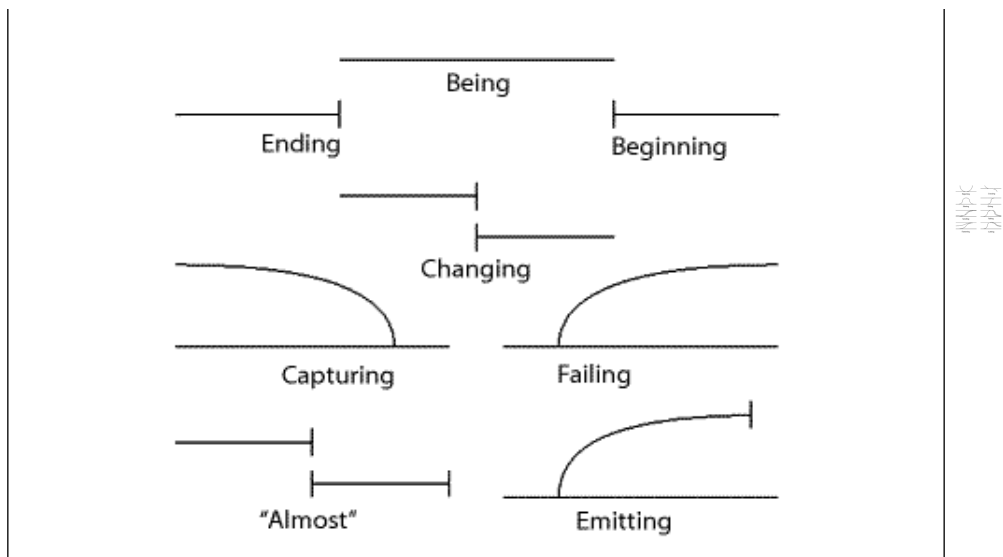
In the light of the above argument, any effort to engage cognitively with reconciling both the closure (implied by the geometry) and the openness to process (implied by metaphoric allusion) would seem to call for an attitude usefully expressed metaphorically by "flirtation", or perhaps by that celebrated in *The Horse Whisperer* (1998). Exploration of the semantic associations might be understood as resembling the arts of poetry-making or tuning a musical instrument, as separately discussed (*Tuning a Periodic Table of Religions, Epistemologies and Spirituality: including the sciences and other belief systems*, 2007; *Poetry-making and Policy-making: arranging a marriage between Beauty and the Beast*, 1993). The argument acquires greater credibility by citing the well-known fascination for drumming of the physicist [Richard Feynman](#) (Jagdish Mehra, *The Beat of a Different Drum: the life and science of Richard Feynman*, 1994) -- in total contrast, as mentioned above, to that associated with physicist Alan Sokal.



## Archetypal morphologies

In this spirit it is appropriate to note the pattern of 16 fundamental "archetypal morphologies" in the figure below, as identified by topologist Rene Thom. Of specific relevance are the "metaphorical" terms, by which he briefly describes the nature of each, in comparison to the labels of a number of the tetragrams in the pattern above of Chinese origin (see also Wolfgang Wildgen, *Catastrophe Theoretical Semantics: an elaboration and application of Rene Thom's theory*, 1982).





## Catastrophic questions

Thom is especially renowned for his related work on [catastrophe theory](#) and [morphogenesis](#). Following initial enthusiasm, catastrophe theory was the focus of controversy and fell out of favour for a period, but as noted by [Floris Takens](#) (*The Work of Professor Sir Christopher Zeeman FRS*, Nieuw Archief voor Wiskunde, 1993) in the introduction by [Wolfgang Wildgen](#) to a recent compilation reviewing Thom's work and its implications (Per Aage Brandt and Wolfgang Wildgen, *Semiosis and Catastrophes: Rene Thom's semiotic heritage*, 2010):

Exaggerating somewhat, one can say that where applied mathematics used to be confined to investigate the equations, and their solutions, given by the accepted mathematical models, for the different phenomena, the work of Zeeman showed a much more liberal attitude towards the choice of these models. In this sense he paved the way for abstract parts of mathematics to the applications. (p. 256)

With respect to the above argument, it might be asked whether the relation between descriptive "geometry" and experiential "resonance" processes can be usefully understood in terms of catastrophes and the nature of the questions they evoke. Then "questions" (and the associated experience of doubt and uncertainty) might be related more closely to process, with "answers" formulated in terms of geometry, following the "collapse" of the "doubt function" (*Cognitive Feel for Cognitive Catastrophes: question conformality*, 2006).

An effort was made separately to explore the relation between the 7 so-called "WH-questions" and Thom's 7 elementary catastrophes, notably with reference to the above archetypal morphologies (*Correspondence of WH-questions to elementary catastrophes*, 2006). With respect to the approach taken here, it is appropriate to note the (necessarily) controversial appreciation of Thom's methodology (David Aubin, *Forms of Explanations in the Catastrophe Theory of Rene Thom: Topology, Morphogenesis, and Structuralism*, 2004).

Given the importance of attitude change with respect to global governance, it is relevant to note the remark of Han L. J. van der Maas, Rogier Kolstein and Joop van der Plicht (*Sudden Transitions in Attitudes, Sociological Methods and Research*, 2003):

The dynamical system approach is the subject of increasing interest in psychology in general... Zeeman (1976) introduced catastrophe theory in psychology and also formulated the specific hypothesis that (attitude) change can be described by catastrophe theory (Thom 1972; Poston and Stewart 1978; Gilmore 1981; Castrigiano and Hayes 1993). This hypothesis implies that smooth changes in independent or control variables may lead to abrupt, discontinuous changes in attitudes.... Catastrophe theory provides a way to model and test transitions in attitudes.

Further credibility to an approach of this nature is offered by the work of Hector Sabelli and Gerald H. Thomas (*The Future Quantum Computer: Biotic Complexity*, 2008) who argue:

Some forms of opposition, including negation, may be modeled by catastrophes. Thom's catastrophes provide a good starting point to go beyond the standard "and" and "or" gates. First, according to Thom's theorem, we need to consider only a few control forms. The limited number of archetypal morphologies that Thom identified is assumed to be universal. Certainly forms are created and constrained by physical factors that also extend across the chemical, biological, social, and psychological domains. We may apply this concept to logical statements. Second, it is good starting point because catastrophe forms appear in the study of choice... Third, Thom... and others have already explored how catastrophes can be used to model active verbs representing actions, as contrasted to Boolean logic that only models the non-active copula "to be." Thom give a constructive and a destructive interpretation to each catastrophe. For instance, the fold represents to begin and to end; the cusp represents to engender or unite and to capture and to break; the butterfly represents to give and to receive, as well as to exfoliate.

Sabelli and Thomas conclude:

In summary, we outline a new approach that adapts the logic of the computer to the logic of nature as embodied by both quantum computing devices and by natural and human processes. Regarding quantum physics as the fundamental logic of nature demands to consider its theory as logical principles. To find a logical interpretation to quantum principles may thus not be regarded as a proposal, or a matter of choice, but is a task to be accomplished. While we are far from attaining it, such goal can be reached. The continuity of evolution requires that the same fundamental forms must be expressed at all levels of organization, so the principles of quantum physics and the principles of rational thinking must be homologous.

## Cognitive identification with boundary logic?

There is a rich literature variously associating the work of [George Spencer-Brown](#) (*Laws of Form*, 1969) -- and his calculus of indications, other wise known as "boundary algebra", with that of [Charles Peirce](#) on [Alpha Existential Graphs](#) (S. Shin, *The Iconic Logic of Peirce's Graphs*, 2002). As argued by [William Bricken](#) (*Syntactic Variety in Boundary Logic*, 2006) in developing this approach:

*Boundary logic* is a formal diagrammatic system that combines Peirce's Entitative Graphs with Spencer Brown's Laws of Form. Its conceptual basis includes boundary *forms* composed of non-intersecting closed curves, *void substitution* (deletion of irrelevant structure) as the primary mechanism of reduction, and *spatial pattern-equations* that define valid transformations. Pure boundary algebra, free of interpretation, is first briefly described, followed by a description of boundary logic.... These new diagrammatic languages for logic convert connectives into configurations of containment, connectivity, contact, conveyance, and concreteness....

Each of these notations provides potential new tools for Cognitive Science and for Computer Science. The structure of each notation suggests unexplored models of how we might read, analyze, manipulate, compute with, and think about deductive logic. The notations also suggest a wide diversity of data structures and algorithms for both hardware and software implementation of logic.

In summary, Bricken concludes:

Algebraic formulation of Peirce's original Entitative Graphs provides a plethora of diagrammatic languages for logic. Diverse geometric and topological transformations of the spatial syntax result in several distinctly different two- and three-dimensional representations, all using the same three abstract pattern-equations to achieve form reduction. Underlying these syntactic varieties is a new set of mathematical concepts: void-equivalence, variary operators, boundary semipermeability, spatial pattern-equations. That our familiar conversational logic and our formal typographic logic can both be rendered in a variety of structurally simpler diagrammatic and experiential representations raises interesting questions for cognitive science. How would a newly acquired ability to visualize or to physically manipulate logical form influence the quality of logical reasoning? More challenging, though, are the unfamiliar formal concepts that do not map onto conventional logic.

Bricken's argument is not explicitly related to that on Thom's archetypal morphologies although such a relation would seem to be "logical", especially in the light of the fundamental categories identified and given diagrammatic form. However, of greater relevance to the argument here is the seeming lack of consideration of how people engage experientially with the language articulated -- avoiding understandable criticism regarding the irrelevance of "bloodless categories". Also of relevance is the apparent lack of interest in applying such an approach to the relationships between the disciplines and their preoccupations. To whom does the approach make "sense" and for whom is it "nonsense"?

***NB: See separate presentation of relevant [bibliographical references](#).***



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