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Imagining Order as Hypercomputing

Operating an information engine through meta-analogy

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Introduction

For 75 years, computers have worked within limits defined by the mathematician [Alan Turing](#) -- although he had also foreseen the possibility of a form of universal computing machine. A recent report draws attention to new investigations into the possibility of such a machine -- one that can solve the unsolvable ([Michael Brooks](#), *Turing's Oracle: the computer that goes beyond logic*, *New Scientist*, 16 July 2014). As the editorial notes:

We already have machines that answer our questions in ways we can't fully appreciate: from quantum computers, whose physics remain opaque, to data-crunching black boxes that translate languages and recognise faces despite knowing nothing of grammar or physiology... Turing showed that any computer predicated on human logic alone will struggle with the same questions we do... But **Turing also conceived of an "oracle" that might transcend these limitations**... Conventional computers give us the answers to questions that we can articulate... Turing's oracle could address issues we can't even articulate... *[emphasis added]*

As noted by Brooks:

In his short life Turing never tried to turn the oracle into reality. Perhaps with good reason: most computer scientists believe **anything approximating an oracle machine would soon fall foul of fundamental restrictions on how information and energy flow in the universe**. You could never actually make one.... two researchers are now seeking to prove the sceptics wrong. Building on theoretical and experimental advances of the past two decades, [Emmett Redd](#) and [Steven Younger](#)... think a "super-Turing" computer is within our grasp. With it could come insights not just into the limits of computation in the cosmos, but into the most intriguingly powerful computer we know of within it: the human brain. *[emphasis added]*

Those researchers, in collaboration with [Hava T. Siegelmann](#), are focusing on experimenting with chaotic [neural networks](#) as a basis for the physical construction of such a computer (*Computing by Means of Physics-Based Optical Neural Networks*, 2010; *Development of Physical Super-Turing Analog Hardware*, 2014).

By contrast, the exploration which follows exploits the chaotic neural networks of the writer in an effort to imagine the functioning of such an oracular process. The assumption is that in some respects, as yet to be "re-cognized", the brain is such a "super-Turing" computer -- and is indeed potentially capable of "going beyond logic" to "address issues we can't even articulate". One indication, for example, is provided by reports of the renowned ability of [Nikola Tesla](#) to perform highly technical experiments in memory (Felix T. Hong, *Tesla and Creativity: hidden messages from his life*, 2010). The discussion is empowered through recognition of the role of meta-

analogy in creative imagination by [Douglas Hofstadter](#) and [Emmanuel Sander](#) (*Surfaces and Essences: analogy as the fuel and fire of thinking*, 2013)

Given the only too evident poverty of response to global issues framed by conventional computer-enhanced logic, there is every justification for speculating on how a new form of thinking might engage more effectively with the chaotic reality of the times ([Edward de Bono](#), *New Thinking for the New Millennium*, 2000; [Richard A. Slaughter](#), *New Thinking for a New Millennium: the knowledge base of futures studies*, 1996).

There is a certain poignancy in exploring what Turing imagined might exist, given the tragedy of his own life and the manner of his death in 1954. It could be said that he embodied remarkably the application of a particular mode of intelligence which enhanced immeasurably the capacities of conventional thinking. However, through the response of UK authorities (described by one Prime Minister as "appalling") to his unconventional sexuality -- necessitating his [chemical castration](#) -- he also embodied alternatives which continue to challenge such thinking. Thus, in championing the possibilities of a binary reality, he also tragically demonstrated its limitations.

It required special UK legislation to enable Queen Elizabeth II to grant a posthumous [royal pardon for Turing's conviction for gross indecency](#) on 24 December 2013. The UK Justice Secretary then indicated that he deserved to be "remembered and recognised for his fantastic contribution to the war effort" and not for his later [criminal conviction](#). It might be asked whether the future will see fit similarly to pardon the institutions and leaders of this period for their humanitarian "effort" -- despite later recognition of their hideous crimes against humanity in failing to engage imaginatively with the problems of their times, even to the extent of effectively "castrating" each other.

The editorial introduction to the possibility of Turing's Oracle by the *New Scientist* is framed with a reference to the widely known "ultimate computer" ([Deep Thought](#)) imagined by [Douglas Adams](#) to have been constructed by pan-dimensional, hyper-intelligent species of beings to answer *The Ultimate Question of Life, the Universe, and Everything*. It is in that imaginative spirit that the following exploration is undertaken.

The concern follows from earlier explorations (*Transcending Simplistic Binary Contractual Relationships*, 2012; *Marrying an Other whatever the Form Reframing and Extending the Understanding of Marriage*, 2013; *Discovering Richer Patterns of Comprehension to Reframe Polarization*, 1998; *Epistemological Panic in the face of Nonduality*, 2010). It lies beyond what might otherwise be expected of the [global brain](#) (*Simulating a Global Brain*, 2001) or [supercomputers](#) (*Superquestions for Supercomputers*, 2010).

Paradoxical locus of nonlocal oracular hypercomputing

In a special issue of the *New Scientist* on [What is reality](#), an introduction by Michael Brooks (*Reality: a universe of information*, 3 October 2012) argues:

Whatever kind of reality you think you're living in, you're probably wrong. The universe is a computer, and everything that goes on in it can be explained in terms of information processing.

The connection between reality and computing may not be immediately obvious, but strip away the layers and that is exactly what some researchers think we find. We think of the world as made up of particles held together by forces, for instance, but quantum theory tells us that these are just a mess of fields we can only properly describe by invoking the mathematics of quantum physics.

That's where the computer comes in, at least if you think of it in conceptual terms as something that processes information rather than as a boxy machine on your desk. *Quantum physics is almost phrased in terms of information processing.*

In the same *New Scientist* special issue, [Mike Holderness](#) asks *Reality: how can we know it exists?* (1 October 2012):

Philosophers are not being rude when they describe the approach most of us take as naive realism. After all, when they cross the street on the way to work, they tend to accept implicitly -- as we all do -- that there is an external reality that exists independently of our observations of it. But at work, they have to ask: if there is, how can we know? In other words, the question "what exists?" reduces, for what in philosophy passes for practical purposes, to questions such as "what do we mean by 'know'?"

Separately Brooks indicates that some theories hold that reality and consciousness are one and the same. He asks: Is the universe really all inside your head?

Construction? It is appropriate to challenge as a possible illusion the sense in which an oracular computer is considered as being located somewhere. The language used by Brooks in his helpful overview is unfortunate in that he focuses on the possibility of constructing it -- in a manner consistent with conventional technological development. The metaphor is also questionably used in a much-cited phrase in the preamble to the [Constitution of UNESCO](#): *since wars begin in the minds of men, it is in the minds of men that the defences of peace must be constructed.*

The use by Brooks of being "within our grasp" could also be symptomatic of issues in understanding its nature, as argued separately (*Beyond Harassment of Reality and Grasping Future Possibilities: learnings from sexual harassment as a metaphor*, 1996). The sense in which neural networks are currently considered as a key to oracular hypercomputing is of particular significance in that such networks are designed to "learn" of their own accord rather than to be "taught" -- as is characteristic of conventional computer programming and other approaches to artificial intelligence.

One fruitful challenge to "building it" is offered with respect to the construction of a spaceship by science fiction writer [Michael Foster](#) (*The Gameplayers of Zan*, 1977). He imagined that building it would require "flying it", through game-playing -- in order to "keep it in place" while it was being constructed. Such a framing would engage the understanding of newer generations nourished by online gaming.

Nonlocality: There is sufficiently widespread consideration of the paradoxes of [quantum nonlocality](#) in relation to [quantum computing](#) to suggest that a hypercomputer would be as much "here" as "there". A [quantum Turing machine](#) (QTM), or universal quantum computer, is an abstract machine used to model the effect of a quantum computer. It provides a very simple model which captures all of the power of quantum computation. In that mode consideration is also given to a [universal Turing machine](#) distinct from the oracular variant. In complexity theory and computability theory, an [oracle machine](#) is an abstract machine used to study decision problems. It is visualized as a Turing machine with a black box (called an oracle) which is able to decide certain decision problems in a single operation -- even [undecidable problems](#). There is also recognition of a [hypercomputer](#) as referring to models of computation that go beyond Turing computability, or are incomparable to it.

As explained by [Stephen Blaha](#) (*The Metatheory of Physics Theories and the Theory of Everything as a Quantum Computer Language*, 2005):

The language of the Standard Model is a quantum type 0 computer language. A Chomsky type 0 language requires a Turing machine to handle its productions. Because particle transitions are quantum and because the left side of a production rule can have several possible right sides -- for example, a photon can transition to an electron-positron pair, a quark-anti-quark pair and so on -- the Turing machine for the Standard Model language must be a non-deterministic Quantum Turing Machine. It must accept a non-deterministic language (p. 35)

Such disparate considerations are however less than helpful to the imaginative opportunity that merits the exploration here. Rather than use "oracle" or "oracular" here as qualifications on "computer" or "hypercomputer", for simplicity another sense is attributed to hypercomputer in the following argument.

In the cloud? From an imaginative perspective, the answer to any question as to "where" such a hypercomputer might be located is best framed by how imagination works in relating "here" and "there", from moment to moment. This could be described in terms of shifts of perspective from "here" to "there" -- with the sense of "there" being transformed into one of "here", possibly to be reversed in a process of alternation or through a periodic cycle.

Intimations of this understanding are evident in [cloud computing](#) -- as now widely implemented. Its main enabling technology is [virtualization](#), whereby software allows a physical computing device to be electronically separated into one or more "virtual" devices. Each of these can be easily used and managed to perform computing tasks. The question here is whether there is a cognitive analogue to such virtualization. For the individual this may well be presaged by current techniques of enabling individuals through a [personal cloud](#).

Other relevant metaphors -- possibly to be understood as cloud-related -- are provided by dancing, through the pattern of shifting positions which may be variously imagined and embodied. Widespread use of psychoactive drugs could also be considered in this light.

What? Similarly, from an imaginative perspective, the answer to any question as to "what" such a hypercomputer might be is best framed by the question "what can it be imagined to be" -- again perhaps shifting from moment to moment. An indication is offered by the classic study by [Gareth Morgan](#) (*Images of Organization*, 1986) whereby "what" is understood metaphorically in terms of eight possibilities: machines, organisms, brains, cultures, political systems, psychic prisons, flux and transformation, and instruments of domination.

Any particular understanding could then be fruitfully challenged with the Sanskrit adage: *Neti Neti* (not this, not that) -- perhaps to be understood through the process suggested by use of [Edward de Bono's Six Thinking Hats](#) (1985), as subsequently generalized (*Six Frames For Thinking About Information*, 2008).

Engendering oracular hypercomputing through investing significance

Potential existence: Such pointers suggest that in many respects a hypercomputer "exists" by being variously imagined into existence -- possibly ceasing to exist when attention is not invested in it, as partially explored separately (*Investing Attention Essential to Viable Growth: radical self-reflexive reappropriation of financial skills and insights*, 2014). It could fruitfully be understood as existing "potentially" (*Wanted: New Types of Social Entity: the role of the "potential association"*, 1971). This would be consistent with thinking regarding [atomic orbitals](#) and the possibility of [atomic electron transition](#) between quantum states -- some of much lower probability.

Growing? Rather than use of the building metaphor (noted above), understood as having engendered the global urbanized society as it now recognized, there is a case for "re-cognizing" the organic process of growing as a fruitful metaphor -- especially appreciated by gardeners -- and as discussed elsewhere (*Flowering of Civilization -- Deflowering of Culture: flow as a necessarily complex experiential dynamic*, 2014)

In recent decades there has been a focus on [ecovillages](#). Of related interest is the effort to create and cluster ecosteries as "loved places where ecological values, knowledge and wisdom are learned, practiced and shared" as sacred, respected and honored dwelling places. Ecostery principles and values are oriented toward harmony with nature (*Reimagining Principles Enabling an Existential Ecostery: engendering out-of-the-box awareness and its transformation*, 2013)

As a metaphorical framework, growing serves to highlight the traditional recognition of the vital role of [crop rotation](#) -- suggesting consideration of cognitive analogues (*Sustainable Cycles of Policies: crop rotation as a metaphor*, 1988). A similar point could be made with respect to the processes of [permaculture](#) -- suggesting the possibility of some form of "cognitive permaculture" (Connor Spears,

Cognitive Permaculture: an introduction to the mental processes involved in sustainable learning gardens, 2013).

Sacred places: A quite different approach to such understanding is potentially offered by **places upheld or experienced as sacred**, most notably Jerusalem (see *Wikipedia Holy city list*, *List of religious sites*, *List of shrines*).

In such a case emphasis is placed on the manner in which there is investment in that "re-cognition". In its absence, that oracular function then ceases to "exist" as an experiential reality -- or exists only potentially. A similar question might be asked of Stonehenge or other places of pilgrimage.

The question could also be asked of the United Nations or the so-called **international community**. Are they, if only potentially, a hypercomputer? This framing helps in highlighting the nature of "where" a hypercomputer may exist. The nature and extent of "existence" is also of relevance with respect to strategy (*Cultivating Global Strategic Fantasies of Choice*, 2010).

A much older tradition ensured the construction of sacred gardens in association with temples (notably in India and Japan), with an estimated 25,000 sacred groves and other sanctified ecosystems in Rajasthan alone, usually associated with a spring or water source. In landscapes ravaged by humans, such zones are proving to be vital to the preservation and renaissance of biodiversity. Can such places also be usefully "re-cognized" as constituting a hypercomputer?

Degrees of existence: To the degree to which it is imagined or **enacted**, there is then a sense that **a hypercomputer may well be working currently, necessarily unrecognized** -- but typically only momentarily whilst investment of attention in it is sustained. This is clearly a provocative internal possibility for an individual, as well as being a provocative possibility for what are conventionally understood to be externalities. However cloud computing already offers a sense of this, as noted above.

The potential range of quantum states framed by thinking on atomic orbitals is also suggestive of the extent to which a hypercomputer might variously "exist", but to a lesser or greater degree. Future creativity may be capable of enacting such computers to a degree beyond current imagination, especially with more profound understanding -- through reframing use of the orbital metaphor (*Beyond the Standard Model of Universal Awareness: Being Not Even Wrong?* 2010).

Given its problematic role in global dynamics, Jerusalem can be usefully explored as a hypercomputer in its own right -- perhaps complexifying the metaphor in the light of **molecular orbital theory**, given its significance for three religions (and their various denominations). So framed, it raises the question as to how and when the possibility of **misplaced concreteness** can be fruitfully raised. If the hypercomputing function is of far greater subtlety than the concrete physical reality, how is that subtlety to be "re-cognized"?

When is it useful to see the concrete reality as a questionably frozen dynamic, possibly better understood in terms of a **standing wave**? This question could be raised with respect to relics in general. How and when should they be honoured? How and when should such "re-cognition" be challenged -- as was only too evident in the response of the Taleban and ISIS to the shrines of other religions, or in the case of the Catholic Church in centuries past (with respect to whatever was previously considered sacred)?

How should sacred memorials -- reminders of the hypercomputing function -- be "re-cognized" in terms of nonlocality? As queried above, is asking where or when they are located better understood as fundamentally inappropriate to the essential nature of hypercomputing? Where is "Jerusalem" -- in spacetime? Are conventional answers offered through what could be usefully deprecated as a process of **dumbing down**?

Necessary impossibility of explaining oracular hypercomputing

This text could well be interpreted as an explanation of the nature of hypercomputing. However, as with the scepticism of most computer scientists (as noted above): **"anything approximating an oracle machine would soon fall foul of fundamental restrictions on how information and energy flow in the universe"**. This applies very particularly to the fundamental restrictions on how insight and creativity are engendered and flow in the knowledge universe -- namely to the process of explanation itself and to the uptake of insight, especially collectively

Anecdote?: Much attention has recently been given to the articulation by **Jonah Lehrer** (*Imagine: how creativity works*, 2012). He usefully notes:

The sheer secrecy of creativity -- the difficulty in understanding how it happens,, even when it happens to us -- means that we often associate breakthroughs with an external force. In fact,, until the Enlightenment, the imagination was entirely synonymous with higher powers: being creative meant channeling, the muses, giving voice to the ingenious gods... Because people could't understand creativity, they assumed that the ideas came from somewhere else. The imagination was outsourced (p. xvi)

Lehrer argues that imagination can indeed be rigorously studied with the aid of brain scanners and neuronal excitement:

The imagination can seem like a magic trick of matter -- new ideas emerging from this air -- but we are beginning to understand how the trick works. The first thing this new perspective makes clear is that the standard definition of *creativity* is completely wrong... Instead *creativity*, is a catchall term for a variety of distinct thought processes... But just because we've begun to decipher the anatomy of the imagination, does'nt mean we've unlocked its secret. In fact, this is what makes the subject of creativity so interesting: it requires a description from multiple perspectives. (p. xvii-xviii).

He concludes his introduction by arguing that creativity should not be thought of as a process reserved for "creative types":

The human mind, after all, has the creative impulse built into its operating system, hard-wired into its most essential programming code. At any given moment, the brain is automatically forming new associations, continually connecting an everyday X to an unexpected Y. This book is about how that happens. It is the story of how we imagine. (p. xx).

The book offers a multitude of inspiring accounts of creativity in action -- from which many may derive insight. The sobering reservation is that somehow these cannot be effectively brought to bear on the most problematic conditions -- such as the Israel-Gaza situation, ISIS, Syria or Ukraine -- to name but a few at the time of writing. This would suggest that, **as they tend to be described, imagination and creativity are inadequate to more fundamental challenges**, despite the number of creative, imaginative people claiming to be concerned with such matters.

Analogy and meta-analogy?: In contrast to the work of Lehrer, a much more substantive study has been produced by [Douglas Hofstadter](#) and [Emmanuel Sander](#) (*Surfaces and Essences: analogy as the fuel and fire of thinking*, 2013). This focuses on the manner in which creativity and imagination are enabled by analogy and metaphor. In their conclusion, following extensive comment on the creativity of Albert Einstein, rather than conceiving of science as "advancing solely through quasi-magical mental processes that are unlikely ever to be explained", they frame their endeavour as follows:

We have, rather, tried to show that the sudden bolts from the blue that change the face of physics are invariably analogies, often even "tiny" analogies -- that is, leaps that seem obvious once they have been pointed out... a contemporary of Johann Sebastian Bach once said that "as soon as Bach heard a theme, he was very quickly able to imagine all its consequences"... It would thus seem that this ability to "imagine all the possibilities" in a very short time lies close to the core of human creativity at its highest levels.... Thus, the most most advanced breakthrough of Einstein's life came out of an analogical leap that was analogous to another analogical leap -- thus an analogy between analogies, or, if you will, a meta-analogy.

Unfortunately, despite the focus by these and other authors, there emerges a sense of a situation as so admirably described by the classic outburst of Jack Nicholson in *As Good as It Gets* (1997): *I am drowning here, and you're describing the water.*

Under the present circumstances of constrained decision-making, the difficulty is further highlighted by Lehrer's earlier book (*How We Decide*, 2009). Both his books have been withdrawn by their original publishers following [considerable controversy](#) -- ironically due to his having allegedly imagined some of his illustrative accounts.

Curiously neither Lehrer nor Hofstadter refer to the earlier work by [Arthur Koestler](#) (*The Act of Creation*, 1964). This is a study of the processes of discovery, invention, imagination and creativity in humour, science, and the arts. *Sic transit creator?*

*** trapped into explaining

Non-realism?: [Hilary Lawson](#) (*The Poetic Strategy*, 2008) discusses how a range of "non-realist" authors (Nietzsche, Heidegger, Wittgenstein, Derrida, Rorty) have reached somewhat similar conclusions -- as contrasted with the perspective of "realists" variously convinced of the possibilities of explanation. In Lawson's terms:

Describing the world is a strangely perplexing process. It feels as if it should be effortless, but the more closely we seek to say how things are the more we uncover our failure to do so... Now there are, of course, those who suppose that the task of describing the world is in some way solvable, who think we can have access to..."the really real". It is a view adopted by many scientists and widely held in our culture and embedded in the notion of progress and the increasing knowledge of humankind. In the philosophical world it is characterised as realism.

As indicated by Lawson:

Non-realism is not about the assertion of a different set of existent things separate from the material which is prior or more real. Instead it is a challenge to the possibility of saying how things are, a challenge to our ability to speak of the really real... non-realism is seemingly at once embedded in a mire. If it is not possible to say how the world really is, if it is not possible to connect language to the world, how is the non-realist to find a means to express any view at all? ... The denial of our capacity to describe the really real would appear also to involve the denial of that denial itself. Such is the non-realist predicament.

Object-oriented ontology (OOO) offers a startlingly fresh way to think about causality, as demonstrated by the work of [Timothy Morton](#) (*Hyperobjects: philosophy and ecology after the End of the World*, 2013; *Realist Magic: objects, ontology, causality*, 2013). With respect to existence, Morton explores what it means to say that a thing has come into being, that it is persisting, and that it has ended. Drawing from examples in physics, biology, ecology, art, literature and music, Morton demonstrates the counterintuitive yet elegant explanatory power of OOO for thinking causality. He coined the term [hyperobject](#) to explain objects so massively distributed in time and space as to transcend localization. Should a hypercomputer be considered in such terms -- especially in relation to any consideration of hypersubjectivity, as discussed separately (*Reality and existence of complex abstractions*, 2014) ?

*** rescher ?

Poetry?: As noted by Lawson:

Realist philosophers, and those who endorse the project to correctly describe an independent reality, have tended to regard poetry

as a romantic flourish, a flowery plaything, while the true work of language takes place in the realm of the literal...

He continues, however, in the light of his argument above:

It is for this reason that the non-realist is led towards poetry. If we are not capable of describing the world, such a claim cannot be made literally without it being at once self-denying. For, if the statement *we are not capable of describing the world* is itself taken as a description of the world - which at first sight it appears to be -- it is not possible to provide the statement with meaning since it denies itself.... And it is here that a poetic stance seemingly allows the non-realist philosopher a space from which to be able to speak. A means of talking that does not involve a commitment to the real. Hence Wittgenstein's remark: "I think I summed up my attitude to philosophy when I said: *Philosophy ought really to be written only as poetic composition*. Or Heidegger's: *Poetically, man dwells on this earth....*

Hofstadter and Sander quote a number of poems in their text. Hofstadter made very extensive use of aesthetics in his earlier seminal study (*Gödel, Escher, Bach: an Eternal Golden Braid. Basic Books, 1979*).

Whether realist or not, a related discussion places emphasis on the cognitive challenge of the quantity and quality of information with which an individual is assumed to be able to engage -- or may aspire to engage -- however this process may be enabled or undermined by an array of quarrelling disciplines (*Embodying a Hypercomplex of Unhygienic Nescience: questionable connectivity enabling apprehension of matters otherwise, 2014*).

The suggestion made in that separate argument is that an adequate degree of coherence may be sought through aesthetic appreciation of patterns of knowledge -- without necessitating the detailed understanding dictated by convention, Reproduced from there, this argument notably highlights the value of poetry in establishing unsuspected relationships -- and rendering them memorable.

Lawson notes that [T. S. Eliot](#) takes up a radical non-realist stance by providing a critique, not of material reality, but of the very possibility of "things":

The fact that we can only think in terms of things does not compel us to the conclusion that reality consists of things. We have found from the first that the thing is thoroughly relative, that it exists only in a context of experience, of experience with which it is continuous.

Lawson sees this not as an abandonment of the rational but as its extension. As noted by [Gregory Bateson](#), in explaining why "we are our own metaphor" to a conference on the effects of conscious purpose on human adaptation:

One reason why poetry is important for finding out about the world is because in poetry a set of relationships get mapped onto a level of diversity in us that we don't ordinarily have access to. We bring it out in poetry. We can give to each other in poetry the access to a set of relationships in the other person and in the world that we're not usually conscious of in ourselves. So we need poetry as knowledge about the world and about ourselves, because of this mapping from complexity to complexity. ([Mary Catherine Bateson, *Our Own Metaphor*, 1972, pp. 288-289](#))

Bateson is thus pointing to the advantages of poetry in providing access to a level of complexity in people of which they are not normally aware.

Closure, containment and binary entrapment?: It is unfortunate that Lawson's argument is framed in the binary terms by which conventional discourse is so handicapped -- with all the strategic implications of: *you're either with us, or against us (Us and Them: Relating to Challenging Others, 2009)*. So framed the argument for "non-realism" does not embody the otherness of "realists", as may be otherwise explored (*Reframing the Dynamics of Engaging with Otherness, 2011*).

This is not however to say that poetry lacks relevance to the strategic challenges of the times, as separately argued (*Poetic Engagement with Afghanistan, Caucasus and Iran an unexplored strategic opportunity? 2009; Poetry-making and Policy-making: arranging a Marriage between Beauty and the Beast, 1993*).

Lawson does indeed consider the binary relationship between openness and closedness -- a feature of his earlier work (*Closure: A Story of Everything, 2001; Reflexivity: The Post-Modern Predicament, 1986*). This is however the focus of a particularly useful discussion by [Steven Rosen](#) with respect to the paradoxical nature of the [Klein bottle](#) (*Topologies of the Flesh, 2006*).

More intriguing is the possibility of embodying binary perspectives in the light of some kind of "wave theory of being" (*Being Neither a-Waving Nor a-Parting: cognitive implications of wave-particle duality in the light of science and spirituality, 2013; Being a Waveform of Potential as an Experiential Choice: emergent dynamic qualities of identity and integrity, 2013*). There is then the possibility that the otherness of an alternative worldview may be encountered otherwise (*Encountering Otherness as a Waveform: in the light of a wave theory of being, 2013*).

Magic?: This seemingly inappropriate theme was previously explored with respect to poetry (*Magic, Miracles and Image-building: poetry-making and policy-making, 1993*). There it was argued that such are the dimensions of the crises faced by humanity and the planet, that it is not uncommon to hear that "a miracle is required".

Indeed, faced with the demonstrated incompetence and impotence of political leaders and their academic advisors, miracles seem

just as likely to offer a way forward as conventional policy-making. At the same time, occasionally people experience gatherings which seem to offer hope because of the "magical" way they work -- without it being possible to identify how this happened. As a result some would say that "we need more magic".

Magic of course has a very bad press. Worse than that of poetry. Both are aspects of culture which the sciences have done their best to marginalize and ridicule -- and religion before them. Ironically, given the subtitle of this paper, even the Walt Disney movie *Beauty and the Beast* has been labelled dangerously evil by Christian fundamentalists -- together with fantasy games such as Dungeons and Dragons (Christian Broadcasting Network, 1993).

But the sciences and religions are now on the defensive. They have proven incapable of responding to the problems that they have helped to engender. In a sense they have provided a wealth of new tools to build a better house, but are incapable of using those tools to construct a house that it is a delight to live in. The qualitative keystone is lacking. Soulless "utility" dwellings and architectural monstrosities best describe the capacity of the sciences in metaphorical terms. And how are religions contributing to our current problems and our capacity to survive them?

The argument was developed there under the following headings:

- [Magic as an interface between poetry and policy-making](#)
- [Image-building, policy-making and science](#)
- [How is magic to be understood?](#)
- [Sharing metaphors towards transformation](#)
- [Worldviews and transformations](#)
- [Magical arts](#)
- [Spell-casting](#)
- [Guided visualization](#)
- [Ritual pattern-making](#)
- [Magical perversions](#)

Of relevance to this discussion of hypercomputing, the argument there with respect to how magic is to be understood is that:

Magic, according to both scholars such as [Daniel O'Keefe](#) (*Stolen Lightning: the social theory of magic*, 1982) and practitioners such as [R. J. Stewart](#) (*Living Magical Arts: imagination and magic for the 21st Century*, 1988), is a set of methods for **arranging awareness according to patterns**; it is not a truth or a religion. Nor is it even a philosophy, in the strict sense of the word, although there are echoes of profound philosophy in most magical traditions. It is basically an **artistic science in which the practitioner controls and develops imagination to cause apparent changes in the outer world**. The serious application of magical methods leads to transformation and it is the transformation which is of value and not the methods themselves. All magic derives from controlled work with the imagination.

In a major study... sociologist Daniel O'Keefe (1982) explores 12 postulates concerning magic of which the first four indicate dimensions relevant to poetry-making and policy-making: Magic is a form of social action; Magic social action consists of symbolic performances -- and linguistic symbolism is central to magic; Magic symbolic action is rigidly scripted; Magic scripts achieve their social effects largely by pre-existing or prefigured agreements.

Magic (like advertising and poetry) does not "work" because its propositions are essentially real or true; it works because practitioners become imaginatively involved in these propositions. Thus for controlled periods of time under non-habitual circumstances, they behave as if they were true. It is not a question of becoming habituated to falsehood but rather of the magician growing through the patterns, whether true or not, and emerging beyond them into a clarity of awareness that was not possible before the experience of transition and transformation. [*emphasis added*]

Mandalas?: Much is made of the use of pentagrams in magic. Understood more generally the question is how any such patterns are used to order imagination fruitfully. This is the case with many schematics ordered centro-symmetrically to enhance memorability, as discussed separately (*9-fold Magic Square Pattern of Tao Te Ching Insights -- experimentally associated with the 81 insights of the T'ai Hsüan Ching*, 2006).

One form of special interest, because of its deliberate orientation toward the observer, is the *yantra* (or *mandala*, in its circular form). These have been used extensively in Eastern cultures to integrate many hierarchic levels of information detail concerning the universe in a form designed to be both comprehensible and to have a profound impact on the attentive observer. Indeed special practices have been developed for their preparation and use. Significant in the light of the weaknesses connected with hierarchical representations... is the fact that here hierarchies are bound together within a common framework with detailed elements on the outer edge of the diagram and the super-ordinate sets linking into a common centre -- the focal point for the observer through whose awareness (once refined) the disparate sets of experience are integrated.

The challenge to the observer is to penetrate into and structure his awareness "through" the schematic. It is especially noteworthy that diagrams of this type contain a high degree of symmetry, as well as colour coding and symbols of various kinds. (These are in part designed to "trigger" the conditions required of the senses and awareness in order for the "programme" to work.) The symmetry features are of course constrained by the planar representation.

At best, international initiatives may present their strategic "vision" as schematics which take such memorable form. But where are the "mandalas" encompassing the current condition? (*Magic Carpets as Psychoactive System Diagrams*, 2010).

Implication?: As distinguished by [David Bohm](#), the implicate order and the explicate order are two different frameworks for understanding the same phenomenon or aspect of reality. The implicate order, also referred to as the "enfolded" order, is seen as a deeper and more fundamental order of reality. In contrast, the explicate or "unfolded" order include the abstractions that humans normally

perceive. According to Bohm (*Wholeness and the Implicate Order*, 1980):

In the enfolded [or implicate] order, space and time are no longer the dominant factors determining the relationships of dependence or independence of different elements. Rather, an entirely different sort of basic connection of elements is possible, from which our ordinary notions of space and time, along with those of separately existent material particles, are abstracted as forms derived from the deeper order. These ordinary notions in fact appear in what is called the "explicate" or "unfolded" order, which is a special and distinguished form contained within the general totality of all the implicate orders (p.â?xv).

Imagining as key to oracular hypercomputing

Conventional computing, and the binary logic with which it is so widely associated, "works" because of the unambiguous clarity with which bits can be distinguished as having a value of 1 or zero. More generally, things either "are", or they are "not". In practice this corresponds to assertions regarding truths or falsehoods as considered variously fundamental to the articulation of belief systems -- frequently engaged in bloody conflict.

Resonance: In the case of hypercomputing, **things may be imaginatively asserted to be anything, provided they are exposed to the imaginative assertion that they are not.** Things therefore only "exist" in the sense that they may also be "re-cognized" as "not existing". Such a statement is appropriately reminiscent of the **falsifiability** considered by some to be a requisite of science.

Aspects of this process have long been explored through the theological process of **apophysis**, or unsaying, as it relates to the nature of deity (Michael A. Sells, *Mystical Languages of Unsaying*, 1994). The nature of **existence is then usefully distinguished as a form of resonance between existing and not-existing** -- as remarkably (and appropriately) exemplified in **resonance hybrids** basic to the existence and viability of organic molecules. This is illustrated by the archetypal tale of the discovery of the "structure" of the **benzene molecule** and understanding of its seemingly improbable viability. See separate discussion with illustrations (*Configuration of alternatives as a resonance hybrid*, 2008).

Problems as indicative of solutions: Of interest here is the manner in which **problems experienced as unsolvable in society and human life are in fact fundamental to the operation of a hypercomputer.** They arise from conflicts between what is upheld as existing, or denied as not existing. Various experienced as problematic, **both conditions are intrinsic to a form of resolution through the dynamics of hypercomputing.** The "problems" are paradoxically indicative of the dynamics of the resolution process.

Is there a dynamic -- analogous to the benzene molecule -- as yet to be understood?

Attachment: The difficulty in society is the manner of attachment of different constituencies to the existence or non-existence (elimination) of a something. What may be "re-cognized" as existing more fruitfully emerges from the dynamic between what is otherwise framed as existence or non-existence.

The focus on one or the other might be compared to attachment to the up or down stroke of a **2-stroke engine** -- one which only "works" through cyclic alternation between both conditions (*Metaphors of Alternation: an exploration of their significance for development policy-making*, 1984). It might also be compared to one or other bonding configuration within a benzene molecule -- which can however only exist by resonance between a variety of such configurations. In envisaging emergence of a new Renaissance, the constraint has been usefully framed by Edward de Bono (*I Am Right You Are Wrong: From Rock Logic to Water Logic*, 1992)

One-stroke thinking, as it might be caricatured, can be seen in the following especially problematic arenas:

- exclusive possession of property, implying lack of rights of others with respect to that property (territorial and turf wars)
- exclusive possession of truth, so evident between the religions and between the disciplines, implying the non-validity of other perspectives -- upholding their own truths and deprecating others as indicative of ignorance
- exclusive understanding of organization and/or strategy, implying the irrelevance of alternative modalities upheld by others (possibly framed as dangerous or irresponsible) -- as especially evident in the political arena

Paradoxically, and necessarily, this argument also applies to itself.

Fear of otherness: Indication of imagining as a key process can be seen in such contexts in terms of imagining the contrary. Typically the contrary may be imagined as "worst fear" -- necessarily because it calls into question that to which there is fundamental attachment in one-stroke thinking.

The question is whether the degree of fear -- effectively framed as one of annihilation -- can be alleviated by shifting metaphor. Rather than a 2-stroke engine, the increasing advantages of multi-stroke engine configurations are more suggestive (**4-stroke**, **6-stroke**, **V6**, **V8**, **V12**). The relationship between successive strokes in the cycle is then smoother -- effectively less catastrophically traumatic in the psychosocial case.

Analogical leaps: Arguments in support of such "re-cognition" include the case made for "polyocular vision" by Magoroh Maruyama (*Polyocular Vision or Subunderstanding? Organization Studies*, 2004). The metaphor can be extended to multiple senses (*Cyclopean Vision vs Poly-sensual Engagement*, 2006; *Strategic Challenge of Polysensorial Knowledge: bringing the "elephant" into "focus"*, 2008). The arguments above regarding Edward de Bono's "thinking hats", or Gareth Morgan's "images of organization", offer similar pointers beyond a "cyclopean" perspective.

Given the arguments of Hofstadter and Sander, this multiplicity could be understood in terms of analogical leaps within a context of meta-analogy meriting "re-cognition".

Is Maruyama's "subunderstanding" then indicative of failure to operate in hypercomputing mode in response to hyperobjects?

(*Hyperaction through Hypercomprehension and Hyperdrive: necessary complement to proliferation of hypermedia in hypersociety*, 2006; Timothy Morton, *Hyperobjects: philosophy and ecology after the End of the World*, 2013).

Distinguishing degrees of difference: The argument above recognizes the role of binary assertion and denial, namely of "is-ness" and "is-not-ness", most notably as associated with exclusive possession (or its denial). Also highlighted is the possibility of reducing its traumatic divisive characteristic by shifting from "2-stroke" through to a greater diversity of strokes ("hats", or whatever the metaphor). This raises questions such as:

- how to "re-cognize" degrees of difference as appropriate in terms of their contrasting qualities. This is the focus of the processes variously advocated by Edward de Bono. More generally it is the question raised by any roundtable (*Implication of the 12 Knights in any Strategic Round Table*, 2014).
- how many degrees of difference are fruitful (4, 6, 8, 12, etc) in order to enable relatively smooth transition -- to "keep the ball rolling smoothly". More generally this may be explored in terms of the number of concepts distinguished in a set -- the requisite variety considered appropriate for some topic (*Representation, Comprehension and Communication of Sets: the role of number*, 1978; *Patterns of N-foldness; comparison of integrated multi-set concept schemes as forms of presentation*, 1984)
- how does the (experiential) nature of a set change -- together with the dynamics between what is distinguished -- as the number of concepts distinguished increases (*Distinguishing Levels of Declarations of Principles*, 1980).
- through what metaphors can understanding how to shift between 2 to 4 (4 to 12, etc) be clarified -- squaring, geometrical transformations, changing gear, etc (*The Future of Comprehension conceptual birdcages and functional basket-weaving*, 1980; *In Quest of a Dynamic Pattern of Transformations: sensing the strange attractor of an emerging Rosetta Stone*, 2012; *Eightfold Configuration of Nested Cycles of Cognitive Transformations: meta-pattern of connectivity through a hypersphere?* 2012).

Modal attachment: It is ironically appropriate to note that, in addition to being attached to a particular number of differences (most typically 2, as with "us and them"), or to a given "gear" ("2nd gear", or possibly "reverse"), there is a natural tendency to develop attachment to patterns distinguished by:

- a particular size (3-fold, 4-fold, 5-fold, 6-fold, 7-fold, 8-fold, 9-fold, 12-fold, etc) then defined as "the system", when it is the variety of such systems which calls for re-cognition"
- a particular modality: poetry, magic, analogy, music, dance, etc. These might be better understood as the configuration of **Muses**, namely the personification of knowledge and the arts, especially literature, dance and music -- the nine daughters of **Zeus** and **Mnemosyne**.
- particular forms -- perhaps better understood as surrogates (gods, angels, principles, celebrities, etc) or through any metaphor of choice

Hypercomputing as imaginative enactment

As stressed above, **any description of imagining is fundamentally misleading** -- as with instructions on riding a bicycle. The key in that example lies in engaging in the process and working with a sense of balance as it emerges. In the case of imaginative enactment, the question is what emerges as a sense of mutually constraining (cyclic) processes corresponding in some ways to a sense of balance -- eliciting a sense of cognitive balance.

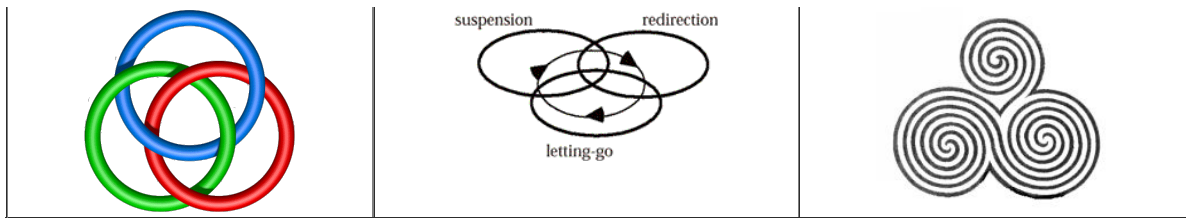
An earlier experiential example is provided by learning to walk. A more complex example is provided by piloting a helicopter -- where there is a degree of significance attributed to so-called "seat-of-the-pants" comprehension of the variety of factors to be held in balance. Again this cannot be "explained". As designer of the Bell helicopter, **Arthur Young** subsequently endeavoured to generalize from those insights to enable the operation of a "psychopter" -- understood by him as the "winged self" (*Geometry of Meaning*, 1976), as discussed separately (*Engendering a Psychopter through Biomimicry and Technomimicry: insights from the process of helicopter development*, 2011).

Related understanding was promoted as **enaction** by **Francisco Varela**, **Evan Thompson**, and **Eleanor Rosch** (*The Embodied Mind: cognitive science and human experience*, 1992). The term was understood to "emphasize the growing conviction that cognition is not the representation of a pre-given world by a pre-given mind but is rather the enactment of a world and a mind on the basis of a history of the variety of actions that a being in the world performs". A chapter in that work by Francisco Varela was entitled with the Buddhist metaphor of "laying down a path through walking" (pp. 237-254). It was subtitled "science and experience in circulation".

Whether bicycle or helicopter, or even walking, there is clearly need to "re-cognize" that more than imagination is implied. There is a subtle order to that imagination for which those examples are helpful. This implies a subtle creative relationship between imagining and ordering to be discovered through what in each case is a question of dynamically managing cycles through their cognitive embodiment.

Phenomenological epoché: Varela offered one image to illustrate the cognitive cycles calling for interrelationship through the **phenomenological epoché** (*The Gesture of Awareness*, 1999) [see also Claus Otto Scharmer. *Three Gestures of Becoming Aware: Conversation with Francisco Varela January 12, 2000*]. With respect to the argument above, Varela's representation of the may be fruitfully compared compared to two other representations as in the following table (from *Present Moment Research: exploration of nowness*, 2001). The **Borromean rings/knots** are a focus of the psychoanalytic approach of **Jacques Lacan** and figures in early depiction of the Christian Trinity.

Borromean rings (notable for their topological implications)	Phenomenological epoché (explored by Francisco Varela)	Traditional Celtic knot pattern (and its associations to the mythopoetic of the megalithic period)



Varela proposes a 3-fold cycle at the core of the act of becoming aware in the moment:

- an initial phase of *suspension* of habitual thought and judgement,
- followed by a phase of *conversion* of attention from 'the exterior' to 'the interior',
- ending with a phase of *letting-go* or of receptivity towards the experience.

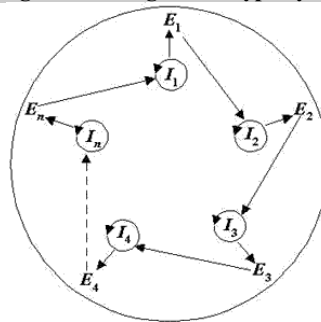
Varela sees the phenomenological *epoché* as "the ensemble of these three organically linked phases", for the simple reason that the second and third are always reactivated by, and reactivate, the first. He provides a valuable discussion of the three interlinked cycles and the obstacles traditionally recognized to some of their processes.

The above images also figure in separate discussions (*Engaging with Globality through Dynamic Complexity*, 2009; *Cognitive Cycles Vital to Sustainable Self-Governance*, 2009; *Interestingness, suggestiveness, memorability and presentation*, 2014)

Cognitive / Imaginative hypercycle? In imagining hypercomputing with such suggestions, it is appropriate to note the manner in which the schematics above might be understood in terms of a hypercycle as a hypothetical stage of macromolecular evolution. What is however required is a sense of cognitive implication in what is otherwise described in terms of molecular chemistry, as originally articulated by M. Eigen and P. Schuster (*The Hypercycle: a principle of natural self-organization*, 1979):

The hypercycle is a self-reproducing macromolecular system, in which RNAs and enzymes cooperate in the following manner.

Cognitive / Imaginative hypercycle?



There are RNA matrices (I_i); i -th RNA codes i -th enzyme E_i ($i = 1, 2, \dots, n$); the enzymes cyclically increase RNA's replication rates, namely, E_1 increases replication rate of I_2 , E_2 increases replication rate of I_3 , ..., E_n increases replication rate of I_1 . In addition, the mentioned macromolecules cooperate to provide primitive translation abilities, so the information, coded in RNA-sequences, is translated into enzymes, analogously to the usual translation processes in biological objects. The cyclic organization of the hypercycle ensures its structure stability. For effective competition, the different hypercycles should be placed in separate compartments. (*Hypercycles, Principia Cybernetica Web*)

Of relevance is the articulation by **Wolfgang Wildgen** (*Semiotic hypercycles driving the evolution of language, Axiomathes*, 18, 2008)

The evolution of human symbolic capacity must have been very rapid even in some intermediate stage (e.g. the proto-symbolic behavior of *Homo erectus*). Such a rapid process requires a runaway model. The type of very selective and hyperbolically growing self-organization called "hypercycle" by Eigen and Schuster could explain the rapidity and depth of the evolutionary process, whereas traditional runaway models of sexual selection seem to be rather implausible in the case of symbolic evolution. We assume two levels: at the first level the species is adapted to ecological demands and accumulates the effects of this process in the genome. At the second level a kind of social/cultural knowledge is accumulated via a set of symbolic forms, one of which is language. [Karl] Böhler's model of three basic functions of signs [organon model] can also be elaborated so that its cyclic structure becomes apparent.

Cognitive autopoiesis?: Consistent with the above argument, the process of **autopoiesis** is also suggestive of a way of understanding the cognitive processes of hypercomputing (**Humberto R. Maturana** and Francisco J. Varela, *Autopoiesis and Cognition: the realization of the living*, 1980). The jacket description of this much-cited work is of relevance:

This is a bold, brilliant, provocative and puzzling work. It demands a radical shift in standpoint, an almost paradoxical posture in which living systems are described in terms of what lies outside the domain of descriptions. Professor Humberto Maturana, with his colleague Francisco Varela, have undertaken the construction of a systematic theoretical biology which attempts to define living systems not as they are objects of observation and description, nor even as interacting systems, but as self-contained unities whose only reference is to themselves. Thus, the standpoint of description of such unities from the 'outside', i. e. , by an

observer, already seems to violate the fundamental requirement which Maturana and Varela posit for the characterization of such systems -- namely, that they are autonomous, self-referring and self-constructing closed systems -- in short, autopoietic systems in their terms. Yet, on the basis of such a conceptual method, and such a theory of living systems, Maturana goes on to define cognition as a biological phenomenon; as, in effect, the very nature of all living systems. And on this basis, to generate the very domains of interaction among such systems which constitute language, description and thinking.

Hypercycles can be related to autopoiesis, as argued by Harald Hüning (*Constructing Higher-order Hypercycles inspired by a Model of Autopoiesis*, 2009):

The principle of the hypercycle accounts for the increase of information in autocatalytic nets while maintaining internal stability against errors... Self-reproducing entities are connected in a cycle where each member gives catalytic support to its successor [as in the schematic above]. Another principle of self-reproduction and repair comes from the theory of autopoiesis. Only one simulation model of autopoiesis is known (Varela et al., 1974) which has been re-examined several times... Hypercycles have been confirmed as the working principle in the natural example of a viral infection mechanism by quantitative analysis... and since 1991 lattice-based simulations of hypercycles have been performed where spatial structures have been found...

Autopoiesis and creativity: Understanding of autopoiesis has been applied to the creative process by Takashi Iba (*An Autopoietic Systems Theory for Creativity*, *Procedia Social and Behavioral Sciences*, 2010) in a manner which appears to take little effective account of the constraints on description discussed above, and the role of imagination:

In this paper, a new, non-psychological and non-sociological approach to understanding creativity is proposed. The approach is based on autopoietic system theory, where an autopoietic system is defined as a unity whose organization is defined by a particular network of production processes of elements. While the theory was originally proposed in biology and then applied to sociology, I have applied it to understand the nature of creation... A creative system is an autopoietic system whose element is "discovery", which emerges only when a synthesis of three selections has occurred: "idea", "association", and "consequence". With using these concepts, we open the way to understand creation itself separated from psychic and social aspects of creativity. On this basis, the coupling between creative, psychic, and social systems is discussed.

Nescience as a mode of hypercomputing?

The theme of this argument is further clarified by the title of the above-mentioned article by Michael Brooks on Turing's Oracle as it appeared in the *New Scientist* in the print version -- in its contrast with the online variant cited above. In the print version the title given is *Know It All* (19 July pp. 34-37). As subtitle it has: *Can we realise Alan Turing's dream of a computer that always has an answer?*

It could usefully be said that the last thing needed is a computer which knows it all, thereby engendering a condition of total dependency -- reminiscent of [Big Brother](#), problematic parenting, or tutorial guidance. This reservation also applies to the subtitle. Missing from both is a sense of the nature of (not) knowing and the insightful paradox appropriate to the answer of any fundamentally complex question -- as with the provocative engagement implied by a Zen *koan*.

At a time when the focus is on increasing speed, saving time, and on time as a scarce resource, it is appropriate to imagine that hypercomputing might not necessarily operate in a "go go" mode -- all the time. It might even function in a mode suggesting an adaptation of Abraham Lincoln's classic quote:

You can answer all the people some of the time, and some of the people all the time, but you cannot answer all the people all the time.

As imagined by Douglas Adams, in answer to the question asked of it by the pan-galactic aliens, Deep Thought devoted seven and a half million years of calculation to the matter (before furnishing the answer of 42). With respect to hypercomputing, "calculation" may be misleading -- given the emphasis here on imagining order. More appropriately, some languages translate "computer" to highlight the ordering function (French, *ordinateur*; Spanish, *ordenador*).

More interesting may be the sense in which hypercomputing is dependent on a fallow period (characteristic of crop rotation cycles) -- much cited as a metaphor with respect to many forms of creativity. In agriculture, a field is left for a period without being sown in order to restore its fertility or to avoid surplus production. As noted by *Wikipedia*:

In Europe, since the times of [Charlemagne](#), there was a transition from a two-field crop rotation to a three-field crop rotation. Under a two-field rotation, half the land was planted in a year, while the other half lay fallow. Then, in the next year, the two fields were reversed. Under [three-field rotation](#), the land was divided into three parts. One section was planted in the autumn with winter wheat or rye. The next spring, the second field was planted with other crops such as peas, lentils, or beans and the third field was left fallow. The three fields were rotated in this manner so that every three years, a field would rest and be fallow.

The fallow period could be imagined as a mode of "not-knowing" or "nescience", as discussed separately (*Nescience and ignorance*, 2014). This could suggest that the processes of a "University of Ignorance" could be imagined as intimately related to those of hypercomputing (see *University of Ignorance: engaging with nothing, the unknown, the incomprehensible, and the unsaid*, 2013). The

mode might well be characterized by silence -- as with Deep Thought's refusal to provide an answer for millions of years. The essence of civilization might be understood in such terms (*Civilization as a Global Configuration of Silences: recognizing silence of a higher order*, 2013).

In a context of hypercomputing, the conventional sense of question and answer could well be called into question (*Am I Question or Answer? Problem or (re)solution?* 2006). Nescience is then a form of imaginative engagement with the form of the question -- "mulling over" the order it implies. That mode requires creative consideration of the form of any answer -- the order through which it might be presented. It could include self-reflexive consideration of the nature of hypercomputing itself -- hypercomputing in "selfie mode".

Especially intriguing is the sense in which hypercomputing could be considered as a pattern of "catastrophic questions", as potentially implied by catastrophe theory (*Conformality of 7 WH-questions to 7 Elementary Catastrophes: an exploration of potential psychosocial implications*, 2006). Consideration of catastrophe is consistent with the sense in which hypercomputing involves "re-cognition" and imagining order which are in some respects catastrophic for hypercomputing itself. This is indicative of the sense in which it is a process "on the edge" of its own annihilation, as separately discussed with respect to more conventional structures (*World Futures Conference as Catastrophic Question: from performance to morphogenesis and transformation*, 2013).

Hypercomputing might then be considered in terms of staring into a "hole in reality" (*Existential implications -- of a "hole" in conventional reality?* 2012) -- potentially as an underlying cognitive reality (*Unthought as Cognitive Foundation of Global Civilization*, 2012). This could relate to the existential problem of terror and the implication of any "words fear" in engaging with alternatives (*Thinking in Terror*, 2005). With problems potentially understood as an existential challenge, Lincoln's quote could also be fruitfully adapted as:

You can challenge all the people some of the time, and some of the people all the time, but you cannot challenge all the people all the time.

The case for eliciting a nescientific perspective has been admirably made by the poet [John Keats](#) with respect to *Negative Capability*:

... it struck me what quality went to form a Man of Achievement, especially in Literature, and which Shakespeare possessed so enormously -- I mean Negative Capability, that is, when a man is capable of being in uncertainties, mysteries, doubts, without any irritable reaching after fact and reason... (1817)

As noted by *Wikipedia*, the term describes the capacity of human beings to transcend and revise their contexts. It has been used by poets and philosophers to describe the ability of the individual to perceive, think, and operate beyond any presupposition of a predetermined capacity of the human being. It further captures the rejection of the constraints of any context, and the ability to experience phenomena free from epistemological bounds, as well as to assert one's own will and individuality upon their activity.

Imagining order and pattern "re-cognition"

Imaginative enactment: Despite the indications above, **the concern remains of how to "not-describe" hypercomputing through offering clues to the potential experience of enactively engaging in it imaginatively.** These include;

- **Creatively exploring web associations:** This experience is an extension of web browsing, namely when creative imagination in the moment "lays down the path in walking" through cyberspace. The user is then a kind of traveller (perhaps framed in exaggerated terms as "spider man")
- **Creatively exploring aesthetic associations:** This is most notably associated with music and poetry and what they may engender. Hofstadter explores this process through the highly rated set of 30 *Goldberg variations* of Bach,
- **Enhancing creativity through meta-analogy:** This process is suggested by the arguments of Hofstadter and Sander with respect to imagining analogies of analogies
- **Imaginative ordering and "re-cognition":** This might be understood as exploring correspondences and complementary metaphors -- even systematically -- namely through imagining alternative modes of framing anything (*Theories of Correspondences -- and potential equivalences between them in correlative thinking*, 2006). This could include possibilities suggested by sets of geometrical or topological forms

Of particular interest in this respect is the comprehensive [study of order](#) by [Christopher Alexander](#), following his seminal elaboration of a [pattern language](#). This can be used as a template for imagining other applications, as discussed separately (*5-fold Pattern Language*, 1984).

The work on order resulted in further developments by Alexander (*New Concepts in Complexity Theory: an overview of the four books of the Nature of Order with emphasis on the scientific problems which are raised*, 2003; *Harmony-Seeking Computations: a science of non-classical dynamics based on the progressive evolution of the larger whole*, *International Journal for Unconventional Computing (IJUC)*, 2009). The latter can in turn be explored for further implications of relevance to any understanding of hypercomputing (*Harmony-Comprehension and Wholeness-Engendering: eliciting psychosocial transformational principles from design*, 2010).

In contrast to the variety of order recognized by Alexander, it is appropriate to note the necessarily unimaginative "order" currently emphasized in the widely used phrase "law and order" -- and with respect to the "forces" mandated to maintain it. Ironically, a subtler and more imaginative sense of the variety of forms of order is associated with "lore", as discussed separately (*Law and Order vs. Lore and Orders? Imagining otherwise the forceful engagement of singularity with plurality*, 2013).

Exercise in imagining hypercomputing via hexagram patterning

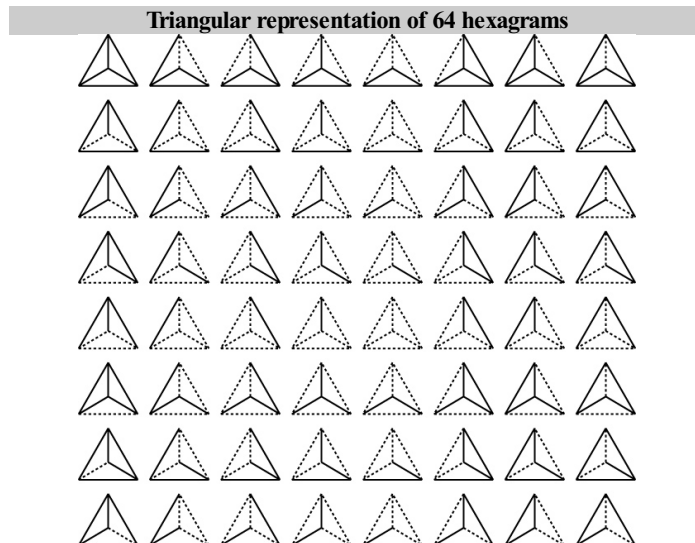
The potential relevance of hypercomputing can be usefully explored in relation to religions. Many might argue these constitute a particular understanding of hypercomputing in their own right, especially when understood as the creative imagining of order through analogy. Of special interest is the sense in which the imagined order then engenders credibility and fundamental belief. Also of relevance, however, is the degree to which the order imagined by different religions is seemingly incompatible -- despite claims to the contrary -- with all the consequences for the conflict these differences then engender ([Stephen Prothero](#), *God Is Not One: the eight rival religions that run the world*, 2011).

Given the special understanding of number variously cultivated by religions, of particular interest is the possibility that development of mathematical theology could prove to be intimately related to the comprehension and credibility of hypercomputing ([Mathematical Theology: future science of confidence in belief](#), 2011). Especially relevant with respect to religion is the binary focus on "belief" or "unbelief" -- variously played out so problematically. The possibility is increased by the arguments of cognitive psychology of [George Lakoff](#) and [Rafael Nuñez](#) (*Where Mathematics Comes From: how the embodied mind brings mathematics into being*, 2001). Hence the examples explored in the following exercise.

Six lines are configured in a number of cultures to form a double triangular "hexagram". This is most commonly associated in the West with the Hebrew [Star of David](#) symbol. It is however also used by Christians (notably the Mormons) and in Islam. Six pointed stars are also to be found in the cosmological diagrams of Hinduism, Buddhism, and Jainism. The non-Jewish Kabbalah (also called Christian or Hermetic Kabbalah) interprets the hexagram to mean the divine union of male and female energy. In traditional alchemy, the two triangles represent the reconciliation of the opposites of fire and water.

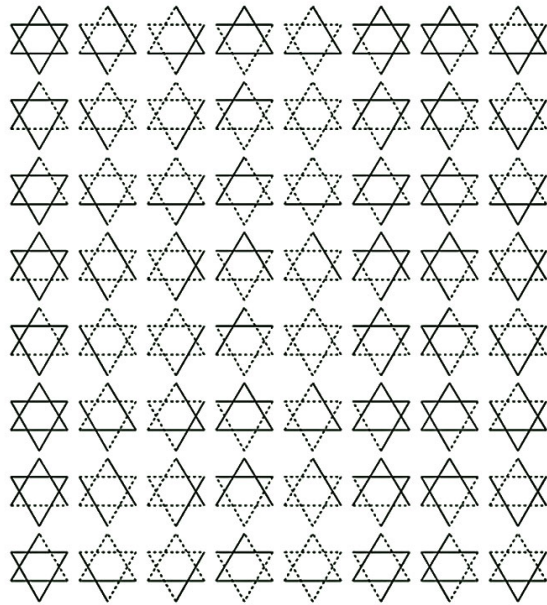
Triangular configuration of *I Ching* hexagrams: It is therefore useful to assume that the pattern is indicative of a form of hypercomputing through the manner in which it is possible to engage with the configuration -- or perhaps some intuitive sense of that possibility. Given that implication, this suggests the possibility of configuring the traditional *I Ching* hexagrams in a triangular form as previously presented ([Triangular representation of 64 *I Ching* hexagrams](#), 2008; [Sustainability through Magically Dancing Patterns 8x8, 9x9, 19x19 -- *I Ching*, *Tao Te Ching* / *T'ai Hsüan Ching*, *Wéiqí*](#), 2008).

As presented there, the following table constitutes an alternative to the columnar representations of hexagrams. It is an effort to explore other mnemonic possibilities. The order follows that used in the Richard Wilhelm translation of the *I Ching*. Although this order is used in the *Wikipedia* entry on the *I Ching*, it is not the order of the [classical King Wen sequence](#). The lower, internal triangle, corresponds here to the lower trigram (in which the horizontal line corresponds to the lowest in the columnar hexagram representation). The upper lines correspond to the upper trigram (in which the central vertical line is the uppermost in the columnar hexagram representation). The convention of complete and broken line is maintained.



Mapping of *I Ching* hexagrams onto Star of David: It is therefore also of interest to explore such representations together with a possible configuration of the 6 lines of the *I Ching* hexagram into a double triangle consistent with such traditional symbolic use. The following table was previously presented ([Mapping of *I Ching* hexagram coding onto Star of David](#); [Double triangular representation of hexagrams: Star of David](#))

64 *I Ching* hexagrams configured as double triangles
 [tentative: of interest is the convention regarding allocation of trigram lines to triangle positions and whether alternative allocations are anyway of significance in their own right]



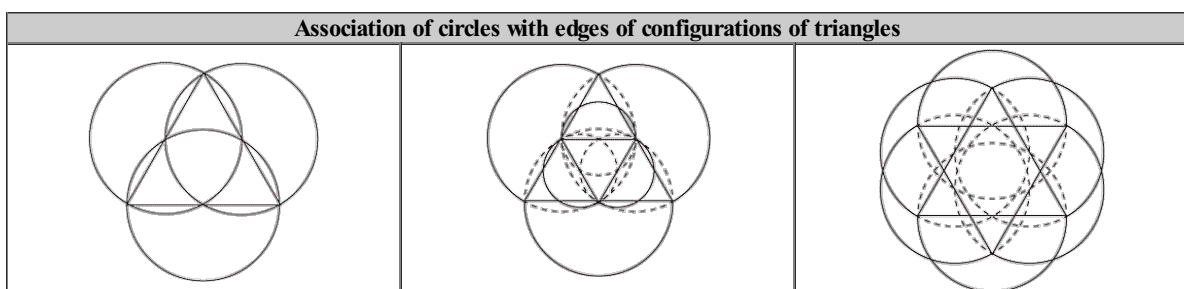
The above set can now be presented as a dynamic pattern (as had been suggested in that earlier exercise) in what follows.

Dynamic representation of hexagram codes mapped onto the Star of David (note if the SWF format animation does not display automatically, it may do so more readily in Internet Explorer)
This area is intended for a dynamic animation that is not rendering in this static view.

It is interesting that [Barbara G. Walker](#), in a discussion of the earlier Fu Hsi (Earlier Heaven) arrangement of the hexagrams, in what is described as the only feminist interpretation of the *I Ching* (*I Ching of the Goddess*, 2002), explains a still earlier representation based on two interlinked triangles: one pointing down and the other up pointing.

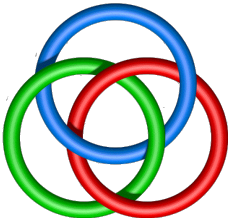
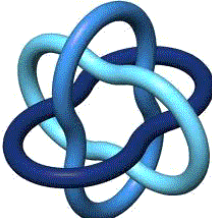
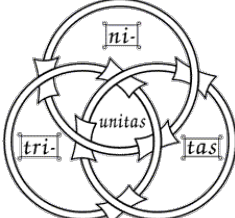
Imagining static line depictions in 2D as circular dynamics in 3D: By "entangling" Eastern and Western symbol systems in this way, a degree of "stereoscopic" understanding of hypercomputing may become apparent, as previously argued (*Enhancing the Quality of Knowing through Integration of East-West metaphors*, 2000). Also of interest is the degree to which **a triangle-based configuration is suggestive of the highly complex relationship between the three Abrahamic religions so fundamental to the current challenges and conflicts of global civilization** (*Root Irresponsibility for Major World Problems: the unexamined role of Abrahamic faiths in sustaining unrestrained population growth*, 2007; *Triangulation of Incommensurable Concepts for Global Configuration*, 2011).

The argument for "re-cognizing" the lines in any symbolic depiction as implying a circle can be partially understood through the following.

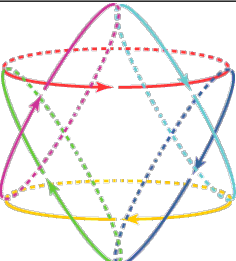
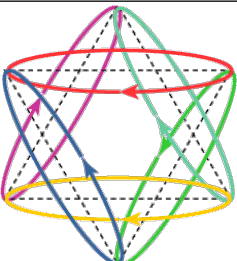
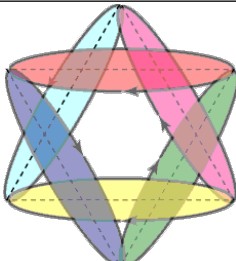


The argument for understanding the circles in 3D rather than in 2D can be partially clarified from the following, remembering that interlocking of circles have been a representation of the Christian Trinity. However, further to the suggestion above, **Borromean rings are also a potentially valuable indication of the complex relationships between the three Abrahamic religions.** The choice of the

Borromean depiction in 3D is also significant as the logo of the [International Mathematical Union](#) -- notably given the argument of [George Lakoff](#) and [Rafael Nuñez](#) (*Where Mathematics Comes From: how the embodied mind brings mathematics into being*, 2001).

Borromean rings		
Conventional depiction (notable for the topological implications)	Presented orthogonally as logo of International Mathematical Union (see Wolfram Mathematica animation)	Employed as a symbol of the Christian Trinity (from a 13th-century manuscript)
		

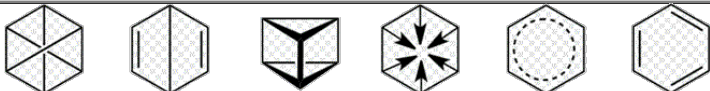
A sense of the 3D pattern of circles implicit in conventional 2D hexagram representations (especially including the Star of David pattern) is variously offered by the following animations. Of particular interest is the difficulty (if not impossibility) of representing the interlocking of those 6 circles, as suggested by the 3-ring Borromean rings above.

Animations indicative of circular dynamics implicit in Star of David hexagram pattern		
"Remote" portion of cycles indicated in dashed form	Cycle indication as a continuous line	Emphasis on the plane framed by each cycle
		


Of particular interest is how contrasting understandings are carried by the 6 cycles -- differently oriented to one another. The implication of the colour reversal is usefully questionable.

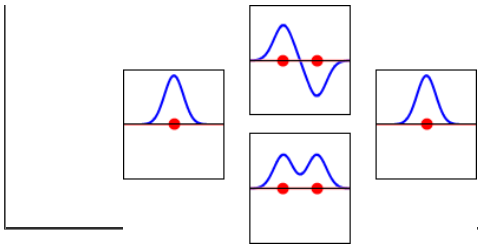
As a vehicle, a cycle then functions somewhat as a conduit or tube for a particular style (or quality) of attention -- understood as a process. The question necessarily raised is the directionality of that attention through the conduit. This is partially suggested (in an unsatisfactory manner) by the reversals in the animations. The left-hand image, using dashed lines for the remote portion, also highlights the sense in which there is a degree of reversal implied by the cycle -- it returns to any starting point -- implying 12 distinct directions, inviting interpretation (*Generic Reframing of the 12 Tribes of "Israel": "We have met the Zionists and them is us"*, 2009).

Insights from resonance structure of 6-fold benzene molecule: The challenge to comprehension is usefully illustrated by the historical process of understanding the [6-fold benzene molecule](#) which is so fundamental to organic molecules and life. This is illustrated by the following image in the *Wikipedia* entry.

Historical development of understanding of the benzene molecule (reproduced from <i>Wikipedia</i>)

Historic benzene formulae (from left to right) by Claus (1867), Dewar (1867), Ladenburg (1869), Armstrong (1887), Thiele (1899) and Kekulé (1865). Dewar benzene and prismane are different chemicals that have Dewar's and Ladenburg's structures. Thiele and Kekulé's structures are used today.

The above image is suggestive of degrees of inadequacy in any comprehension of whatever is implied by a Star of David/Trinity pattern. In the latter case, the inadequacy is compounded by the manner in which any earlier depiction is asserted to be unquestionably correct, and the possibility that the most current is itself inadequate -- and likely to be subject to subtler interpretations (as with those of quantum mechanic understanding of [molecular orbitals](#)) as illustrated in the animation below.

Indicative animation of molecular orbital of hydrogen atom (reproduced from <i>Wikipedia</i> entry as the simplest illustration of molecular orbitals)	
	Electron wavefunctions for the 1s orbital of a lone hydrogen atom (left and right) and the corresponding bonding (bottom) and antibonding (top) molecular orbitals of the H ₂ molecule. The real part of the wavefunction is the blue curve, and the imaginary part is the red curve. The red dots mark the locations



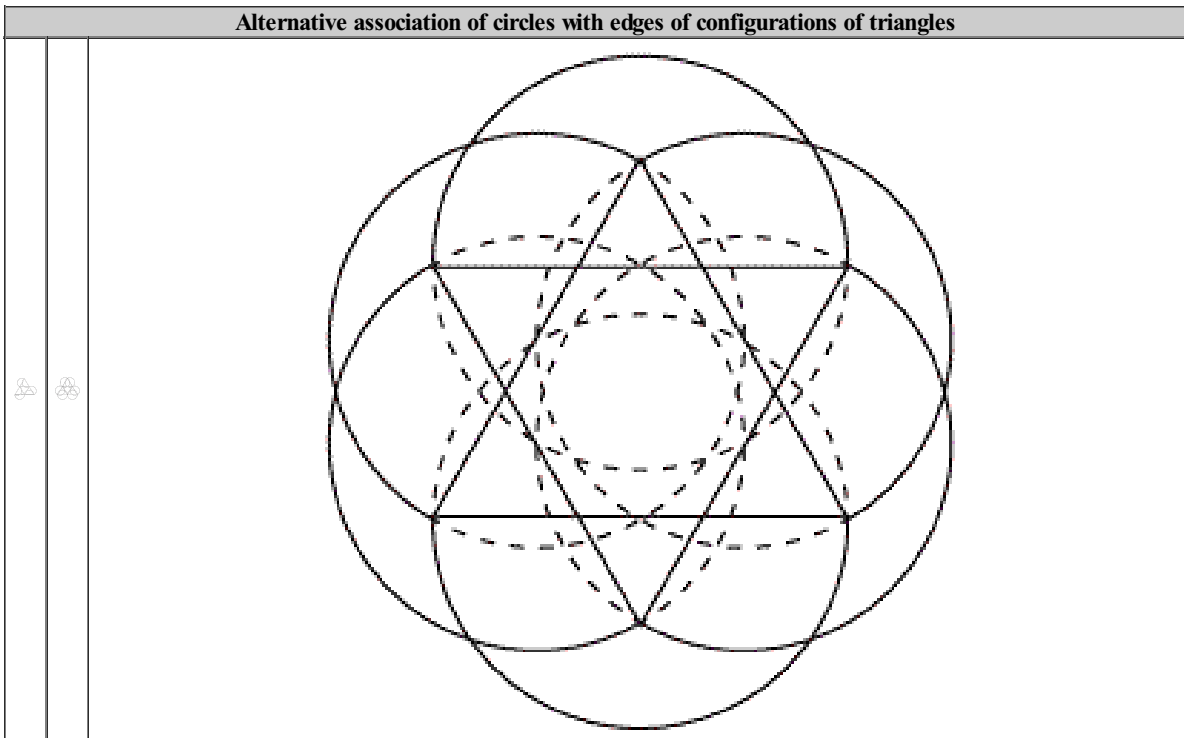
of the nuclei. The electron wavefunction oscillates according to the [Schrödinger wave equation](#), and orbitals are its [standing waves](#). The standing wave frequency is proportional to the orbital's kinetic energy. (This plot is a one-dimensional slice through the three-dimensional system.)

There are many animations of the benzene molecule on the web to illustrate its resonance structure -- so fundamental to life. As is so typical, most of them are subject to copyright or marketing restrictions. The following simple presentation illustrates the principle of oscillation between single and double bonding -- between the (carbon) atoms at the vertex positions of the hexagonal structure. Although conventionally depicted in 2D, the configuration is necessarily to be understood as being in 3D (at least).

Benzene molecule animations indicative of resonance between configurations A and B	
Schematic of bonding configuration (A)	Schematic of bonding configuration (B)

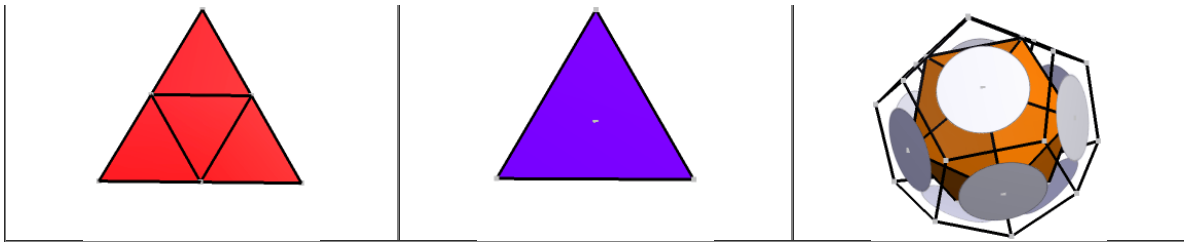
Insights from tetrahedral folding: The contrast between the linear representation of hexagrams in 2D, and any richer comprehension implied by cycles in 3D, is suggestive of further insight. The Star of David pattern can be transformed by reducing the size of one triangle relative to the other in the hexagram -- nesting the smaller within the larger, with all that that may imply symbolically. The corresponding parallel lines then constitute metaphors of one another. Of interest then is how the lines in 2D are to be understood as "edge-on" views of circular processes in 3D (as explored above).

The right-hand image from the earlier exploration can then be used to take the argument further as shown in the accompanying images below.



The point to be stressed is that the 2D configurations of triangles can be considered as an unfolded tetrahedron. A mapping of the *I Ching* hexagrams onto a tetrahedral form was presented above. However, when folded into the 3D tetrahedral form, the challenge is how the implicit circular dynamics are to be understood. Is the folding/unfolding dynamic also intrinsic to hypercomputing -- as suggested by the explication/implication argument with respect to the [holomovement](#) of David Bohm? Some understanding is offered by the animations (left and centre) below. The animation on the right is presented in lieu of ability to associate circles with edges.

Animations suggestive of transformations through 3D (produced with Stella Polyhedron Navigator)		



Especially relevant is the manner in which any movement "along" a 2D line of the nested triangle is matched by analogous movement along the corresponding parallel (of the co-linear two-lines in the external triangle). However, when folded into a tetrahedron, such double lines merge into a single line -- oriented quite distinctively in 3D relative to that with which they were parallel in 2D. The movement "along" that merged line is then better understood as movement around the circle it implies. Reaching any apparent end-of line then implies reversal of direction. The significance of this reversal may be "re-cognized" in terms of **enantiodromia** or through the much-quoted lines of T S Eliot (in *Little Gidding*, 1942):

*We shall not cease from exploration
And the end of all our exploring
Will be to arrive where we started
And know the place for the first time.*

Hypercomputer operation clarified through metaphors of engine design

Metaphorical use was made above of the recognized advantages achieved in the progression from a 2-stroke engine to multi-stroke engine configurations. The point made was that the relationship between successive strokes in the cycle is then smoother -- effectively less catastrophically traumatic in the psychosocial case. As a metaphor, an engine offers a degree of clarity of understanding, given the widespread familiarity with its operation.

This familiarity is however accompanied by recognition on the part of many users of engines -- most notably automobile drivers -- of how limited their understanding of its actual operation may be, especially if it breaks down and needs repair. Even more interesting is the nature of creativity in the innovative design of ever more efficient engines -- possibly of greater simplicity or a reduction in emissions.

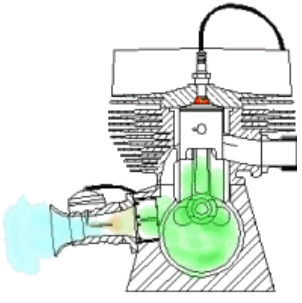
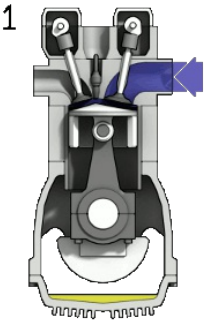
The previous section argued for recognition that the individual lines used in depictions of symbolic hexagrams -- such as the Star of David and the *I Ching* -- could be "re-cognized" as **static** 2D indications of what might be more fruitfully understood as **dynamic** 3D cyclic processes. **Any conventional symbolic configuration of lines can then be understood metaphorically as a form of "information engine"** -- as with a mandala. The schematic explorations of the previous section are then to be understood as "views" of the operation of an information engine -- indicative of a process potentially required for hypercomputing.

Given the argument made for analogy and meta-analogy in creative imagination, various indications are possible with regard to the design of information engines of different capacity and purpose. The amount and quality of thinking that has been devoted to engine design merits consideration with respect to its implications for information engine design as indicated by the following -- especially in the light of the thermodynamic insights susceptible to interpretation in information terms.

Variety of reciprocating engines suggestive of implications for information engine design and operation and for styles of hypercomputing (linking to descriptive entries in <i>Wikipedia</i>)		
Type	Bourke / Deltic / Orbital / Piston Pistonless (Wankel) / Radial / Rotary / Split cycle / Stelzer / Tschudi	
Stroke cycles	2-stroke / 4-stroke / 6-stroke	
Configurations and Number of cylinders	Single cylinder	Single / Split-single
	Inline / Straight	I2 / I3 / I4 / I5 / I6 / I7 / I8 / I9 / I10 / I12 / I14
	Flat	F2 / F4 / F6 / F8 / F10 / F12 / F16
	V / Vee	V2 / V3 / V4 / V5 / V6 / V8 / V10 / V12 / V14 / V16 / V18 / V20 / V24
	W	W8 / W12 / W16 / W18

There is every possibility that, with respect to processing information, civilization is currently constrained by technology corresponding to the simplest engines, as suggested by the following animations.

Combustion engine operations with potential metaphorical implications for an information engine	
2-stroke engine animation (reproduced from <i>Wikipedia</i>)	4-stroke engine animation (reproduced from <i>Wikipedia</i>)

	
<p>A two-stroke, or two-cycle, engine completes a power cycle in only one crankshaft revolution and with two strokes, or up and down movements, of the piston in comparison to a "four-stroke engine", which uses four strokes. This is accomplished by the end of the combustion stroke and the beginning of the compression stroke happening simultaneously and performing the intake and exhaust (or scavenging) functions at the same time.</p>	<p>A four-stroke engine (also known as four-cycle) completes a power cycle through four separate strokes of the piston within the cylinder. As indicated in the animation above, these are: 1 - Intake, 2 - Compression, 3 - Power, 4 - Exhaust. The right blue side is the intake and the left brown side is the exhaust. The cylinder wall is a thin sleeve surrounded by cooling liquid.</p>

A single cylinder, 2-stroke design is clearly admirably represented by the classic *I Ching* symbols of a single line (whether broken or unbroken). It is also reflected in the understanding of a bit having a value of 0 or 1. This is fundamental to any indication of agreement or disagreement, and to the process of decision-making. It is also fundamental to recognition of "us" and "them". Configurations of 2 lines are already more of a challenge to comprehension

The six stacked lines of an *I Ching* hexagram, or the configuration of six lines in the Star of David, are indicative of a much more complex information engine design. However, through the incorporation of multiple lines into each "design", this is indicative of a mode of operation more reminiscent of conventional automobiles. This is especially the case when each "line" is indicative of two modes, and that line is in fact indicative of a "cycle" in engine operation. Thus in both hexagram configurations, there are 6 processes each alternating between two conditions through the cycle.

Given the orientations of the cycles in the Star of David pattern presented above, especially suggestive is the [firing order](#) of a V6 engine (1-6-5-4-3-2) as the crankshaft is rotated through the 720° required for all cylinders to fire. The advantage of the engine metaphor is that it offers clarity to understanding of the design possibilities in relating 6 cylinders, implying 12 stroke cycle phases -- for example.

The Star of David pattern is then especially indicative of how this configuration "drives" a central "crankshaft" of the information engine. The "crankshaft" can be compared with the "pivot" of the classic taoist quote.

"The Pivot"

(The Way of Chuang Tzu, interpreted by Thomas Merton London. Unwin, 1970)

Tao is obscured when men understand only one of a pair of opposites, or concentrate only on a partial aspect of being. Then clear expression also becomes muddled by mere word-play, affirming this one aspect and denying all the rest. Hence the wrangling of Confucians and Mohists; each denies what the other affirms, and affirms what the other denies. What use is this struggle to set up "No" against "Yes", and "Yes" against "No" ? Better to abandon this hopeless effort... The possible becomes impossible; the impossible becomes possible. Right turns into wrong and wrong into right -- the flow of life alters circumstances and thus things themselves are altered in their turn. But disputants continue to affirm and to deny the same things they have always affirmed and denied, ignoring the new aspects of reality presented by the change in conditions.

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

It is then noteworthy that the cycles indicated by corresponding lines (parallels) in a Star of David configuration need to be in phase with one another. Understood metaphorically as the 12 "tribes of Israel", there is clearly an issue in the operation of the engine when the "tribes" are in unfruitful agreement or disagreement, as with the archetypal knights of any round table (*Implication of the 12 Knights in any Strategic Round Table*, 2014).

As noted, the engine metaphor is helpful in that it highlights the many problems of consensus and vulnerability which now characterize global civilization (*Ungovernability of Sustainable Global Democracy? Towards engaging appropriately with time*, 2011). As declared on multiple occasions at the time of writing, consensus on a peaceful outcome in the Israel-Palestine situation is held to constitute an impossible dilemma because the Palestinians are framed by the Israelis as operating "irrationally".

That situation bears considerable resemblance to an automobile stalled on the roadside with various people of different competence examining the engine. The questionable assumption is that they should all "agree" on how it should be fixed (*The Consensus Delusion*, 2011). In fact the information engine functions by multiple processes, counterbalancing each other through counteracting phases. The engine cannot work if the operation of all the cylinders is "in phase" -- on the assumption that it is some form of single cylinder, 2-stroke engine.

As with previously presented arguments for technomimicry, **the engine metaphor is valuable as a template for configuring distinct**

attention processes. There is however clearly a major challenge to engaging imaginatively with the metaphor -- to the point of embodying and enacting it, as is presumably required for hypercomputing (and as illustrated by the particular skills demonstrated by Nikola Tesla)

It is appropriate to note the technical clarity of engine design in comparison with the indications offered by the many detailed metaphorical commentaries on the distinct conditions encoded by the *I Ching* hexagrams (*Transformation Metaphors: derived experimentally from the Chinese Book of Changes (I Ching) for sustainable dialogue, vision, conferencing, policy, network, community and lifestyle*, 1997). The contrast is effectively an indication of the manner in which the above description is called into question by the process it describes -- effectively as a 2-stroke description.

There is some irony to the fact that the so-called super-Turing computer, should have been associated with an "oracle" function -- given that the *I Ching* has been widely valued as a form of oracle through its use in divination processes.

Recognizing a confluence of imaginative possibilities

Given the accumulating levels of global crisis, any exercise in re-imagining possible order merits consideration. In the light of the argument above, some threads which could be considered to be converging are identified in what follows. Part of the challenge may lie in how they are configured or woven together (*Interweaving Thematic Threads and Learning Pathways*, 2010).

People are increasingly obliged to dwell in virtual worlds -- creations of their imagination (Living as an Imaginal Bridge between Worlds: global implications of "betwixt and between" and liminality, 2011). There is then a case for imagining how an imaginary society might be sustained (Manfred B. Steger, *Globalisation and Social Imaginaries: the changing ideological landscape of the Twenty-First Century*, *Journal of Critical Globalisation Studies*, 2009; Benedict Anderson, *Imaginary Societies*, 2003; Cornelius Castoriadis, *The Imaginary Institution of Society*, 1987). Of particular interest is the framing of Imaginary Society cultivated by the [Imaginary Foundation](#).

Technomimicry through technological metaphors: The argument for engines as a generative metaphor was made above. This could be extended to aircraft engines (as highlighted by references to the helicopter), to rotary engines (as with the [Wankel engine](#)), or to electric motors and dynamos. Also separately argued are the insights to be derived from nuclear fusion and the requisite toroidal reactor design (*Enactivating a Cognitive Fusion Reactor: Imaginal Transformation of Energy Resourcing (ITER-8)*, 2006).

Deriving patterns from geometry and topology: here is a curious ambiguity between the unifying claims and seemingly divisive roles of belief systems in society. Great emphasis was placed above on the relevance of mathematics to eliciting more fruitful patterns of order through which the roles and relationships of belief could be comprehended -- with its indicative potential for hypercomputing.

The focus above was on 6-fold patterns, as with the *I Ching* and the Star of David. Especially problematic are of course the relations with Islam, potentially exemplified by the 5-fold pattern of the Islamic Star. Geometry offers an interesting ways of reconsidering that relationship, as argued separately (*Middle East Peace Potential through Dynamics in Spherical Geometry: engendering connectivity from incommensurable 5-fold and 6-fold conceptual frameworks*, 2012).

Especially intriguing, given the association of hypercomputing with analogy, are explorations of mirroring and the paradoxes of introversion -- given that they may constitute phases in a cognitive cycle (*World Introversion through Paracycling: global potential for living sustainably "outside-inside"*, 2013).

Particular significance can be associated with the discovery of mathematical surfaces on which contrasting perspectives can be located such that each has the "superficial" sense of being "right" -- and reinforced in the impression that others, located elsewhere on the surface, are necessarily "wrong" -- even "upside down". One of the most comprehensible surfaces of this kind is the planetary sphere, on which conflicting assertions as to whether it is "day" or "night" can be made at any one time. This example points to the possibility of working with disagreement, rather than endeavouring to eliminate it (*Using Disagreements for Superordinate Frame Configuration*, 1992). As suggested by the Star of David configuration, the 12 "tribes of Israel" may be variously oriented to one another -- if not orthogonally -- inhibiting agreement.

Memorable clusters: There is a marked tendency to order many kinds of information into sets exhibiting particular characteristics (*Patterns of N-foldness: comparison of integrated multi-set concept schemes as forms of presentation*, 1980). This can be highlighted by the following simple multiplication table linking below to examples of global significance.

Examples of patterns of order associated with the simplest numbers							
	3	4	5	6	7	8	9
3	9	12	15	18	21	24	27
4	12	16	20	24	28	32	36
5	15	20	25	30	35	40	45
6	18	24	30	36	42	48	54
7	21	28	35	42	49	56	63
8	24	32	40	48	56	64	72
9	27	36	45	54	63	72	81

Governance and encodings of polyhedral mappings		
	Governance groups	Selected polyhedra for mapping
4		Tetrahedron (F/V)
	UN Security Council	Triangular prism (F)
		<i>Wu Xing</i> (5-processes cycle)

5	(Permanent members)	Square pyramid (F/V)	<i>Hygieia</i> (Pythagoreans)
6		Tetrahedron (E) Cube (F) Octahedron (V) Triangular prism (V)	
7		Szilassi polyhedron (F)	George Miller (<i>The Magical Number Seven, Plus or Minus Two: Some Limits on Our Capacity for Processing Information</i> , 1956)
8	Group of 8 (G8)	Cube (V) Octahedron (F) Truncated tetrahedron (F) Square pyramid (E)	<i>BaGua</i> ; Stephen Prothero (<i>God Is Not One: the eight rival religions that run the world</i> , 2011)
9		Triangular prism (E)	Enneagram (A. G. E. Blake, <i>The Intelligent Enneagram</i> , 1996)
12	Various round tables	Cube (E) Octahedron (E) Dodecahedron (F) Icosahedron (V) Truncated tetrahedron (V) Cuboctahedron (V)	<i>Checklist of 12-fold Principles, Plans, Symbols and Concepts: web resources</i> (2011); Multiple references
14		Cuboctahedron (F) Truncated octahedron (F) Truncated cube (F) Szilassi polyhedron (V)	
15	UN Security Council; Group of 15 (G15)		Transformations identified by Christopher Alexander (<i>Harmony-Seeking Computations</i> , 2009)
18		Truncated tetrahedron (E)	Multiple references
20	Group of 20 (G20)	Dodecahedron (V) Icosahedron (F)	Amino acids (as encoded directly by the genetic code)
21	Group of 21 (Non-Aligned Nations in the Conference on Disarmament)	Szilassi polyhedron (E)	Multiple references
24	Group of 24 (G24)	Cuboctahedron (E) Truncated cube (V) Rhombicuboctahedron (V) Snub cube (V)	Multiple references
26		Rhombicuboctahedron (F) Truncated cuboctahedron (F)	Multiple references
30	Group of 30 (G30)	Dodecahedron (E) Icosahedron (E) Icosidodecahedron (V)	<i>Goldberg Variations</i> of Bach; Requisite variety of perspectives (Stafford Beer, <i>Beyond Dispute: the invention of Team Syntegrity</i> , 1994); Participants in the <i>The Conference of the Birds</i> by Farid ud-Din Attar.
32		Icosidodecahedron (F) Truncated icosahedron (F) Truncated dodecahedron (F)	Multiple references
36		Truncated octahedron (E) Truncated cube (E)	
38		Snub cube (F)	
42		Small rhombidodecahedron (F)	Answer to The Ultimate Question of Life, the Universe, and Everything by Deep Thought
48		Rhombicuboctahedron (E) Truncated cuboctahedron (V)	
60		Snub cube (E) Icosidodecahedron (E) Truncated icosahedron (V) Truncated dodecahedron (V) Rhombicosidodecahedron (V) Snub dodecahedron (V) Small rhombidodecahedron (V)	Multiple references
62		Rhombicosidodecahedron (F) Truncated icosidodecahedron (F) Snub dodecahedron (F)	
64			Hexagrams of the <i>I Ching</i> (Book of Changes)
72		Truncated cuboctahedron (E)	Multiple references
81			Tetragrams of the <i>Tai Xuan Jing</i> (Canon of Supreme Mystery)
90		Truncated icosahedron (E) Truncated dodecahedron (E)	
92		Snub dodecahedron (F)	
120		Rhombicosidodecahedron (E) Truncated icosidodecahedron (V) Small rhombidodecahedron (E)	
150		Snub dodecahedron (E)	
180		Truncated icosidodecahedron (E)	

With respect to the imagining of order framed as characteristic of hypercomputing, the above tables suggest how the variety of

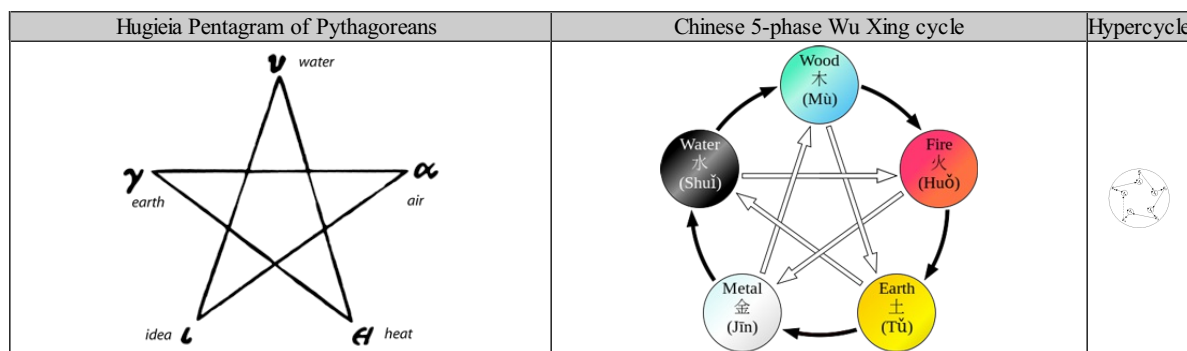
polyhedral patterns may be considered metaphorically as a form of cognitive gearbox. This is then indicative of pathways along which changing gear is viable between distinct patterns of order through compatible transformations. Especially relevant is the manner in which significance can then be variously attributed to faces (F), vertices (V), or edges (E). examples of such attributions are given separately (*Mapping possibilities with regular polyhedra*, 2008; *Polyhedral Pattern Language: software facilitation of emergence, representation and transformation of psycho-social organization*, 2008; *Geometry of Thinking for Sustainable Global Governance: cognitive implication of synergetics*, 2009)

Metatheory, metamathematics and metaphysics: If hypercomputing is to be associated with meta-analogy, as argued above, there is a case for exploring understandings of other "superordinate" approaches. This is curiously associated with "omega" as originally highlighted by **Pierre Teilhard de Chardin** in terms of the **Omega Point** -- a maximum level of complexity and consciousness towards which he believed the universe was evolving. This can be compared to the logical arguments of **Gregory Chaitin** (*Metamaths: the quest for omega*, 2007; *Thinking about Gödel and Turing*, 2007; *Mathematics, Complexity and Philosophy*, 2011). As noted above, such preoccupations can be related to hypercomputing (Stephen Blaha, *The Metatheory of Physics Theories and the Theory of Everything as a Quantum Computer Language*, 2005).

There is some irony to the fact that the so-called super-Turing computer (or O-computer), should have been associated with an oracular function -- given that the *I Ching* has been widely valued as a form of oracle through its use in divination processes. Given the manner in which circular processes were highlighted above, similar irony can be explored with respect to occurrences of the O-ring (*The-O ring: Theory, Theorem, Theology, Theosophy? a playful intercultural quest for fruitful complementarity*, 2014).

Significance attributed to symbols of belief systems: As an extension of the use of polyhedral forms, symbols of a variety of belief systems, including the Christian Cross and the Star of David, can be interrelated in exploratory animations of greater complexity (*Dynamic Exploration of Value Configurations: interrelating traditional cultural symbols through animation*, 2008).

Given the focus on distinguishing the cognitive phases of imaginative hypercomputing, of particular interest is the order implied by traditional patterns especially associated with health in its most general systemic sense. In this respect a comparison was made separately between the Chinese 5-phase *Wu Xing* pattern and that of the Pythagorean *Hygieia* from which "hygiene" derives (*Cycles of enstoring forming mnemonic pentagrams: Hygieia and Wu Xing*, 2012). These can be provocatively compared with recent understanding of hypercycles (as illustrated above).



Aesthetics, poetics and autopoiesis: As was briefly argued above, aesthetics can play a fundamental role in engendering and sustaining a pattern of associations potentially vital to the coherence of hypercomputing processes. This is especially evident in music and poetry and the value of their experience. Given the technical arguments for autopoiesis, it is curious to recognize the origins it shares with poesis and poetry-making. This merits consideration in the light of the extreme contrast between the logical encoding of I Ching hexagrams and the poetry through which commentary on them is presented.

In this sense the order engendered in hypercomputing can be understood as poetry-in-the-making, as can be variously argued (*Being a Poem in the Making: engendering a multiverse through musing*, 2012). The argument can be extended to music and song (*A Singable Earth Charter, EU Constitution or Global Ethic?* 2006). It is appropriate to ask how the sustaining memorability of sung epic poems, like the *Mahabharata* -- could be understood in terms of hypercomputing. Of particular potential relevance is the significance associated with *overtone singing*.

With respect to arguments of cognitive psychology for the embodiment of mind, especially in movement, there is a case for recognizing the role of dance in sustaining a form of recognition -- or enaction -- of hypercyclic patterns.

Personal implication in hypercomputing: This speculative exploration was introduced with the indication that hypercomputing could prove to be much more intimately related to cognitive processes than is currently suspected (*Radical Cognitive Mirroring of Globalization: dynamically inming the unquestioningly outed*, 2014). Attention was drawn to relevant arguments of such as Hofstadter and Sander (*Surfaces and Essences: analogy as the fuel and fire of thinking*, 2013), notably in the light of the imaginative creativity of such as Albert Einstein. To what extent is the imaginative ordering of reality, in which many engage, to be considered as hypercomputing?

One valuable summary of speculation on these matters is offered by **Selmer Bringsjord** and **Konstantine Arkoudas** (*The Modal Argument for Hypercomputing Minds, Theoretical Computer Science*, 2004):

We now know both that hypercomputation (or super-recursive computation) is mathematically well-understood, and that it provides a theory that according to some accounts for some real-life computation (e.g., operating systems that, unlike Turing

machines, never simply output an answer and halt) better than the standard theory of computation at and below the "Turing Limit". But one of the things we do not know is whether the human mind hypercomputes, or merely computes -- this despite informal arguments from Gödel, Lucas, Penrose and others for the view that, in light of incompleteness theorems, the human mind has powers exceeding those of TMs and their equivalents. All these arguments fail; their fatal flaws have been repeatedly exposed in the literature. However, we give herein a novel, formal modal argument showing that since it's mathematically possible that human minds are hypercomputers, such minds are in fact hypercomputers. We take considerable pains to anticipate and rebut objections to this argument.

Bringsjord has also articulated the argument otherwise (Selmer Bringsjord and M. Zenzen, *Superminds: People Harness Hypercomputation, and More*, 2003), described as follows:

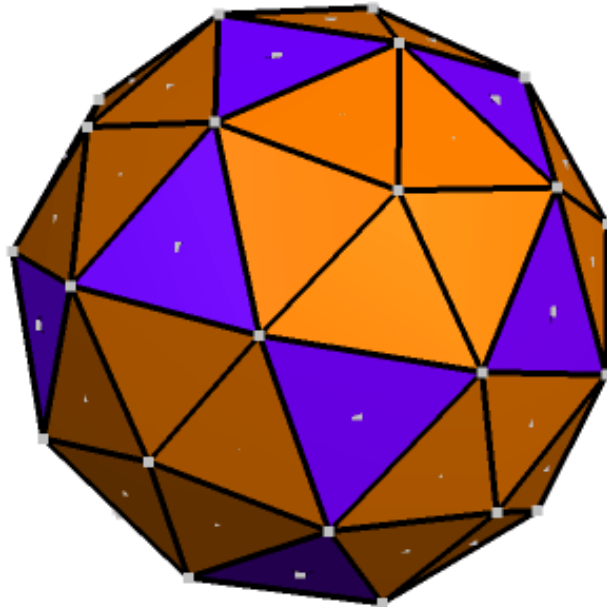
This is the first book-length presentation and defense of a new theory of human and machine cognition, according to which human persons are superminds. Superminds are capable of processing information not only at and below the level of Turing machines (standard computers), but above that level (the "Turing Limit"), as information processing devices that have not yet been (and perhaps can never be) built, but have been mathematically specified; these devices are known as super-Turing machines or hypercomputers. Superminds, as explained herein, also have properties no machine, whether above or below the Turing Limit, can have... The final chapter of this book offers eight prescriptions for the concrete practice of AI and cognitive science in light of the fact that we are superminds.

As a metaphor -- about engagement with analogy and metaphor -- to what extent does the remark of [Kenneth Boulding](#) apply:

Our consciousness of the unity of the 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. (*Ecodynamics; a new theory of societal evolution*, 1978, p. 345)

Or, as the poet John Keats puts it: *man's life is a continual allegory - and very few eyes can see the mystery of his life - a life like the scriptures, figurative*. Or again, as Gregory Bateson stated in concluding a conference on the effects of conscious purpose on human adaptation, is that: *We are our own metaphor*. (2004, p. 304).

42 as the answer of Deep Thought after millions of years
to *The Ultimate Question of Life, the Universe, and Everything*.
Illustrated by animation of two 42-faced polyhedra?



(produced with [Stella Polyhedron Navigator](#))

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