



laetus in praesens

Alternative view of segmented documents via Kairos

19 April 2021 | Draft

Meta-pattern via Engendering and Navigating "Pantheons" of Belief? Exploration of three-dimensional patterns inspired by mathematical experience of interrelationship

- / -

Introduction

Emergence of a pantheon -- cognitive or otherwise
 Pantheons as patterns of cognitive N-foldness
 Pantheon dynamics in a globalized semi-secular civilization?
 Mathematical theology enabling the quest for a meta-pattern?
 Complex equations forming "pantheons" of mathematical experience?
 Prime number and curvature implications for global governance?
 Polyhedra suggestive of arrays of requisite variety of pantheons in 3D
 Configuring the 64 subjects of mathematics as a 64-edged drilled truncated cube
 Exploring potential dynamics within a pantheon?
 Engendering and navigating pantheons -- "angelic" and "demonic"?
 Pantheon as a psychosocial "O-ring" -- speculatively understood?
 References

Introduction

Conventionally a [pantheon](#) is the particular set of all gods of any individual polytheistic religion, mythology, or tradition. There are an estimated 4,200 different religions in the world, although these may be variously clustered ([Stephen Prothero, *God Is Not One: the eight rival religions that run the world -- and why their differences matter*, 2010](#)). However, in an extensively secularized global civilization of considerable complexity, "pantheon" may in practice have other meanings -- as with "religion" and "god". Religion may then be extended to mean a pattern of fundamental beliefs. Any such religion may then be recognized as having one or more gods -- and perhaps many.

Framed in this way, it could be asked whether science can be recognized as a pantheon -- whether this is to be understood in terms of fundamental concepts or extends to the many specific disciplines which cultivate them. A similar question could be asked of the arts. Such a pattern is evident in relation to the media and its celebrities -- and to sports. In each case the focus is on a pattern of belief, how it is cultivated, and the integrative focal points it engenders.

The question here is how a pattern of belief emerges and how some form of pantheon is then engendered within it or by it. The situation is obviously relatively dynamic in that the pattern for an individual or a group typically develops and evolves over time -- most obviously in response to events and shifts in fashion. In the case of science this may be recognized in terms of [paradigm shifts](#) and revolutions ([Thomas Kuhn, *The Structure of Scientific Revolutions*, 1962/2012](#)).

The focus here is however on what an individual cultivates as a pantheon of "gods" to be honoured in some way -- whether as a child, an adolescent, or an adult. Clearly the pantheon at any particular time is susceptible to development. New gods are recognized or engendered and the pantheon as a whole may be reconfigured and transformed. There may then be a challenge to navigating from one pantheon to another -- to the extent that the relation to the earlier gods can be easily abandoned, and especially if the emerging gods are only partially or dimly understood. As is only too obvious, pantheons and their gods may effectively compete for the belief of an individual -- with each having a tendency to deprecate or demonise the other.

Following engagement with such a succession and variety of pantheons, the concern might then be framed as to whether the process offers insight into the nature of any "meta-pattern", what form that might take, and how engagement with it might be cultivated. One insight in that regard is offered by [Gregory Bateson](#):

The pattern which connects is a meta-pattern. It is a pattern of patterns. It is that meta-pattern which defines the vast generalization that, indeed, it is patterns which connect. ([Mind and Nature: a necessary unity](#), 1979)

And it is from this perspective that he warned in a much-cited phrase: *Break the pattern which connects the items of learning and you necessarily destroy all quality*. There is of course the irony that each pantheon has a natural tendency to cultivate the assumption that it is itself that meta-pattern -- or that its array of (secondary and dependent) deities is indicative of its more fundamental and transcendent nature. All else is then necessarily illusion and potentially dangerous as such.

The difficulty in the current global civilization is that any such preoccupation is necessarily naive from the perspective of a given pantheon -- other than that believed to be primary. Framing alternative worldviews as fundamentally irrelevant or problematic establishes the claim that there is no fundamental difficulty to be addressed. For each pantheon the truth is already at hand -- or is a natural consequence of its further development, if not to its commitment to some form of global hegemony. In practice the situation gives rise to institutional arenas in which a degree of token discourse with "others" is tolerated at best. Most evident are legislative assemblies, but the dynamic is also evident in interdisciplinary, intersectoral and interfaith gatherings.

The situation is further complicated by the degree to which iconic figures in religion, science, and other domains may be experienced and labelled (if only nicknamed) as "gods" or having "god-like" attributes. Eminent professors may be known by such labels (*Gods of Science: Stephen Hawking and Brian Cox discuss mind over matter*, *The Guardian*, 11 September 2010; Jerry Klinger, *The Coronavirus Hysteria and the Gods of Science*, *Times of Israel*, 10 March 2020).

Leaders of countries may be referred to as deities, or may so consider themselves (Pierre Briançon, *Macron's 'Jupiter' model unlikely to stand test of time*, *Politico*, 16 June 2017; William Drozdiak, *After Decade in Power, Mitterrand still 'Dieu'*, *The Washington Post*, May 11, 1991):

Two-thirds of the French public consider him a superb statesman, and his reverential nickname, "Dieu" (God), attests to the imperial demeanor that many French voters admire in a head of state.

Comparable allusions are made regarding the heads of commercial enterprises and finance, notably through their presentation as "Masters of the Universe" (*Davos as the "crowning experience" for the "Masters of the Universe", "Mistresses of the Universe"?* 2009). The relations between such deities -- if any -- may well recall those evident in myths regarding traditional pantheons.

The pantheons of religion have given rise to lists of the deities associated with them (*List of deities*; *List of demigods*). However *Wikipedia* also offers an extensive *List of people who have been considered deities*. Surprisingly this includes George Washington and Prince Philip -- and more recently Prince Charles on the death, of the former.

Those acknowledged as the "gods" of other pantheons are not similarly recognized however, except through devices such as the many *Lists of Celebrities*, the *Forbes Celebrities 100*, and *Orders of Precedence* for purposes of protocol (*List of heads of state by diplomatic precedence*; *Order of precedence in the Catholic Church*). The *Lists of academic ranks* by country are naturally subject to interpretation in terms of the *Academic Ranking of World Universities*.

Of some relevance to the following argument are references to a "personal pantheon", namely one freely composed independently of any particular belief system. One example -- *My Personal Pantheon* -- has been extensively, but anonymously, developed. This bears comparison with that titled *Pantheon of Atheists* -- again extensively developed, but with a degree of humour.

Conventionally a pantheon is typically the result of a degree of **anthropomorphism** and **personification** through which human characteristics are attributed to the deities arrayed -- notably to facilitate memorable reference to them. A pantheon could however be understood more generally as an array of fundamental distinctions held to be separately meaningful -- into which "supernatural" attributes are somehow imbued, as with values (irrespective of any secular bias). These can be more conventionally recognized as complex **memes**, or even as **memeplexes**, namely clusters of memes.

A reasonable summary of the controversial matter is offered by Sam Barnett-Cormac (*Pantheons and Archetypes*, *Quaker Openings*, 17 October 2017):

Some see the figures of the gods of their pantheon as literally existing, as having their own agendas, and as interacting with one another and with the world as we know it; in summary, that they behave as theistic deities. Others see them as embodiments of ideas, or ideals; as archetypes that are useful in their practice. For example, a pagan who believes in practical magic might invoke a deity appropriate to their current working; in doing so, they may literally believe there is a supernatural being that they are inviting to assist them, or they may believe that they better focus their mind and energies but dwelling on the figure -- or perhaps both!...

Well, the example of modern pagans and other polytheists does show us a key form of conception and usage of pantheons beyond the literal... They are concepts, archetypes, ideas and ideals. In essence, they can fill the same role as stories. We use stories to shape our thoughts and to communicate... The figures of traditional pantheons are not simply a collection of characteristics and areas of dominion. They are also part of intertwined sets of stories

Framed in this way, there is then the paradox as to whether a pantheon is most appropriately experienced as a memeplex clustering "god-like" qualities distinguished as memes. For those preferring such conventionally secular terms, any exploration of such memes then evokes the question as to the nature of the experiential "pantheon" -- given any deprecation of the pantheons engendered by religions.

This exploration exploits the conventional articulation of mathematics into 64 disciplines as indicative of a pantheon in its own right. So framed it focuses on the fundamental equations deemed by mathematicians to constitute a nexus of beauty and truth -- and potentially to have changed the world, as argued by Ian Stewart (*In Pursuit of the Unknown: 17 equations that changed the world*, 2012). These can

be contrasted with the UN's 17 [Sustainable Development Goals](#) by which it is currently hoped to change the world -- namely through a pantheon of a different kind.

Emergence of a pantheon -- cognitive or otherwise

Whether meme or memplex, there are various indications as to how a pantheon might be experienced as "emerging". These include:

- [cognitive development](#) in childhood, and the extensive studies of the staged process by which concepts are distinguished and acquire credibility from initial confusion. Notable in that respect are the contrasting understandings of that process.
- development of religions in a succession of stages from forms of animism, perhaps too readily labelled as primitive. A wide variety of methods has been applied to this matter, perhaps most notably framed as [psychology of religion](#) -- giving rise to many disagreements and continuing debate. Such disagreement is exacerbated by tendencies towards reification and avoidance of the experiential so fundamental to any believer
- development of disciplines and methodologies, such as science, from their confused beginnings -- with the progressive recognition of boundaries and mandates, and the exclusion of whatever is defined as a [pseudoscience](#), for example (K. Brock Enger, *Understanding the Development of Disciplines and the Ways they Contribute to Knowledge and Reflect Practice: an analysis of articles published in higher education and library and information science*, *Advances in Library Administration and Organization*, 24, 2006)
- development of reaction to some other pantheon progressively experienced as unsatisfactory
- development of progressive recognition of a set of iconic figures and celebrities in some domain, most obviously the arts or sport
- cultivation in board games and online gaming of traditional pantheons, as is most evident in *Dungeons and Dragons*.
- development of recognition of sets of concepts and principles deemed fundamental, whether by religion, science, or government
- recognition of stages in educational development, most notably as framed by academia
- recognition of stages in the development of insight between which a form of "rebirth" may be inferred or experienced (*Varieties of Rebirth: distinguishing ways of being "born again"*, 2004). This may result in experience of a new configuration of "gods" -- a new pantheon.

In general terms it could be argued that there is a development from a confusing sense of subjective identification with an array of progressively more distinct experiences -- possibly deprecated from other perspectives as inchoate or "mystical". For those experiencing them, these are only subsequently named and labelled objectively in some way. This enables a later process of ordering and classification -- as a consequence of their progressive reification (as memes). There is considerable irony to the manner in which a traditional pantheon may be effectively reified to the degree that it is embodied in symbolic architecture -- distracting from its intangible significance, as with the [Pantheon in Rome](#) (and its many imitations).

Any associated personal experience of a pantheon may be understood as evolving through some form of learning, initiation, self-reference or mirroring -- arguably claimed to be of ever higher order.

As noted with respect to the psychology of religion, any such pantheon emergence tends to be accompanied by dynamics of disagreement. These are seldom encompassed by those identifying with it as fervent believers or adherents -- other than through processes of deprecation and demonisation of alternatives typical of long-term rivalry (*Knowledge Processes Neglected by Science: insights from the crisis of science and belief*, 2012). The individual is notably confronted by the need to make whatever sense is possible in an authoritative context potentially experienced as highly confusing. This is the microcosmic version of the current challenge of [global sensemaking](#).

Pantheons as patterns of cognitive N-foldness

The pantheons of tradition tend to be of a particular size. It is therefore curious to note that other "memes" tend to be arrayed in clusters of a specific size, with little understanding of why this is the case. As one example, humans have an unexplored enthusiasm for 12-fold arrays -- whether or not they are to be recognized as memplexes (*Checklist of 12-fold Principles, Plans, Symbols and Concepts: web resources*, 2011).

That checklist necessarily includes a number of traditional pantheons. The question that then merits exploration is whether other 12-fold sets of principles, concepts, etc are to be recognized as constituting pantheons in some experiential sense. The checklist is in fact the annex to an exploration of how such a 12-fold pattern might be indicative of an array of systemic functions (*Eliciting a 12-fold Pattern of Generic Operational Insights: recognition of memory constraints on collective strategic comprehension*, (2011). Why is it considered appropriate to distinguish 12 memes in any such set -- in preference to some other number? Are such distinctions indicative of [requisite variety](#), as might be understood in some cybernetic or systemic sense?

A similar exercise can be undertaken with respect to the unexplored enthusiasm for more complex 20-fold patterns (*Requisite 20-fold Articulation of Operative Insights? Checklist of web resources on 20 strategies, rules, methods and insights*, 2018). For whom do such patterns function as experiential pantheons and why? That exercise was provoked by the possibility that in [general systems](#) terms some justification for such a pattern was to be found at a fundamental biological level (*Memetic Analogue to the 20 Amino Acids as vital to Psychosocial Life?* 2015).

Just as with the 12-fold and 20-fold arrays, the 8-fold pattern is variously considered of fundamental significance whether or not it is explicitly embodied in a traditional pantheon. There is no lack of reference to some form of 8-fold array, whether by quite distinct religions, as a feature of policy analysis, or as an organizational scheme for a class of subatomic particles. Clearly, given the determining role of the [10 Commandments](#) for the Abrahamic religions, this could also be recognized as the expression of a form of pantheon.

Yet to be determined: **is the the size of such arrays of memes to be considered arbitrary and coincidental, or is it of particular**

significance to the organization of meaning -- under some circumstances, and perhaps only credible to some? Why does any such array "work" to the point of being a deeply valued organization of experience -- again, typically only for some?

The argument can be taken further, and more generally, through considering the arrays of concepts, methods and insights variously proposed in academic treatises, strategic documents, and in a variety of domains, as explored separately (*Patterns of N-foldness: comparison of integrated multi-set concept schemes as forms of presentation*, 1980). A wide range of examples was presented in annexes to that exercise (*Examples of Integrated, Multi-set Concept Schemes*, 1980).

Pantheon dynamics in a globalized semi-secular civilization?

The size of a pantheon (or memeplex) clearly varies. There are obvious preferences for particular sizes, with little explanation justifying the choice. Arguably the size may extend through 20 to 100, although the pantheons of Hinduism allegedly number thousands of deities. There is clearly an unexplored constraint on the number that can be held to be meaningful in experiential terms, especially given constraints on human memory, as separately discussed (*Comprehension of Numbers Challenging Global Civilization*, 2014).

The latter noted a possible upper constraint implied by "Dunbar's number", namely a suggested cognitive limit to the number of people with whom one can maintain stable social relationships (commonly held to be 150). Given the understanding of a pantheon as a set of interrelated stories, it might then be asked how many stories or jokes a raconteur is typically able to recall. At best, what mnemonic aids enable any complex set of memes to be recalled, as highlighted by Frances Yates (*The Art of Memory*, 1966)

Especially curious is the **extremely limited attention to the relation between whatever distinct meanings are arrayed within any pantheon**. This is as evident in the 8-fold, 10-fold, 12-fold, or 20-fold arrays. It is striking that the systemic nature of the pattern of relations between the UN's Sustainable Development Goals is considered of such limited interest -- given their acclaimed fundamental role for a global system in crisis. Little is known about the purported (or assumed) interactions between those goals, although a recent analysis has been published behind a paywall (David Tremblay, et al, *Sustainable Development Goal Interactions: an analysis based on the five pillars of the 2030 agenda*, *Sustainable Development*, 28, 2020. 6).

If a pantheon is appropriately understood as a pattern -- potentially indicative of a meta-pattern -- a particular contrast to such systemic negligence is offered by Christopher Alexander's *A Pattern Language: towns, buildings, construction* (1977). Alexander (and his team) clarified 254 interlinked patterns as providing one such pattern language with that particular focus. Their work was framed by a study of *The Timeless Way of Building* (1979), as discussed separately (*Pattern language: a timeless way of building*, 1981). As described there, of relevance to any understanding of a meta-pattern, this noted Alexander's argument that:

There is a central quality which is the root criterion of life and spirit in a man, a town, a building, or a wilderness. This quality is objective and precise, but it cannot be named

Alexander's focus on building was presented with the suggestion that other pattern languages are indeed possible. As an exploration of that possibility that set of patterns and linkages was "translated" into four other variants of the interlinked pattern of 254 (*5-fold Pattern Language*, 1984). With respect to any architecture of knowledge or experience, "building" can indeed be understood more generally -- and especially cognitively.

Also of potential relevance are the carefully articulated memeplexes of 64, 72 and 81, which feature in Western and Eastern traditions, with interrelationships most explicit in the Eastern patterns of 64 and 81 (*9-fold Magic Square Pattern of Tao Te Ching Insights experimentally associated with the 81 insights of the T'ai Hsüan Ching*, 2006).

Metaphor is extensively used in the classic Chinese examples to render comprehensible the distinctions and the relationships between them (*Transformation Metaphors -- derived experimentally from the Chinese Book of Changes (I Ching) for sustainable dialogue, vision, conferencing, policy, network, community and lifestyle*, 1997).

The 72-fold distinctions in the Western traditions are controversially embedded in mythological frameworks which undermine their credibility from a conventional perspective -- therefore calling for careful clarification (*Variety of System Failures Engendered by Negligent Distinctions: mnemonic clues to 72 modes of viable system failure from a demonic pattern language*, 2016; *Engaging with Hyperreality through Demonique and Angelique? Mnemonic clues to global governance from mathematical theology and hyperbolic tessellation*, 2016).

One obvious reason for preference for patterns of a particular size, and especially in the case of those of a larger size, is the characteristics of those numbers which facilitate memorability. Especially noteworthy are combinations of prime number factors (offering a degree of symmetry) which enable this. Examples include: 12 (as $2^2 \times 3$), 64 (as 2^6), and 72 (as $2^3 \times 3^2$). The variety of such patterns is considered separately (*Commentary on patterns of N-foldness*, 2020).

It is however remarkable to note the extent to which the relations between the deities of traditional pantheons have figured in the memorable tales which are a feature of myth. There is a considerable degree of irony to the fact that the principal figures of such pantheons in the Western tradition have been appropriated for the iconography of the **United Nations Specialized Agencies** (Apollo, Ceres, etc). This offers the elusive suggestion that the relations between the functions with which those agencies are associated are implied by the myths of the pantheons with which they were associated.

Mathematical theology enabling the quest for a meta-pattern?

Role of number: In the desperate quest for global coherence and harmony, it is strange to note the manner in which number seems to play a central role in seemingly unrelated modes:

- in the constraints of human comprehension and the memorability of articulations of fundamental principles and strategic initiatives
- in the preference for patterns or pantheons of meaning of particular size, with no explanation as to the choice made
- in the role of music as the primary discipline in ordering patterns meaningfully, memorably and attractively for many
- in the mathematical disciplines assiduous in their study of highly complex patterns of relationships, irrespective of whether their insights can be rendered meaningful to many or to the governance challenges of the times
- in the enthusiasm of many for particular patterns of numbers, deprecated as pseudoscience and superstition by the relevant disciplines, despite determining seating arrangements in important negotiations or in the design of buildings
- in the importance attached to number, proportion and symmetry in architecture, design and symbolism, whether or not framed in terms of sacred geometry
- in the importance to the theology of different religions of particular patterns of numbers -- as they may indeed govern the sacredness of geometry

With respect to the challenges of governance, and to any understanding of the global unity to which reference is so frequently and glibly made, it is then appropriate to ask: **how is "unity" to be understood?** This is especially the case within a global civilization in which there is also considerable preoccupation with the respect for diversity and its implications for individual and collective identity.

Unfortunately it is only too easy to recognize that appeals for unity are simply and naively a disguise for exhortation to agree with "my plan", or "our plan". (Rebekah Koffler, *The Words that Undermine Biden's Call for Unity, White House Dossier*, 21 January 2021; *Exhortation to We the Peoples from the Club of Rome*, 2018; *Adhering to God's Plan in a Global Society: serious problems framed by the Pope from a transfinite perspective*, 2014). It is however remarkable how global consensus has been achieved in response to the pandemic with respect to social distancing (*Humanity's Magic Number as 1.5? Dimensionless constant governing civilization and its potential collapse*, 2020).

The interrelationship between the distinct modalities of appreciation of number (as listed above) could indeed be explored. The challenge is of course that as distinct modalities they could be held to constitute a pantheon governed by an elusive meta-pattern -- one potentially perceived as alien by each. Those identified with each mode would readily tend to promote their particular relevance to eliciting such a meta-pattern -- to the extent that they recognize the possibility of its existence.

Mathematical theology: Given the primary association of pantheons with religious belief, and despite the secularisation of belief systems, there is a case for exploring the challenge of emergent "unity" (and the nature of any "meta-pattern") through the seemingly improbable discipline of mathematical theology. The possibility is discussed separately in terms of self-reflexive global reframing to enable faith-based governance (*Mathematical Theology: future science of confidence in belief*, 2011; *Bibliography of Relevance to Mathematical Theology*, 2011). Relevant commentaries include;

- James Bradley: *Theology and Mathematics: an introduction* (*Theology and Science*, 9, 1, 2011)
- Philip J. Davis: *A Brief Look at Mathematics and Theology* (*The Humanistic Mathematics Network Journal Online*, 27, 2004)
- Hitoshi Ochiai: *Mathematical Theology* (*Sekaishisoshu*, November 2009)
- W. J. Eckerslyke: *Theological Mathematics* (*WikiInfo*, 11 January 2009)
- Rebecca Newberger Goldstein: *Mathematics as Theology* (*Dialog -- Philoctetes Center*), 1 December 2009)
- Sarah Voss: *Mathematical Theology* (*Spiritual Information: 100 Perspectives*, 2005)
- Edward A. Maziarz: *Meta-mathematics and Meta-theology: an inquiry* (*Philosophia Mathematica*, 1975, 2)
- J. R. Lucas: *Mathematical Theology* (*Oxford Scholarship*, 1970)

As implied by the above argument, any initiative in quest of a meta-pattern would be expected to engender a pantheon of contrasting modalities and mutually challenging dynamics. Its method, however institutionalised, would indeed be a metaphor of its own preoccupation, as envisaged separately (*International Institute of Advanced Studies in Mathematical Theology Enabling Proposal for Faith-based Governance*, 2011):

Potential strategic importance of mathematical theology	Integrative thematic organization
Reframing mathematical theology in terms of confidence	Mathematical theology of experience
Imagining the initiative: reframing conventional labels	Comprehension of ignorance, nonsense and craziness
Institutional and thematic precedents	Implication of research on opinion and belief
Organization of the initiative	Symbolic location of the initiative
Examples of research themes for consideration	

Self-referential quest? With respect to such a grail-like collective quest for transformative, integrative insight, the initiative might be provocatively enriched by the symbolism of the traditional Sufi tale of *The Conference of the Birds* (*Mantiq al-tair*) by Farid al-Din Attar. In their collective pursuit of that transformative understanding -- a transcendent theory of everything -- each of the 30 birds in that tale has a special significance, and a corresponding didactic fault. In reaching the expected goal -- the land of the mythical *Simurgh* -- all they see there are each other and their collective reflection in a lake. "*Simurgh*" actually means "30 birds" in Persian -- potentially to be understood as a dynamic form of pantheon.

It might then be asked whether the Sustainable Development Goals of the UN would have been of greater global significance had they taken the form of a 30-fold pattern -- corresponding to the 30-fold articulation of the Universal Declaration of Human Rights.

Pantheon of mathematics? Of peculiar relevance to this argument is the degree to which mathematics can be understood as an extreme form of detachment from personal belief -- in contrast to the preoccupation of theology as the extreme identification with belief. Both extremes pose a challenge with respect to the organization of meaning.

Paradoxically, despite vigorous assertions of impersonal objectivity, many mathematical innovations are named after their discoverers --

who have become the icons of that discipline. That seeming contradiction is exemplified in the so-called "folklore" of mathematics by recognition of the [Erdős number](#), namely the "collaborative distance" between mathematician [Paul Erdős](#) and another mathematician, as measured by authorship of mathematical papers.

The "icons" of mathematics are readily recognized and may even be said to belong to the "pantheon of mathematics" in any non-mathematical description of the psychosocial system of mathematicians -- however irrelevant this may be held to be from a mathematical perspective. From that perspective it is appropriate to note the existence of an online database named [Pantheon](#). This project uses biographical data to expose patterns of human collective memory.

Pantheon has one dataset -- effectively a [Pantheon of Mathematicians](#) -- profiling 828 people classified as mathematicians born between 500 BC and 1988. The focus of the dataset is on the geographical associations of the mathematicians (birth, death). Together with the period they were alive, this is the only concern with how they might be considered to be related as a social system. There is no indication of how their mathematical preoccupations might be related in defining mathematics as a system.

Citations as framing an emergent meta-pattern? It might be assumed that the relations between mathematical papers -- through the vast network of citations -- would offer a more systematic understanding of mathematics as a whole. The major difficulty is that there are multiple citations databases with problematic coverage of the literature as a whole ([Best citations database](#), [MathOverflow](#)).

A major complicating factor for any systemic comprehension is the manner in which ranking of journals and papers is taken into account ([Citations of Mathematical Journals](#)). This is most evident with respect to any notion of an [impact factor](#), namely a measure of how many times an academic journal article or book or author is cited by other articles, books or authors -- but potentially biased by the coverage of that citation index and its selection of journals.

Perhaps remarkably, rather than endeavouring to recognize mathematics in systemic terms, the American Mathematical Society frames the practice of mathematics in non-mathematical terms as a "culture" ([The Culture of Research and Scholarship in Mathematics: citation and impact in mathematical publications](#), *American Mathematical Society: Committee on the Profession*). In that valuable clarification is noted:

A scientist's publication record is the basic "statistic" on which promotion, salary and funding decisions are made. In many fields the number of citations to a work, the order of authorship, and impact factor of the journal, are used as proxies for expert evaluation. For a variety of reasons, mathematicians have not embraced the impact factor as a reliable indicator of a journal's quality. Indeed, there are documented cases where unscrupulous editors have dramatically inflated the impact factors of entirely undistinguished journals...

Several issues combine to require careful consideration of publication cultures before understanding and using citation statistics in Mathematics... Citations tend to be focused and targeted to specific required results rather than being used as a broad survey of the field... These citation practices may contribute to the relatively low impact factors of even the most prestigious mathematical journals, as compared to those in other fields.

The degree to which current practice is dissociated from any systemic understanding of mathematics is further clarified by the report of a Joint Committee on Quantitative Assessment of Research from the International Mathematical Union (IMU) in cooperation with the International Council of Industrial and Applied Mathematics (ICIAM) and the Institute of Mathematical Statistics (IMS): [Citation Statistics](#) (2008).

The situation is also complicated by differences within subdisciplines of mathematics:

Variation of citation counts by subdisciplines within a particular discipline is known but rarely systematically studied. This paper compares citation counts for award-winning mathematicians in different subdisciplines of mathematics... We find a pattern in which mathematicians working in some subdisciplines have fewer citations than others who won the same award, and this pattern is consistent for all awards. (Lawrence Smolinsky and Aaron Lercher, [Citation rates in mathematics: a study of variation by subdiscipline](#), *Scientometrics*. 91, 2012)

Further insights are offered by Keith R. Leatham ([Observations on Citation Practices in Mathematics Education Research](#), *Journal for Research in Mathematics Education*. 46, 2015, 3). One notable factor is the often extreme delays in publication in "high impact" journals compared to the rapidity of publication in other media which may not be covered by citation indexing. Somewhat ironically the coverage by Google Scholar may be deemed more comprehensive than other facilities -- although deprecated as "tainted" by the absence of effective peer review.

Complex equations forming "pantheons" of mathematical experience?

Given the sophisticated approach of mathematics to patterns of order, this argument can be developed by considering how an all-connecting "meta-pattern" might be recognized. **Could mathematical experience as a whole be fruitfully articulated in some form of "pantheon"?** Such questions would follow from much-cited studies of what is indeed referenced by that term (Philip J. Davis and Reuben Hersh, [The Mathematical Experience](#), 1981/1995; *The Mathematical Experience*, Study Edition, 2012).

Theory of Everything as a meta-pattern? The above argument has focused on the possibility of some form of transcendent meta-pattern. In the realm of physics, a primary focus of mathematics, a [Theory of Everything](#) (TOE) is a hypothetical single, all-encompassing, coherent theoretical framework that fully explains and links together all physical aspects of the universe. Finding such

TOE is considered one of the major unsolved problems in physics. [String theory](#) and [M-theory](#) have been proposed as theories of everything. String theory has a notable feature that requires extra dimensions for mathematical consistency. As currently understood spacetime is 26-dimensional in [bosonic string theory](#), 10-dimensional in [superstring theory](#), and 11-dimensional in [supergravity theory](#) and M-theory.

Of considerable relevance to this argument is the form that such a theory might take, the number of variables required, and the operations through which they would be related. How complex would such a theory need to be to encompass the reality it seeks to embody?

To whom would it be comprehensible and should comprehensibility indeed be a constraint on the formulation of such a theory? The question is highlighted by the most complex form of symmetry discovered by mathematics -- and known as the [Monster Group](#), being of order 8×10^{53} (approximately). The monster is unusual among simple groups in that there is no known easy way to represent its elements.

However of particular interest is the assumed restriction of "everything" to what the discipline of physics currently deems relevant -- thereby excluding the problematic dynamics noted separately ([Knowledge Processes Neglected by Science: insights from the crisis of science and belief](#), 2012; [Neglected "external" dimensions](#), 2010). Naively it could be asked whether that discipline would then have any future in the millennia to come -- other than in the provision of "footnotes" to that theory. This would be the case if there was no probability that reality could be understood otherwise ([Beyond the Standard Model of Universal Awareness: being not even wrong?](#) 2010; [Quest for a "universal constant" of globalization? Questionable insights for the future from physics](#), 2010).

Given the fundamental significance of the Monster Group, its inexplicability would be ironic if it were to be concluded that it was effectively a Theory of Everything. [Monstrous moonshine](#) (or moonshine theory) now describes the unexpected connection between the Monster Group and modular functions. The reference to "moonshine" is an invitation to speculation on the wider implications of any Theory of Everything ([Potential Psychosocial Significance of Monstrous Moonshine: an exceptional form of symmetry as a Rosetta stone for cognitive frameworks](#), 2007).

Somewhat intriguing in that respect is the potential correspondence between the 20-fold articulation of the Monster Group and the 20-fold pattern noted above ([Memetic Analogue to the 20 Amino Acids as vital to Psychosocial Life?](#) 2015). The Monster Group contains 20 [sporadic groups](#) (including itself) as [subquotients](#) -- now nicknamed as the "happy family".

"Extra dimensions?" The challenge for the future is evident in the meaning to be associated with the so-called [extra dimensions](#) required by string theory (Robert Garisto, [Curling Up Extra Dimensions in String Theory](#), *Physical Review Focus*, 1, 7, 9 April 1998; [How can one imagine curled up dimensions?](#) *Physics Stack Exchange*, 3 April 2012; [Would someone please explain the whole "tiny curled up extra dimensions" thing?](#) *Reddit*; Paul Sutter, [How the universe could possibly have more dimensions](#), *Space*, 21 February 2020). Clearly any experiential pantheon implies analogous cognitive challenges.

One indication of the nature of the cognitive realm neglected to date by physics and mathematics is provided by [George Lakoff](#) and [Mark Johnson](#) ([Philosophy In The Flesh: the embodied mind and its challenge to western thought](#), 1999) and by George Lakoff and Rafael Núñez ([Where Mathematics Comes From: how the embodied mind brings mathematics into being](#), 2000). The argument is further developed by Mark Johnson ([The Meaning of the Body: aesthetics of human understanding](#), 2007) and Maxine Sheets-Johnstone ([The Primacy of Movement](#), 1999).

Provocatively the argument can also be developed in the light of various understandings of [psychophysics](#) and [sociophysics](#) ([Purportedly objective configurations with potentially subjective implications](#), 2021; [Eliciting provocative clues for psychosocial challenges](#), 2021). **Are specifically distinctive cognitive functions to be recognized as experientially associated in some manner with the fundamental equations of mathematical experience**, as might emerge from the arguments of [Douglas Hofstadter](#) and Emmanuel Sander ([Surfaces and Essences: analogy as the fuel and fire of thinking](#), 2012).

Are such possibilities also excluded by current explorations of the "mathematics of mathematics" or "meta-mathematics" (Wolff-Michael Roth, [The Mathematics of Mathematics: thinking with the late, Spinozist Vygotsky](#), 2017; Stephen Cole Kleene, [Introduction to Metamathematics](#), 1952)?

Curiously a related argument can be developed with respect to the experience of time ([Cognitive Implication of Globality via Temporal Inversion: embodying the future through higher derivatives of time](#), 2018).

Mathematics subject classification? It might be assumed that the focus of mathematics would give rise to an especially sophisticated organization of its subject matter, most obviously in the [Mathematics Subject Classification](#) (MSC). Its origins and evolution are reviewed by [Craig Fraser](#) ([Mathematics in Classification Systems](#), *Encyclopedia of Knowledge Organization*, 2019; [Mathematics in Library and Review Classification Systems: an historical overview](#), *Knowledge Organization*, 47, 2020, 4). This review is introduced by the quotation:

The classification of mathematical studies is involved in extraordinary difficulties, and so is the classifying of many mathematical books. The relations of the branches are so intricate, so plastic, so recondite, that it is well-nigh impossible to define them or to comprehend them.
(Henry E. Bliss, *The Organization of Knowledge in Libraries and the Subject-Approach to Books*, H.W. Wilson Company, 1935)

The MSC is currently a [hierarchical classification](#) scheme, with three levels of structure. This is indeed suggestive of an emergent pantheon as argued above (Dave Rusin, [A Gentle Introduction to the Mathematics Subject Classification Scheme](#), *The Mathematical Atlas*, 12 May 1999). At the top level, 64 mathematical disciplines are labeled with a unique two-digit number.

However for physics papers the *Physics and Astronomy Classification Scheme* (PACS) is often used as an alternative. Due to the large overlap between mathematics and physics research it is quite common to see both PACS and MSC codes on research papers, particularly for multidisciplinary journals and repositories such as the *arXiv*. The *ACM Computing Classification System* (CCS) is a similar hierarchical classification scheme for *computer science*. There is some overlap between the AMS and ACM classification schemes, in subjects related to both mathematics and computer science, however the two schemes differ in the details of their organization of those topics. The classification scheme used on the *arXiv* is chosen to reflect the papers submitted. As *arXiv* is multidisciplinary its classification scheme does not fit entirely with the MSC, ACM or PACS classification schemes. It is common to see codes from one or more of these schemes on individual papers.

Arguably the obvious challenge is the interrelationship between these systems of organizing math-related themes -- given that each is of potentially fundamental significance to the representation and organization of a singular reality. Somewhat ironically, their questionable relationship is analogous to that of pantheons in other domains, as argued separately (*Is the House of Mathematics in Order? Are there vital insights from its design*, 2000).

In a study of the place of philosophy in modern mathematics, the organization of the MSC of 2010 has been specifically criticized criticizes the MSC2010 on the ground that it does not reflect underlying connections that exist between different parts of mathematics (Daniel Parrochia, *Mathematics and Philosophy*, ISTE/Wiley, 2018). If mathematics is a system, how is that system articulated in systemic terms -- as might be explored in the *philosophy of mathematics*?

The question raised there was **whether this body of knowledge has any structure that emerges from the mathematical insights it endeavours to incorporate**. Or, alternatively and in its entirety, is it only to be understood as a tree -- namely one of the simplest structures in mathematical terms -- of some value only to librarians of mathematical institutes? To what extent are such librarians acquiring responsibility for the coherence of the pattern of hyperlinks extending from particular papers, especially to other branches of mathematics through *citation indexing*?

That initial question was later explored separately as:

- *Dynamics of Symmetry Group Theorizing: comprehension of psycho-social implication* (2008)
- *Towards a periodic organization of the Mathematics Subject Classification* (2009)
- *Periodic Pattern of Human Knowing: implication of the Periodic Table as metaphor of elementary order* (2009)
 - *Mathematical knowledge management*
 - *Missing "map" of mathematics: a self-reflexive "periodic table"?*
 - *Origin of mathematics and the periodic table -- in human cognition?*

Given the accessibility of relevant techniques, and the degree of familiarity that mathematicians have with them, it might be asked why there is not continuing experimentation with alternative orderings of mathematical subject matter. The contrast with the case of the periodic table of chemical elements is striking (Denis H. Rouvray and R. Bruce King, *The Mathematics of the Periodic Table*, 2005).

What criteria might be relevant to eliciting more fruitfully meaningful patterns of order from mathematics itself?

Why is that possibility of such limited interest to mathematicians given the significance they attach to their own domain? Is it indeed the case that the architecture of mathematics subject matter as a "pantheon" in its own right has evoked far less interest than that of the Pantheon -- as reviewed by Giangiacomo Martines (*The Relationship between Architecture and Mathematics in the Pantheon. Nexus Network Journal*, 2, 2000).

Equations as an implication of fundamental order? In mathematical *equations*, a *variable* is a symbol which works as a placeholder for an expression or quantities that may vary or change. It is often used to represent the *argument of a function* or an arbitrary element of a set. In addition to numbers, variables are commonly used to represent *vectors*, *matrices* and *functions*

If there are fewer equations than variables, the system is called underdetermined. This type of system may have either zero or infinitely many solutions. If there are more equations than variables, then the system is called overdetermined. In general, the goal is to be able to solve N equations with N variables, this is called a determined system, but you can have more or fewer equations than variables. The presentation of an equation in the form of a theorem gives rise to an extensive *List of theorems called fundamental* (as provided by *Wikipedia*). Little effort is seemingly devoted to indicating the relationships between such theorems.

Equations have a curious relationship to any understanding of explanation -- given that **the existence of a proven equation may be understood to indicate that a feature of reality has thereby been explained**. A difficulty in the psychosocial realm is the complex relationship between equivalence, equality and explanation. The complexities in the construction of an equation are however indicative of the complexities in the form of distinctive cognitive modalities -- as they might be distinguished in a pantheon of experience (and represented by distinctive deities of some kind).

Beautiful equations? The so-called *Euler identity* (or Euler equation) has been named as the "most beautiful theorem in mathematics" and has tied in a nomination by mathematicians for the "greatest equation ever" (Robert P. Crease, *The greatest equations ever*, *PhysicsWeb*, October 2004). It is presented as follows:

Euler identity	
$e^{i\pi} + 1 = 0$	<ul style="list-style-type: none"> • e is <i>Euler's number</i>, the base of <i>natural logarithms</i>, • p is the ratio of the circumference of a circle to its diameter, as discussed above. • i is an <i>imaginary number</i> defined by its property $i^2 = -1$. This is consistent with 3 variants: $i^0 = 1$, $i^1 = i$, $i^3 = -i$

As noted by *Wikipedia*, its [mathematical beauty](#) is associated with its use of the three basic arithmetic operations only once: [addition](#), [multiplication](#), and [exponentiation](#). It also links five fundamental [mathematical constants](#) (*Five constants tie together multiple branches of mathematics*, 2008; *Enabling a reconciliation between one and nothing: π and the mysterious Euler identity*, 2012)

Reflection on the mathematical experience is associated with consideration of what is understood as mathematical beauty -- especially in fundamental equations. This follows from the frequently articulated belief of mathematicians in the intimate relationship of mathematics, truth and beauty (Michael Atiyah, *Truth, Beauty and Mathematics*, *The World Academy of Sciences*, 22 October 2009; Doris Schattschneider, *Beauty and Truth in Mathematics*, *Mathematics and the Aesthetic*, 2006; David Appell, *Math = beauty + truth / (really hard)*, *Salon*, 5 September 2002; Caarlo Cellucci, *Mathematical beauty, understanding, and discovery*, *Foundations of Science*, 20, 2015, 4; Clara Moskowitz, *Equations Are Art inside a Mathematician's Brain*, *Scientific American*, 4 March 2014).

In this light it is therefore relevant to note the various efforts to identify the equations considered most beautiful and/or influential:

- Clara Moskowitz: *The 11 Most Beautiful Mathematical Equations* (*LiveScience*, 1 June 2017)
- Mihai Andrei: *The most beautiful and important mathematical equations* (*ZME Science*, 28 January 2021)
- Melissa Hogenboom: *What is the most beautiful equation?* (*BBC*, 20 January 2016)
- Maurizio Sluijmers: *10 Mathematical Equations That Changed The World* (*Medium*, 26 June 2020)
- Sean Li: *10 Mind Blowing Mathematical Equations* (*A Reasoner's Miscellany*, 5 October 2011)
- Sam Brin: *Top Ten Most Beautiful Equations in Physics* (*Owlcation*, 2016)
- Ian Stewart: *In Pursuit of the Unknown: 17 equations that changed the world* (Basic Books, 2012)

Techniques of neuroscience have been used experimentally on mathematicians to review a set of 60 mathematical formulas (seemingly not indicated) and to rate these on a scale ranging from minus five (ugly) to plus five (beautiful) (Semir Zeki, et al *The experience of mathematical beauty and its neural correlates* *Frontiers in Human Neuroscience*, 13 February 2014):

Many have written of the experience of mathematical beauty as being comparable to that derived from the greatest art. This makes it interesting to learn whether the experience of beauty derived from such a highly intellectual and abstract source as mathematics correlates with activity in the same part of the emotional brain as that derived from more sensory, perceptually based, sources. To determine this, we used functional magnetic resonance imaging (fMRI) to image the activity in the brains of 15 mathematicians when they viewed mathematical formulae which they had individually rated as beautiful, indifferent or ugly. Results showed that the experience of mathematical beauty correlates parametrically with activity in the same part of the emotional brain, namely field A1 of the medial orbito-frontal cortex (mOFC), as the experience of beauty derived from other sources.

Fundamental equations? Surprisingly the overlap between the (approximately) 10-fold lists above was far less than might be expected - given the qualifier "most" used by each. Over 40 equations were noted, limited here to 30 by exclusion of some which appeared to have less in common with a core set of 30. It is important to note that a number of the equations can be variously represented with the choice made not necessarily consistent with that of others.

The purpose of this table is primarily to highlight the contrasting forms which quite distinct fundamental equations may take. No effort has been made to indicate the significance of the variables or operations in each case since that is typically evident (to some) from the hyperlinked commentaries.

The point to be stressed is the manner in which these equations are recognized as fundamental to the experience of mathematics. As such they can be understood as constituting the elements of a form of pantheon through which that experience is framed and configured.

- **The contrasting forms are especially suggestive as an articulation of the distinctive cognitive functions which are associated with the constituents of any pantheon.**
- For those unfamiliar with mathematics, **the alienating hieroglyphic form of the equations is especially indicative of how representations of "deities" of other pantheons may be experienced as meaningless by those who have no engagement with them.**

30 Fundamental equations as "mathematical deities" of a "pantheon of mathematical experience"			
Name	Equation	Name	Equation
General relativity	$G_{\mu\nu} + \Lambda g_{\mu\nu} = \frac{8\pi G}{c^4} T_{\mu\nu}$	Euler identity	$e^{i\pi} + 1 = 0$
Special relativity	$t' = t \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}}$	Gaussian integral (normal distribution)	$\int_{-\infty}^{\infty} e^{-x^2} dx = \sqrt{\pi}$
Prime-counting function	$\pi(x) = \sum_{n=1}^{\infty} \frac{\mu(n)}{n} J(\sqrt[n]{x})$	Euler product formula	$\sum_n \frac{1}{n^s} = \prod_p \frac{1}{1 - \frac{1}{p^s}}$
Wave equation	$\frac{\partial^2 u}{\partial t^2} = c^2 \frac{\partial^2 u}{\partial x^2}$	Bayes's theorem	$P(A B) = \frac{P(B A)P(A)}{P(B)}$
Euler-Lagrange equation	$\frac{d}{dt} \left(\frac{\partial L}{\partial \dot{q}} \right) = \frac{\partial L}{\partial q}$	Second law of thermodynamics	$\frac{\partial^2 u}{\partial t^2} = v^2 \nabla^2 u$

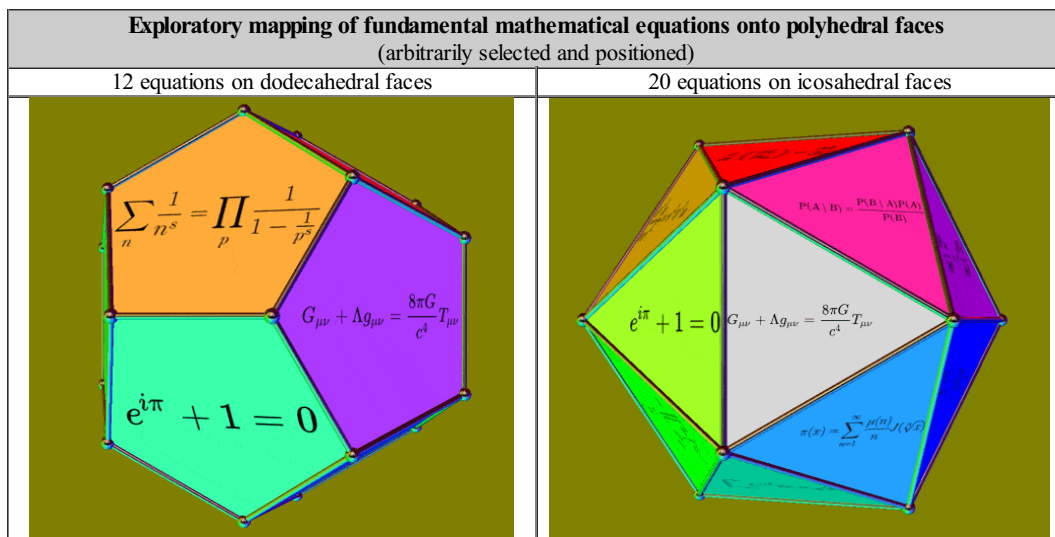
Calculus fundamental theorem	$\int_a^b f(x) dx = F(b) - F(a)$	Fourier transform	$\hat{f}(\xi) = \int_{-\infty}^{\infty} f(x) e^{-2\pi i x \xi} dx$
Dirac equation	$i\hbar\gamma^\mu \partial_\mu \psi - mc\psi = 0$	Schrödinger equation	$i\hbar \frac{d}{dt} \Psi(t)\rangle = \hat{H} \Psi(t)\rangle$
Information entropy (Shannon)	$H = -\sum p(x) \log(p(x))$	Fibonacci sequence	$F(n) = \frac{(\varphi)^n - (-\frac{1}{\varphi})^n}{\sqrt{5}}$
Newton's second law	$\mathbf{F} = \frac{d\mathbf{p}}{dt}$	Law of gravity	$F = G \frac{m_1 m_2}{r^2}$
Pythagorean theorem	$a^2 + b^2 = c^2$	Logarithms (and exponents)	$\log xy = \log x + \log y$
Chaos theory	$x_{t+1} = k_{xt} (1 - x_t)$	Square root of minus one (imaginary unit)	$i^2 = -1$
Energy-Mass equivalence	$E = m c^2$	Euler polyhedra characteristic	$V - E + F = 2$
Minimal surface equation	$\mathcal{A}(u) = \int_{\Omega} (1 + \nabla u ^2)^{1/2} dx_1 \dots dx_n$	Black-Scholes equation	$\frac{\partial V}{\partial t} + \frac{1}{2} \sigma^2 S^2 \frac{\partial^2 V}{\partial S^2} + rS \frac{\partial V}{\partial S} - rV = 0$
Callan-Symanzik equation	$[M \frac{\partial}{\partial M} + \beta(g) \frac{\partial}{\partial g} + n\gamma] G^{(n)}(x_1, x_2, \dots, x_n; M, g) = 0$	Maxwell's equations	$\nabla \cdot \mathbf{E} = 0 \quad \nabla \cdot \mathbf{H} = 0$ $\nabla \times \mathbf{E} = -\frac{1}{c} \frac{\partial \mathbf{H}}{\partial t} \quad \nabla \times \mathbf{H} = \frac{1}{c} \frac{\partial \mathbf{E}}{\partial t}$
Yang-Baxter equation	$(\tilde{R} \otimes \mathbf{1})(\mathbf{1} \otimes \tilde{R})(\tilde{R} \otimes \mathbf{1}) = (\mathbf{1} \otimes \tilde{R})(\tilde{R} \otimes \mathbf{1})(\mathbf{1} \otimes \tilde{R})$	Navier-Stokes equation	$\rho \left(\frac{\partial \mathbf{u}}{\partial t} + \mathbf{u} \cdot \nabla \mathbf{u} \right) = -\nabla p + \nabla \cdot \left\{ \mu (\nabla \mathbf{u} + (\nabla \mathbf{u})^T - \frac{2}{3} (\nabla \cdot \mathbf{u}) \mathbf{I}) + \zeta (\nabla \cdot \mathbf{u}) \mathbf{I} \right\} + \mathbf{f}$

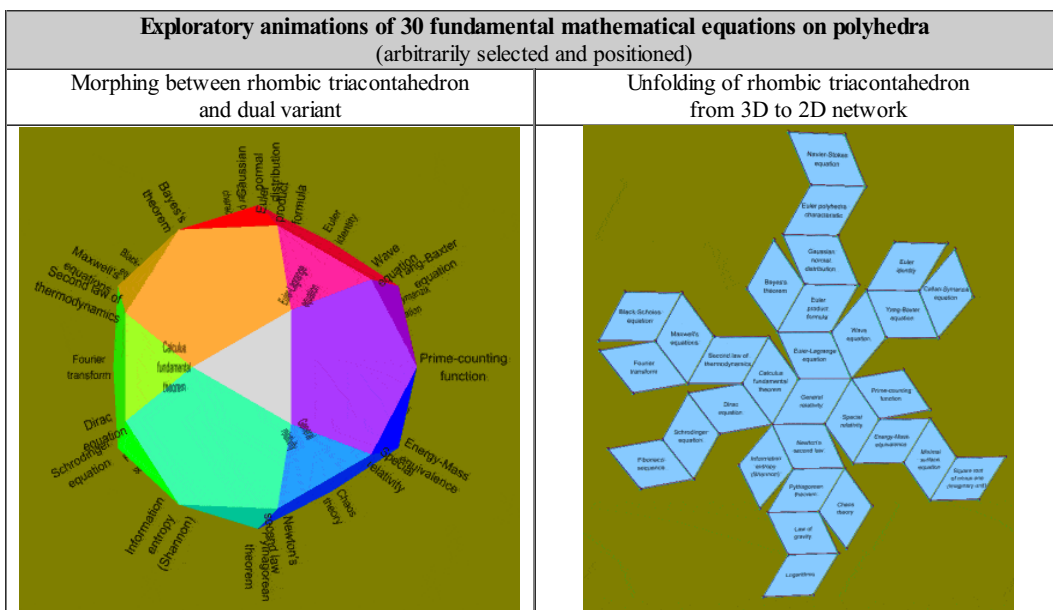
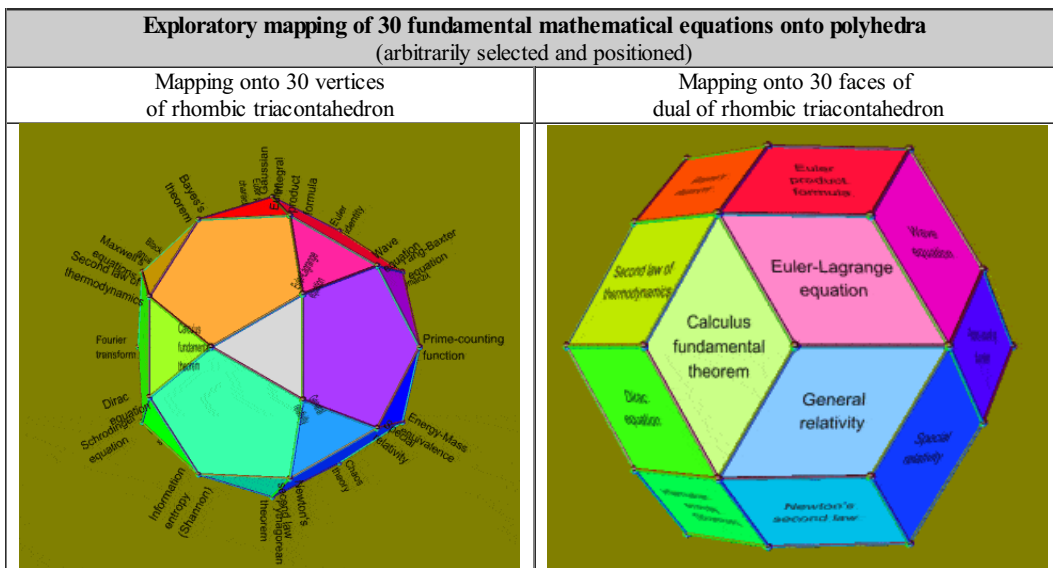
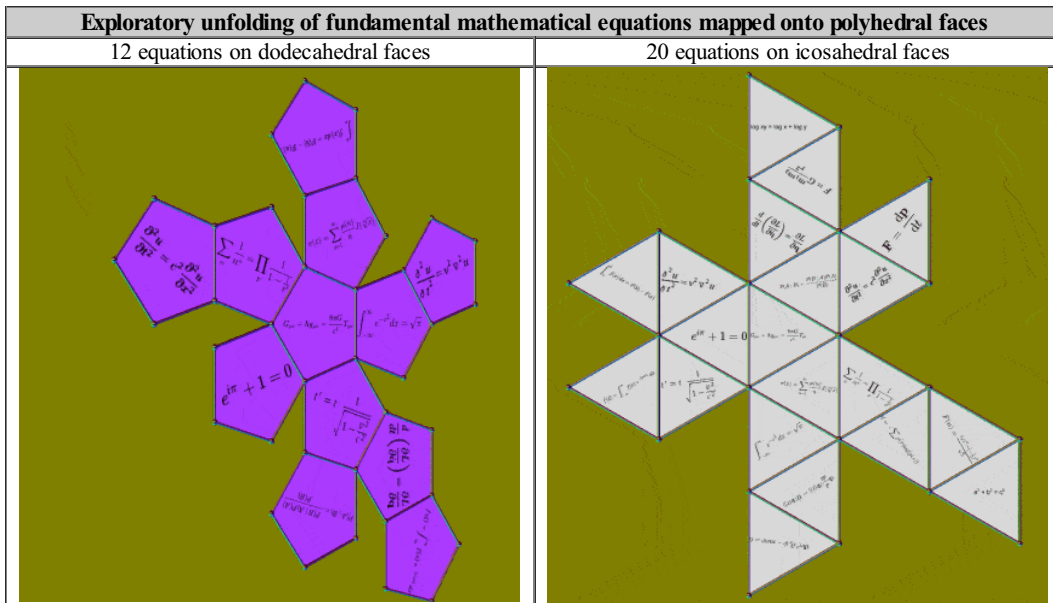
Pantheons as configurations of arrays of fundamental mathematical significance? Especially intriguing with respect to the "10-fold" lists above is why so many mathematicians focus both on the coherence of checklists of equations and on highlighting such a limited set of equations. Is there no more relevant configuration of the array of equations by which "truth-and-beauty" could be ordered? Is a 10-fold list as good as it gets?

In quest of any comprehension of "mathematics as a system", it is appropriate to note the arguments for the entangled origins of geometry and philosophy (Olivier Keller, *Préhistoire de la Géométrie: la gestation d'une science d'après les sources archéologiques et ethnographiques*, EHESS, 1996). To those arguments might be added the assertion of Buckminster Fuller that polyhedra are to be understood as systems, with the corollary that all systems may be represented by polyhedra then meriting exploration -- especially in the case of mathematics. In Fuller's terms (*Synergetics: Explorations in the Geometry of Thinking*, 1975/1979):

- Synergetics is the geometry of thinking. How we think is epistemology, and epistemology is modelable; which is to say that knowledge organizes itself geometrically... (I, 905.01)
- Any conceptual thought is a system and is structured tetrahedrally. This is because all conceptuality is polyhedral. (I, 501.101). By tetrahedron, we mean the minimum thinkable set that would subdivide Universe and have inter- connectedness where it comes back upon itself. (I, 620.03)
- *All systems are polyhedra: All polyhedra are systems.* (II, 400.56)
- Human thoughts are always conceptually and definitively confined to system considerability and comprehension....All systems are subject to comprehension (I, 400.07-20)

As mnemonic aids, some provocative alternatives to checklists are presented experimentally below using polyhedra -- for 12, 20 and 30 equations. Again, no attempt has been made to select or position these to enhance the significance of the experimental mappings. With respect to use of a polyhedron for the 12-fold pattern, this is an intentional shift into 3D -- beyond the conventional tendency to configure those imbued with "god-like" functions at a 2D round table (*Clarifying the Unexplored Dynamics of 12-fold Round tables: visualization of patterns of sustainable discourse between 12 systemic archetypes*, 2019).





Prime number and curvature implications for global governance?

Comprehension of sustainable development: Rather than idle curiosity, the questions evoked by the "fundamental equations" above acquire far greater pertinence through the manner in which the United Nations has engendered a set of [Sustainable Development Goals](#). The set could be understood as the global constitution of a form of secular pantheon in strategic terms. With no explanation as to the

systemic nature of that pattern of 16 Goals (with a 17th coordinating Goal), it is the successor to the 8-fold set of [Millennium Development Goals](#). Similar questions could be asked of the latter with regard to the perceived systemic inadequacies which resulted in its replacement.

Intended as they are to change the world (as noted above), it is only a mathematician who could comment on the coherence of a prime number set of 17 goals in changing the world -- in the light of the coherence of a 17-fold set of equations held to have had a similar function, as claimed by [Ian Stewart](#) (*In Pursuit of the Unknown: 17 equations that changed the world*, 2012; *Jumping Champions: leaping over the gaps between prime numbers*, *Scientific American*, December 2000).

Wallpaper group: Writing on prime numbers, the challenge is framed otherwise by Stewart's colleague, [Marcus du Sautoy](#) (*The Music of the Primes*, 2003), variously subtitled: *Why an Unsolved Problem in Mathematics Matters* and *Searching to Solve the Greatest Mystery in Mathematics*. With a specific mandate to enhance public understanding of science, Marcus du Sautoy has initiated one project *Maths in the City* aiming to highlight the fundamental role that maths plays in society by viewing the urban environment in a mathematical way; another is a BBC Two series *The Code*. Both note the unsuspected role of the 17-fold "wallpaper group", as does another study by Ian Stewart (*Professor Stewart's Cabinet of Mathematical Curiosities*, 2009).

Although no such indication is offered, ironically **this is seemingly one of the very rare ways in which the 17-fold set of UN Goals might be recognized as coherent** (Anna Nelson, et al, *17 Plane Symmetry Groups*; Frank A. Farris. *Creating Symmetry: the artful mathematics of wallpaper patterns*, 2015). Others are variously presented (*Prime Curios: 17*; Tanya Khovanova (*Number Gossip: 17*)).

These include the fact that 17 distinct sets of regular polygons (triangles, squares and hexagons) can be packed in combinations around a point (*Counting how many regular polygons combinations can form 360 degrees around a point*, *Math StackExchange*, 2019). Understood as a [tessellation](#), this is otherwise expressed in terms of the 17 possible ways that a pattern can be used to tile a flat surface with a common single vertex. Used separately the three polygons make a total of 3

The set of 17 derives from the fact that a graph can be viewed as a polygon with face, edges, and vertices, which can be unfolded to form a possibly infinite set of polygons which tile either the sphere, the plane or the hyperbolic plane. If the [Euler characteristic](#) is positive then the graph has an elliptic (spherical) structure; if it is negative it will have a hyperbolic structure; but if it is zero then it has a parabolic structure. When the full set of possible graphs is enumerated it is found that only 17 have Euler characteristic 0, namely a wallpaper group. As noted by Marcus du Sautoy, the Alhambra palace in Granada contains examples of all 17 patterns.

A further lead to any intuited sense of 17-fold coherence in 4 dimensions is offered in by the 64 [convex uniform 4-polytopes](#) of which 5 are polyhedral prisms based on the Platonic solids and 13 are polyhedral prisms based on the Archimedean solids. One is however duplicated with the cubic hyperprism (namely a [tesseract](#)), reducing the set to 17.

Cognitive implications of tessellation? Of potential interest in relation to the degree of preference for the coherence of 15-fold strategic articulations, is the recent discovery of the 15 tilings of convex pentagons (Olena Shmahalo, *Pentagon Tiling Proof Solves Century-Old Math Problem*, *Quanta Magazine*, 11 July 2017). Of similar relevance to other clustering preferences are those variously described as:

- [regular tessellations](#) (3) made of either triangles, squares or hexagons separately
- [isogonal, non-edge to edge tilings](#) (7) of convex regular polygons
- [Archimedean, uniform or semiregular tilings](#) (8) with two or three triangles, squares or hexagons; only eight combinations of regular polygons create semiregular tessellations.
- [semiregular or uniform tilings](#) (11) with one type of vertex, but two or more types of face, namely 3 regular tilings, and 8 semiregular (*List of Euclidean uniform tilings*)
- [nonconvex tilings](#) (14) using [star polygons](#), and reverse orientation vertex configurations (in addition to the 11 convex uniform tilings).
- 2-uniform (20), or 2-isogonal tilings, defined by two vertices (), also called or demiregular tilings)
- 3-uniform tilings (61)

If such tiling patterns are indeed a key to comprehending cognitive clustering preferences, this immediately raises the question of whether more appropriate clusters would result from consideration of tilings on a sphere (positive Euler characteristic). Seemingly constrained as it is to planar tilings (zero characteristic), does this suggest that humanity has trapped itself unknowingly in a "flat Earth" strategic perspective rather than exploring "global" or other possibilities (*Irresponsible Dependence on a Flat Earth Mentality -- in response to global governance challenges*, 2008).

Negative curvature -- a hyperbolic structure (negative characteristic)? The case for topological complexification in the quest for more fundamental order can be made otherwise in terms of the significance accorded by astrophysicists to recognition of negative curvature and its implications for understanding the shape of the universe, as discussed separately (*Eliciting a Universe of Meaning -- within a global information society of fragmenting knowledge and relationships*, 2013). Recent research by [Stephen Hawking](#) and colleagues (*Accelerated Expansion from Negative Lambda*, 2012) has shown that the universe may have the same surreal geometry as some of art's most mind-boggling images (Lisa Grossman, *Hawking's 'Escher-verse' could be theory of everything*, *New Scientist*, 9 June 2012). This offers a way of reconciling the geometric demands of [string theory](#), a still-hypothetical "theory of everything", with the universe as observed -- through a negatively-curved Escher-like geometry (essentially a hyperbolic space).

The insight relies on a mathematical twist previously considered impossible, namely the use of a **negative cosmological constant** rather than a **positive** one. The new approach provides a description of "all the possible universes that could have been -- including ones in which the solar system never formed, or in which life might have evolved quite differently". Making conventional use of a positive cosmological constant, it had proven impossible to describe universes that were "anything more than clunky approximations to reality". A plethora of universes have now been generated from wave functions with negative cosmological constants.

Arguably, whether discovered by artificial intelligence or otherwise, analogous topological breakthroughs may have significance for connectivity in the ways of knowing, as argued separately in relation to deprecated symbol systems (*Engaging with Hyperreality through Demonique and Angelique? Mnemonic clues to global governance from mathematical theology and hyperbolic tessellation*, 2016; *Quest for a "universal constant" of globalization? Questionable insights for the future from physics*, 2010). **Might viable global governance require some analogue to negative curvature to render global order coherent?**

Sustainable Development Goals and "God's number" of 20? Despite the 17-fold pattern of the UN Goals, it is curious to note the extent to which worldwide enthusiasm for **Rubik's Cube** has been interpreted in that light (*Recognition of Rubik's Cube as a relevant strategic development metaphor*, 2017). It is then especially curious from a mathematical perspective, in the light of the 20-fold argument above, that there is considerable focus on the minimal number of moves required to resolve a scrambled Rubik's Cube. As noted by *Wikipedia* with respect to *optimal solutions for Rubik's Cube*, There are two common ways to measure the length of a solution to Rubik's Cube. The first is to count the number of quarter turns. The second is to count the number of outer-layer twists, called "face turns".

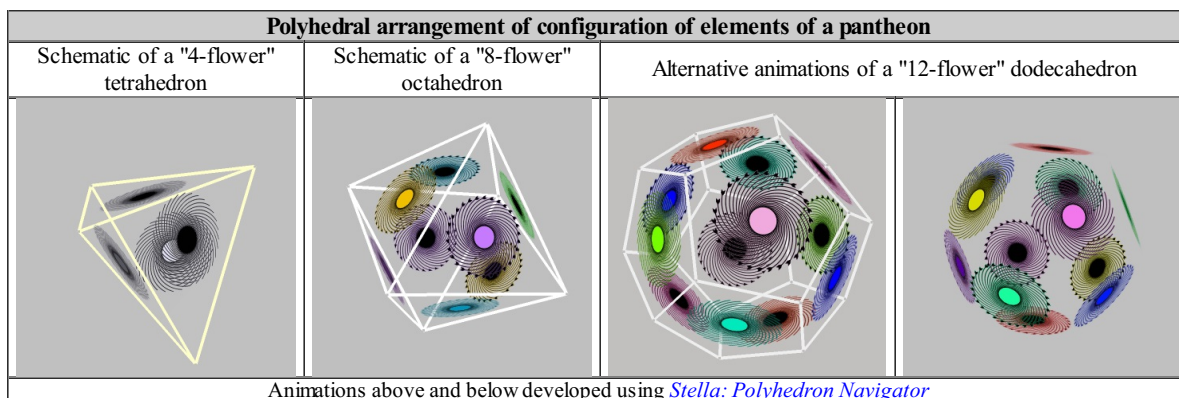
The maximum number of face turns needed to solve any instance of the Rubik's Cube is 20, and the maximum number of quarter turns is 26. These numbers are also the **diameters** of the corresponding **Cayley graphs** of the **Rubik's Cube group**. That diameter is known as "God's Number" (Tomas Rokicki, et al., *The Diameter of the Rubik's Cube Group Is Twenty*, *SIAM Journal on Discrete Mathematics*, 2013; *God's Number is 20*, 14 August 2010). There are many algorithms to solve scrambled Rubik's Cubes. An algorithm that solves a cube in the minimum number of moves is known as **God's algorithm**. Ironically it is to that capacity that cubing enthusiasts aspire.

Polyhedra suggestive of arrays of requisite variety of pantheons in 3D

As mentioned above, it is curious to note how intangible pantheons of deities in their original sense have been embodied with little question in the architecture of iconic buildings -- but not in knowledge architecture. The experimental animations above are indicative of the possibility of embodying contrasting cognitive modalities in polyhedral arrays -- as a form of knowledge architecture of mnemonic significance (at least).

Given the set of symmetrical polyhedra of different degrees of complexity, the simplest polyhedra might then be recognized as suitable for mapping the most fundamental equations (with any "supernatural" functions). Those of lesser import could then be understood as suitable for ordering equations of more secondary function.

Polyhedral sets of "flowers" as a pantheon design metaphor? One design metaphor explored separately derived from polyhedral arrangements of "flowers" (*Flowering of Civilization -- Deflowering of Culture: flow as a necessarily complex experiential dynamic*, 2014). Following the argument above with regard to polyhedral holding patterns of different complexity, some indicators are offered by extending into three dimensions what might be considered any "2D-flower" pattern, as illustrated by the following images and animations.



Other examples of use of this metaphor are presented separately (*Gallery of Polyhedral Flower Arrangements: engendering sustainable psycho-social systems through metaphor*, 2014).

Of interest in this mnemonic approach is the representation of the compatibility between the flowers in the "ecosystem" constituted by each case (*Arranging the flowers to engender an ecosystem?* 2014). This could be indicated by how the directionality of the arrows (clockwise/anti-clockwise, inward/onward) meshes with the neighbouring flowers (or "clashes" with them). A more complex case is offered by the "12-flower" case of the dodecahedron as indicated below.

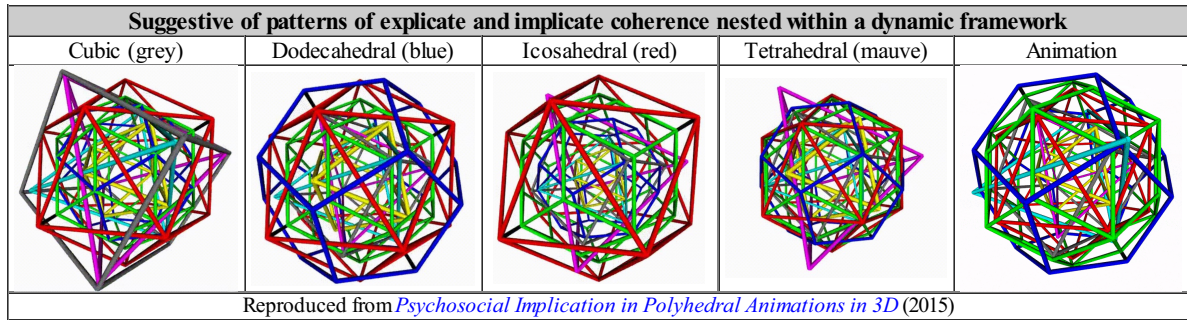
The configuration of 12 "flowers" is consistent with the separate argument developed with regard to the requisite variety of 12-fold patterns of governance (*Enabling a 12-fold Pattern of Systemic Dialogue for Governance*, 2011; *Eliciting a 12-fold Pattern of Generic Operational Insights: Recognition of memory constraints on collective strategic comprehension*, 2011). In terms of the flower metaphor, what might "gardening knowledge" then imply for a global knowledge-based system (*Knowledge Gardening through Music*, 2000)? Again the relevance of the song: *Where have all the flowers gone? ... Oh, when will they ever learn?*

Pantheons as nested configurations? Such an experiment can be extended to other forms of pantheon -- of which the set of Sustainable Development Goals now offers an iconic example. Mathematics has a tendency to distinguish equations which are more or less fundamental-beautiful and enabling of change. It could be asked whether a pantheon might then be understood as nested systems -- nested sub-pantheons -- as implied by the nested "heavens" of some religious traditions.

In the case of mathematics there is a certain elegance to exploration of the possibility of nesting levels of the pantheon in nested

polyhedra as presented below

An animation indicative of how connections are activated between disparate parts of a configuration would be useful, especially any distinction between those which were "explicate" (externally on a polyhedron) and the "implicate" (internally across a polyhedron) -- a distinction articulated by [David Bohm](#) (*Wholeness and the Implicate Order*, Routledge, 1980). In forming coherent structures as resonance patterns, **this would be suggestive of how collective memories are held, recalled or fade away**. The following screen shots are suggestive of the emergence of dominant patterns -- with the animation on the right suggestive of the evanescent nature of any such dominance.



Configuring the 64 disciplines of mathematics as a 64-edged drilled truncated cube

The *Mathematics Subject Classification* (MSC) at its highest hierarchical level has 64 mathematical disciplines labeled with a unique two-digit number (as noted above). This could indeed be understood as framing the pantheon of mathematical experience. The preference for a pattern of 64 would seem to be as unexplained as that for other checklists, whether more or less fundamental in implication.

Perhaps only coincidentally, the 64-fold organization is especially suggestive in mathematical terms of possibilities of experimenting with more appropriate configurations of the disciplines of mathematical experience. The 64-fold pattern is of course fundamental in the following respects, as noted by *Wikipedia*:

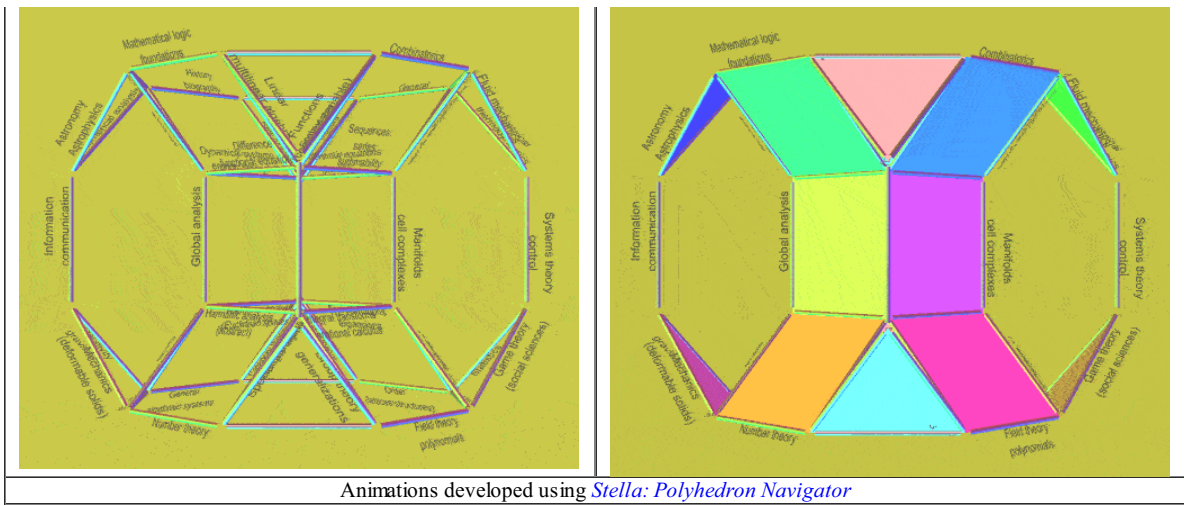
- It is the square of 8, the cube of 4, and the sixth power of 2. It is the smallest number with exactly seven [divisors](#). It is the lowest positive [power of two](#) that is adjacent to neither a [Mersenne prime](#) nor a [Fermat prime](#). 64 is the sum of [Euler's totient function](#) for the first fourteen integers. It is also a [dodecagonal number](#) and a [centered triangular number](#).] 64 is also the first whole number that is both a perfect square and a perfect cube.
- 64 is the number of codons in the [RNA codon table](#) of the genetic code
- There are 64 convex [uniform 4-polytopes](#) (namely 4-dimensional polyhedra) clustered into [8 types](#), including the 6 regular convex 4-polytopes (but excluding the infinite sets of the [duoprisms](#) and the [antiprismatic prisms](#))
- The current information-based civilization is now primarily dependent on [64-bit computing](#), namely a 64-bit [central processing unit](#) (CPU), as well as [arithmetic logic unit](#) (ALU) architectures based on processor registers, address buses, or data buses of that size.

In the quest for polyhedra suitable for mapping a 64-fold set of distinctions, it is therefore somewhat curious to note that the 64-edged [drilled truncated cube](#) is unique in enabling such a mapping in 3D (*Proof of concept: use of drilled truncated cube as a mapping framework for 64 elements*, 2015). Other polyhedra have that characteristic but are either complex compounds of simpler polyhedra or 3D aspects of 4D polytopes -- both posing challenges to their comprehensibility for mapping purposes.

The drilled truncated cube can therefore be used in a simple exploration of how the realm of mathematics can be coherently configured in a manner distinct from **a checklist of disciplines which does so little to honour the fundamental significance attributed to the mathematical experience**.

Understood as a pantheon of a particular form, **associating the articulated disciplines of mathematics with the features of that form is then helpful in recognizing how other patterns of cognitive modalities of similar complexity could be ordered in this way**.

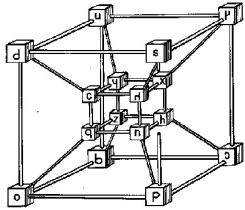
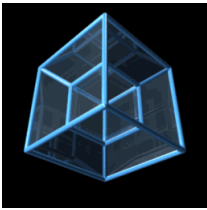
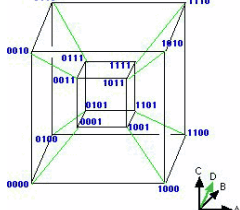
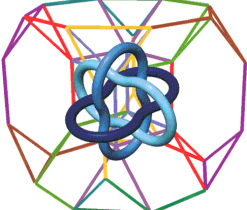
Exploratory mapping of 64 mathematical disciplines onto 64-edged drilled truncated cube (original discipline names slightly edited to reduce length in order to facilitate mapping)	
32 faces rendered transparent	Only 4 octangular faces rendered transparent



Animations developed using *Stella: Polyhedron Navigator*

No attempt has been made in this preliminary exercise to position the 64 mathematical disciplines on the polyhedron in a manner which might reflect to a higher degree their relationships. Various visualization techniques could be considered for that purpose, including colour and animation. As noted above with respect to citation links between papers in different disciplines, the framework could be used to explore the connectivity of those disciplines in quest of the nature of a pattern that connects -- potentially in dynamic terms.

Logical implications? Exploration of meta-mathematics, and the mathematics of mathematics (as mentioned above), have tended to highlight the role of **symbolic logic**. In this sense the form of the drilled truncated cube is itself interesting in its resemblance to the structure of the 4D tesseract of significance to the configuration of the sixteen **Boolean functions** of logic, especially with respect to studies of **oppositional geometry** -- presumably of relevance to relations between modalities in any pantheon.

Suggestive visual correspondences to configurations of relevance to logical connectivity			
<p>The Logic Alphabet Tesseract - a four-dimensional cube (see coding). by Shea Zellweger</p>	<p>Tesseract animation</p>	<p>Topologically faithful 4-statement Venn diagram is the graph of edges of a 4-dimensional cube as described by Tony Phillips</p>	<p>Embedding of the Borromean ring logo of the International Mathematical Union within a drilled truncated cube</p>
			
<p>Diagram by Warren Tschantz (reproduced from the Institute of Figuring).</p>	<p>by Jason Hise [CC0], via Wikimedia Commons</p>	<p>A vertex is labeled by its coordinates (0 or 1) in the A, B, C and D directions; the 4-cube is drawn as projected into 3-space; edges going off in the 4th dimension are shown in green.</p>	<p>See <i>Wolfram Mathematica</i> animation of the logo</p>

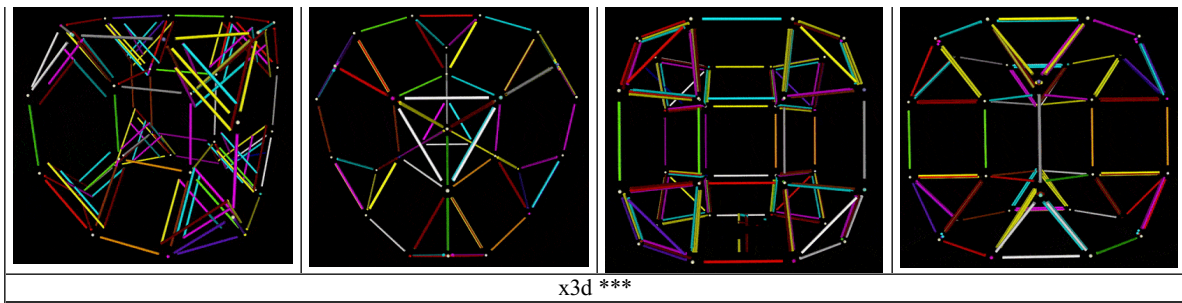
Exploring potential dynamics within a pantheon?

Dynamics within a pantheon ordered in 3D as a drilled truncated cube? The point was stressed above that little effort is made to clarify in systemic terms the dynamics within any pantheon. The drilled truncated cube could offer a way of exploring the dynamics within a pantheon of 64-fold complexity.

As an exercise to that end, the movement of selected edges between parallel positions offers one design metaphor of mnemonic value, as discussed separately in detail with respect to that form (*Decomposition and recomposition of a toroidal polyhedron -- towards vortex stabilization?* 2015). This formed part of a discussion of *Psychosocial Implication in Polyhedral Animations in 3D: patterns of change suggested by nesting, packing, and transforming symmetrical polyhedra* (2015).

The following animations developed from that exercise offer contrasting views of what might be understood as the dynamics of a pantheon taking the the form of a drilled truncated cube. As a feature of the design choice, the edges switch colour when they reach their parallel position.

Alternative perspectives on the same experimental movement of selected edges of a drilled truncated cube			



Dynamics implied by an influential 2D circular configuration: Ironically far greater consideration of the dynamics of transformative movement within a 64-fold configuration has been given to that between the 64 hexagrams of the *I Ching* -- usefully recognized as an archetypal pantheon in its own right. The dynamics identified follow from transformations in the systematic encoding of each hexagram which determines the change to an alternative condition. Historically it was this pattern of transformations which was influential in the original insight of **Gottfried Leibniz** that subsequently gave rise to the binary coding fundamental to modern computing.

In contrast to the more widely known tabular configurations, the circle of **Shao Yong** (1011-1077), or the *I Ching* hexagram circle, was an influential feature of the communication to Leibniz in 1701 (James A. Ryan, *Leibniz' Binary System and Shao Yong's "Yijing"*, *Philosophy East and West*, 46, 1996, 1). Features of the configuration are discussed separately (*Diagram of 384 Relationships between I Ching Hexagrams*, 1983; *Bagua and the sequence of 64 hexagrams*, *Shanghai Daily*, 20 December 2015).

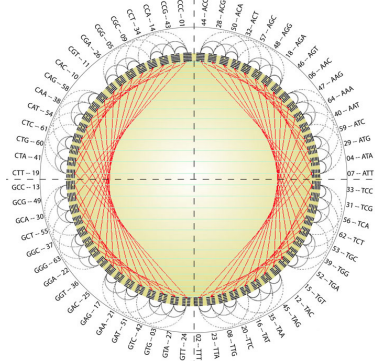
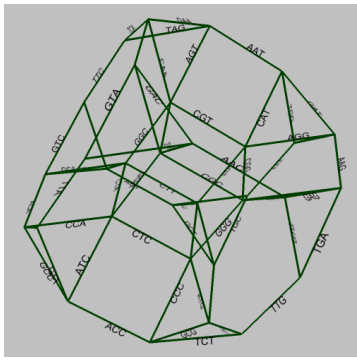
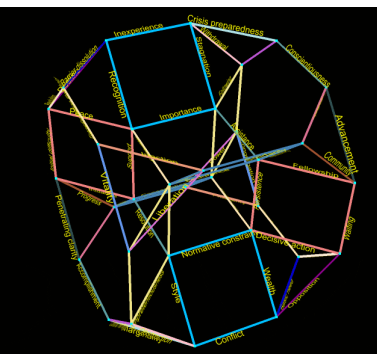
The question here is how to embody more fruitfully the psychosocial dynamics implied by the *I Ching* encoding patterns. The possibility had been clarified in an earlier study in the light of the alternation between two orientations as shown below centre and right, with commentary adapted to current issues (*Alternating between Complementary Conditions -- for sustainable dialogue, vision, conference, policy, network, community and lifestyle*, 1983).

Map of transformations encoded by a circle of 65 hexagrams and their relationships		
Shao Yong circle of hexagrams as communicated to Leibniz (1703)	Global, 'heads-together' networking conditions ('top-in')	Local, 'back-to-back' networking conditions ('top-out')
By Unknown - Perkins, Franklin. <i>Leibniz and China: a commerce of light</i> . Cambridge UP, 2004. 117., Public Domain, Link	Reproduced from <i>Alternating between Complementary Conditions</i> (1983)	

The internal dynamics, as classically understood, are discussed separately from which the following images are reproduced (*Encompassing the "attraction-harassment" dynamic with a notation of requisite ambiguity?* 2017). Such images in 2D are immediately suggestive of projections into polyhedral variants in 3D.

Relational map from a Chinese cultural perspective? Projection of all 64 <i>I Ching</i> relational conditions (hexagrams) onto a circle (use browser facility to view enlarged version for details)		
Original version by Anagarika Govinda (1981)	Addition of labels to version on the left	Alternative version with Chinese elements instead of the questionable non-traditional English interpretations
Reproduced with the kind permission of Anagarika Govinda, from the <i>Inner Structure of the I Ching; the Book of Transformations</i>	Labels added from <i>Transformation Metaphors -- derived experimentally from the Chinese Book of Changes (I Ching)</i> (1997)	Hexagrams and ideograms from <i>Transformation Metaphors</i> (1997)

The question meriting attention is how the coherence of seemingly incommensurable contrasts might be usefully represented with the aid of new technologies? Possibilities are suggested by the following.

Circle of hexagrams surrounded by a circle of codons	Examples of drilled truncated cube of 64 edges as a "pantheon" in 3D	
	random attribution of genetic codons	random attribution of hexagram names
		
<p>Reproduced from <i>Enabling Wisdom Dynamically within Intertwined Tori: requisite resonance in global knowledge architecture</i> (2012)</p>		

Engendering and navigating pantheons -- "angelic" and "demonic"?

Ontogeny recapitulating phylogeny? As the systematic organization of life in general -- potentially to be recognized as a pantheon -- systems biology makes use of circular **cladograms** and **dendrograms** and **phylogenetic trees** (as illustrated below). These techniques could be compared with those used by comparative mythology in the organization of mythomemes. However it does not appear that efforts have been made to explore the possibility of such organization of knowledge in 3D.

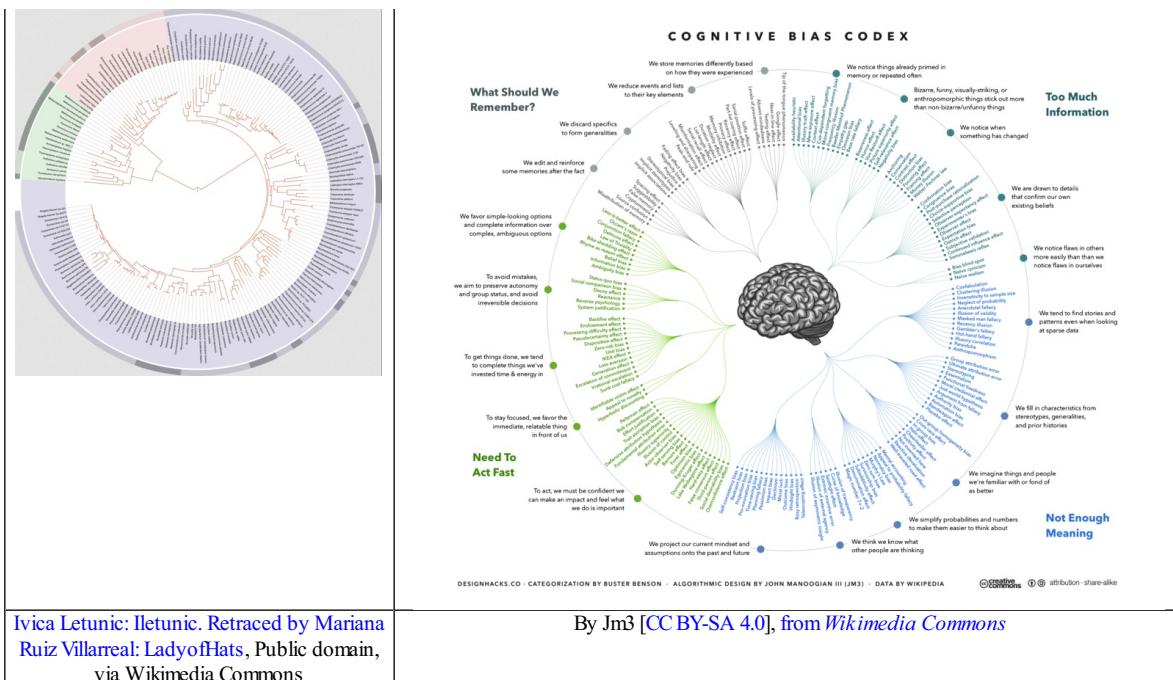
With respect to the continuing controversy with regard to **recapitulation theory**, it is noteworthy that its potential relevance to cognitive development is of ongoing interest. From that perspective it could be asked whether the articulation of a pantheon follows some such pattern.

From a general systems perspective, one possibility that can be explored is the potential correspondence between fundamental biological processes and globalization (*Engendering Invagination and Gastrulation of Globalization: reconstructive insights from the sciences and the humanities*, 2010). This includes discussion of:

- Isomorphism of globalization and embryogenesis: summary
- Invagination as a postmodern "quagmire": methodological preamble
- Invagination in psychosocial terms: understandings from web resources
- Morphogenesis of globalization: enabling topological transformation
- Enactivating "gastrulation" of "globalization"
- Engendering holistic integration: Borromean knots and Klein bottles?
- From global to helicoidal -- "Shells" of globality

Cognitive bias and "Death Star" pantheons? A related diagrammatic approach has been used in the remarkable organization of 180 **cognitive biases** in the circular articulation of the **Cognitive Bias Codex** (Terry Heick, *The Cognitive Bias Codex: a visual of 180+ cognitive biases*, TeachThought, 3 July 2019).

Phylogenetic tree	Cognitive bias codex
<p>Highly resolved, automatically generated tree of life, based on completely sequenced genomes</p>	<p>Cognitive Bias Codex: design by John Manoogian III categories and descriptions; implementation by Buster Benson. See large scale version</p>



Arguably it is indeed cognitive biases which are central to comprehension of the global problematique at this time -- and to effective engagement with it. Just as the religious pantheons may refer to the organization of "demons" in "hells" (in addition to the organization of "deities" in "heavens"), there is a case for exploring the set of such biases as a form of demonic pantheon in cognitive terms (*Variety of System Failures Engendered by Negligent Distinctions: mnemonic clues to 72 modes of viable system failure from a demonic pattern language*, 2016). However, rather than a representation in 2D (as above), it is appropriate to ask whether greater insight could be achieved by the organization of biases in 3D.

Configuration of future blindness biases in 3D: The argument can be developed in terms of the cognitive biases integral to current global institutions (*Group of 7 Dwarfs: Future-blind and Warning-deaf: self-righteous immoral imperative enabling future human sacrifice*, 2018). This is especially the case in the light of the envisaged *Global Reset* (Justin Haskins, *Introducing the 'Great Reset': world leaders' radical plan to transform the economy*, *The Hill*, 25 June 2020; *Klaus Schwab: 'Great Reset' Will Lead to Transhumanism*, *New World Order Report*, 17 November 2020).

The question is the susceptibility of such initiatives to some form of cognitive bias, as may be argued with respect to their collective representation as a "negative pantheon" on polyhedra (*Global configuration of cognitive biases: towards mapping G7 susceptibility*, 2018). The failure to learn from history, and the assumption of lack of bias, takes little account of the resultant unintegrative conflict as concluded by *Nicholas Rescher*:

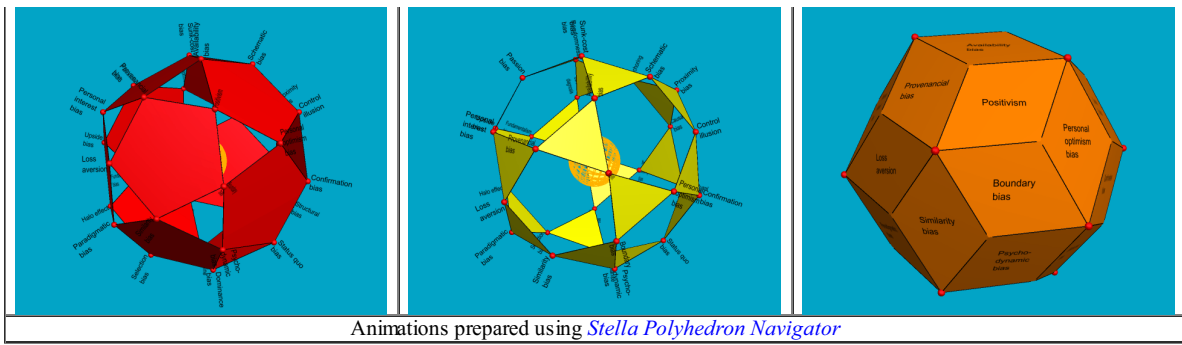
For centuries, most philosophers who have reflected on the matter have been intimidated by the strife of systems. But the time has come to put this behind us -- not the strife, that is, which is ineliminable, but the felt need to somehow end it rather than simply accept it and take it in stride. To reemphasize the salient point: it would be bizarre to think that philosophy is not of value because philosophical positions are bound to reflect the particular values we hold. (*The Strife of Systems: an essay on the grounds and implications of philosophical diversity*, 1985)

In a quest for insight into "future blindness" it is somewhat extraordinary to note the far greater proportion of references to the "future of blindness" and to "blindness in the future" -- especially given the eventual possibility of enabling the blind to see (*Future blindness and the deaf effect as cognitive biases*, 2018).

Especially interesting therefore is the checklist of 30 forms of future blindness by *Morne Mostert* (*Future Blindness: an index of bias for leaders*, University of Stellenbosch, 15 October 2015) and the thesis of Arno Nuijten (*Deaf Effect for Risk Warnings A Causal Examination applied to Information Systems Projects*. Erasmus University Repository, 2012).

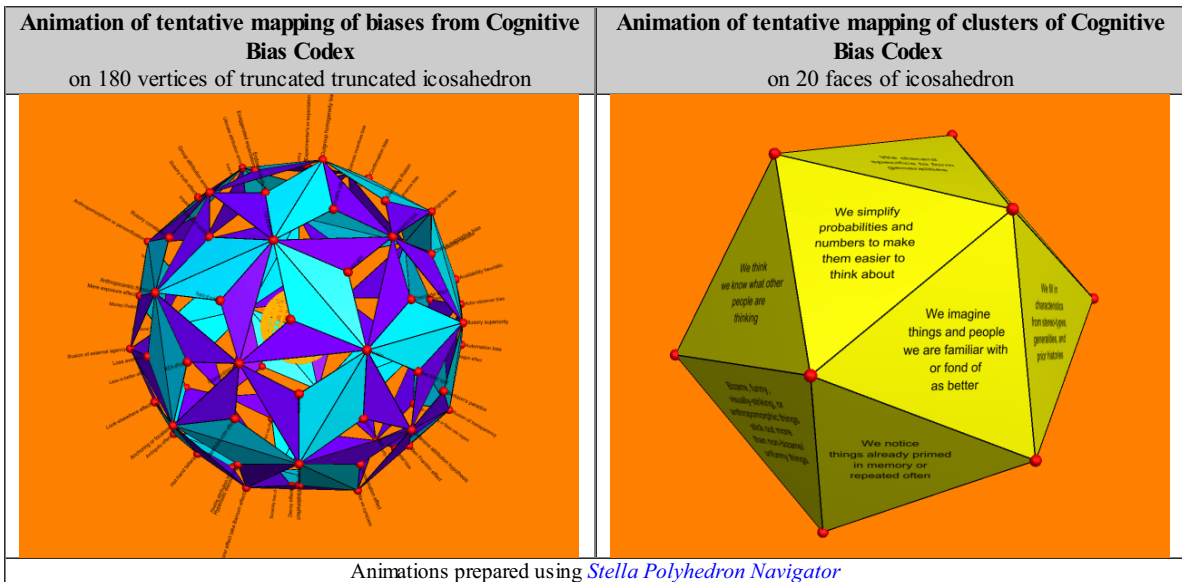
The set of 30 "future blindness biases" selected by Mostert can be usefully configured in 3D. The rhombic triacontahedron on the right is the dual of the icosidodecahedron in the images on the left.

Animations of tentative mapping of 30 Future blindness biases onto polyhedra		
onto vertices of icosidodecahedron (triangular faces transparent)	onto vertices of icosidodecahedron (pentagonal faces transparent)	onto faces of rhombic triacontahedron



Animations prepared using [Stella Polyhedron Navigator](#)

Configuration of 180 cognitive biases in 3D: The larger set of cognitive biases can be tentatively configured as follows, necessarily raising the question of how they may be clustered and interrelated in any such mapping.



Animations prepared using [Stella Polyhedron Navigator](#)

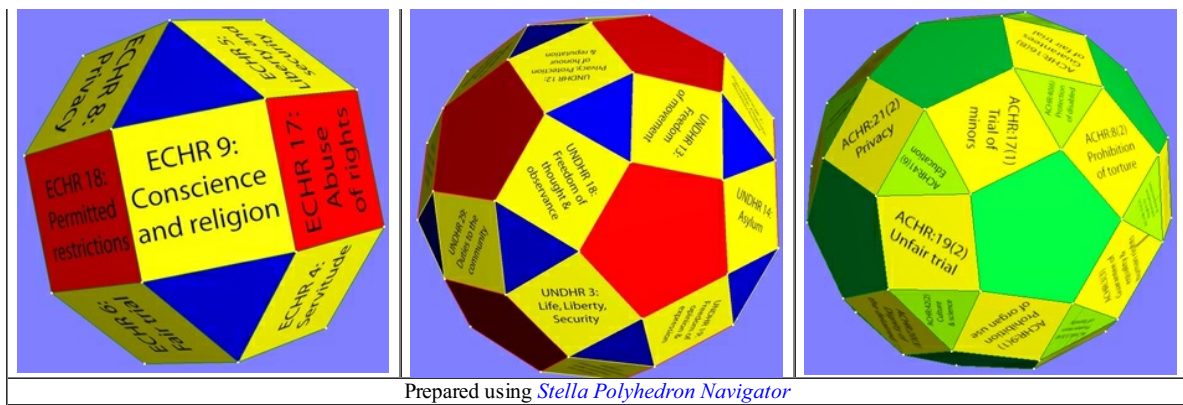
In popular imagination such configurations could be readily recognizable as corresponding to the design of a *Death Star* -- the fictional mobile space station and galactic superweapon featured in the *Star Wars* space-opera franchise. Indeed it is that imagination which currently gives attention in online gaming to the "war of the pantheons" and to the "dimensions of chaos". Just as pantheons have inspired architectural forms, it is of some relevance to recall the Nazi ambitions in relation to *Wewelsburg Castle* -- used by the SS from 1934 under *Heinrich Himmler* as a complex to serve as the central SS cult-site and as a so-called "Centre of the World".

Both popular imagination and global leadership now anticipate [space warfare](#) in quest of [full-spectrum dominance](#) of physical space. Curiously, given the religious interpretation of pantheon, this quest is matched by a less evident quest for "full-spectrum dominance of spiritual space".

In the case of evangelical Christianity, [dominionism](#) is a primary driving force with major political implications (Brian Morris, *Dominionism – nothing to see here?* *Australian Independent Media*, 16 April 2021; Katherine Yurica, *Conquering by Stealth and Deception: how the dominionists are succeeding in their quest for national control and world power*, Rosamond Press, 14 September 2004). This is however consistent with the [Great Commission](#), with its "marching orders for Christians", as a "a comprehensive task that aims at developing a worldwide Christian civilization and culture" -- understood to be one of the most significant directives in the Bible (*Matthew 28:16-20*). Corresponding agendas of mutual dominance may be recognized in the other Abrahamic religions (Chris Farrell, *Civilization Jihad: Islam's "Great Commission"*, Scribd, 2014).

It is therefore appropriate to anticipate the design of cognitive counterparts to any "Death Star" in the drama -- of which configurations of human values are indicative, as argued separately (*Dynamic Exploration of Value Configurations: polyhedral animation of conventional value frameworks*, 2008). The

Polyhedral representation of value configurations: a challenge to integrative imagination screen shots of stages in the transformation of the geometry of sets of values		
<i>European Convention on Human Rights</i>	<i>Universal Declaration of Human Rights</i>	<i>Arab Charter on Human Rights</i>
18 Articles displayed on 2 face-types of a rhombicuboctahedron	30 Articles displayed on 1 face-type of a rhombicosidodecahedron	53 Articles displayed on 2 face-types of a rhombicosidodecahedron



Prepared using *Stella Polyhedron Navigator*

As the hypothetical confluence of three Abrahamic pantheons, any integrative comprehension of Jerusalem usefully frames the challenge of the insights with which its dimensions might be fruitfully ordered (*Jerusalem as a Symbolic Singularity: comprehending the dynamics of hyperreality as a challenge to conventional two-state reality*, 2017).

Some "navigational implications" are explored separately (*Hyperspace Clues to the Psychology of the Pattern that Connects*, 2003). The navigation metaphor can be notably explored in the light of progressive insight into the so-called Pentagramma Mirificum as a spherical polyhedron (*Global Psychosocial Implication in the Pentagramma Mirificum: clues from spherical geometry to "getting around" and circumnavigating imaginatively*, 2015; *Beyond dispute in 5-dimensional space: Pentagramma Mirificum?* 2015).

Further clues to the possibility of such navigation are considered separately (*Time for Provocative Mnemonic Aids to Systemic Connectivity?* 2018)

- Roman dodecahedron, Chinese puzzle balls and Rubik's Cube? Associating significance with a dodecahedron
- Interweaving disparate insights? Increasing the dimensionality of the archetypal Round Table?
- Inversion of the cube and related forms: configuring discourse Necessity of encompassing a "hole" -- with a dodecameral otherwise? mind?
- Dynamics of discord anticipating the dynamics of concord

Pantheon as a psychosocial "O-ring" -- speculatively understood?

Design criteria? Imagination regarding the architectural embodiment of any pantheon has focused primarily on the iconic buildings of that name -- and on archetypal Round Tables around which the deities might be configured. The animations above explore the possibility of extensions into higher dimensional configurations. Possible configurations can be understood more symbolically and allusively, as in the case of the "philosopher's stone" or some other device for interweaving disparate insights.

Especially intriguing are the design criteria to enable dynamics vital to the integrity of any such pantheon or meta-pattern (Brian Grimmer *The Meta Model: Beyond A Theory of Everything?* 1 August 2014; Martha Senger, *The Iconic Revolution*). As argued separately:

Criteria for a Rosetta stone as a meta-model? There is a case for repeatedly challenging any elaboration of a Rosetta stone (or a Philosopher's stone) -- or a Theory of Everything -- on the basis of criteria which can already be recognized, and in the light of criteria which may be of relevance. (*Insights into Dynamics of any Psychosocial Rosetta Stone*, 2018)

Missing from the objectivity by which the quest for such a design is framed are the paradoxical considerations evoked by Douglas Hofstadter (*I Am a Strange Loop*, 2007) in a sequel to his seminal study (*Gödel, Escher, Bach: an Eternal Golden Braid*, 1979).

"The O-ring"? In the spirit of the unexpected correspondence explored in moonshine mathematics (noted above), any such paradox invites speculation on the "ring" ironically shared by theology and theorem -- and their philosophical complement (*The-O ring: Theory, Theorem, Theology, Theosophy? a playful intercultural quest for fruitful complementarity*, 2014).

As argued there, curiously the prefix "theo" is effectively central to one of the most divisive debates in the current global civilization, namely that between science and religion. On a mathematical blog an obvious question was asked: **Is there some connection between the etymology of "theorem" and words like "theology" or "theist"?** (Michael Lugo, *Etymology of "theorem"*, *God Plays Dice*, 23 November 2008). Some respondents asserted that they are not related, as for Eugene van der Pijll:

There are two different Proto-Indo-European roots here: *dheie-*, to look, watch, and *dhes-*, holy, divine. The first evolved into Greek *theaomai*, "to watch", *thea*, "spectacle", and *theatron*, "theater". Together with *orao* "to look": *thea-oros* > *theoros*, "spectacle watcher"; and *theoremata*, "performance", *theoria*, "attendance at a spectacle". The other became *thesos* > *theos*, god, and *thea*, goddess. So theorem and theory are related to theater, but not to god.

It might be similarly asserted that "waves" and "particles" are not related -- except from the perspective of quantum mechanics. Appropriate to this playful argument however, it took the perspective of a playful theoretical physicist, [Richard Feynman](#), to show dramatically (to a government committee of inquiry) the vulnerability of the O-ring -- under certain conditions -- as an explanation for the traumatic US [Challenger Space Shuttle disaster](#) in 1986. As a piece of theatre in its own right, and given the etymological argument, that presentation suggests a further extension of this speculation (*The-O Ring and The Bull Ring as Spectacular Archetypes: dramatic*

correlation of theatre, theory, theorem, theology, and theosophy, 2014).

If an "O-ring" is indeed emblematic of the pattern that connects -- and of a meta-pattern -- the question is then how it embodies the "strange loop" with which Hofstadter identifies. Is it indicative of the form of a pantheon -- if only as the organizing metaphor for Hofstadter's own identity?

Marrying incommensurables? The earlier speculation concluded with a discussion of *Nonsense commensurate with dysfunctionalities of "theo" variants* (2014). This quoted the renowned poem, *The Owl and the Pussy-Cat* (1871) by Edward Lear, known for his various works of nonsense. Curiously it offers a degree of memorable coherence to the improbable relationship between incommensurables fundamental to human society -- more recently expressed as that between the "headless hearts" and the "heartless heads" (*Challenge of the "headless hearts" to the "heartless heads"?* 2018).

Aside from the more obvious sexual connotations, one remarkable no-nonsense commentary on the possible hidden significance of the poem is offered by David Cowles (*Owl and Pussycat, Aletheia*, 26 March 2014). With respect to the famous ring by which the owl and the cat were finally "married" (obtained from the end of the "Piggy-wig's nose"), Cowles wonders:

Could it be that the ring was actually a [Möbius strip](#), a one sided, 2 dimensional object? A Möbius strip is 'non-orientable', a topology in which there is no fixed beginning or end and no fixed orientation. Many eschatological cosmologies, for example Dante's in the Divine Comedy, include a non-orientable topology. A Möbius strip has the unique property that allows you to travel around it continuously, always coming back to the starting point; however, each time you return to the starting point, your orientation is reversed.

This possibility might be compared with that of one archetypal ring, namely the [Ouroboros](#) as the tail-eating snake (or dragon) -- itself a potential candidate for the form of a pantheon. How might the paradoxical "cognitive twist" of the Möbius strip be understood as embodied in the Ouroboros? Some explorations to that end are presented separately (*Complementary visual patterns: Ouroboros, Möbius strip, Klein bottle; experimental animations in 3D of the ouroboros pattern*, 2017; *Enantiodromia: cycling through the 'cognitive twist'*, 2007).

Reference to the "nose ring" of the "Piggy-wig" usefully recalls the function of such a ring in leading domesticated animals -- adapted to the sense of humans being "led by the nose". The reference is especially appropriate in a period in which there is every suspicion that global civilization is being deliberately "dumbed down" via the media and the education system (John Taylor Gatto, *Dumbing Us Down: the hidden curriculum of compulsory schooling*, 2005; Ivo Mosley, *Dumbing Down: culture, politics, and the mass media*. 2000; Andrea Halewood, *The Silencing of the Lambs*, *OffGuardian*, 16 April 2021; Rosemary Frei, *What's up with our fact-checking blind spots?* *OffGuardian*, 10 April 2021).

Is the O-ring indicative of a sense in which humanity is being "led by the nose" -- in a manner yet to be recognized?

Singular ring? Speculation can be taken further by addressing the assumption that any ultimate meta-pattern or pantheon is necessarily singular. In the mythopoetic formulation of *The Lord of the Rings* (1954) of such popular appeal, a singular ring is described in the concluding lines of a poem regarding the 20 "rings of power":

One Ring to rule them all,
One Ring to find them,
One Ring to bring them all and in the darkness bind them
In the Land of Mordor where the Shadows lie.

As discussed separately, that ring might well be understood as providing the bearer with the most repressive forms of control over social change and development (*The "Dark Riders" of Social Change: a challenge for any Fellowship of the Ring*, 2002). Tolkien presents the [challenge of the One Ring](#) in terms of the necessity for its destruction to safeguard humanity and the planet.

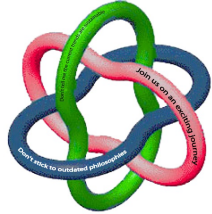
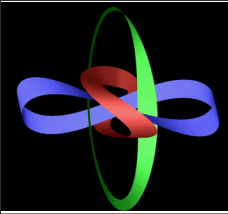
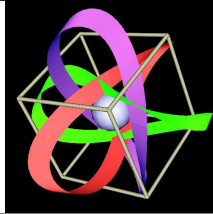
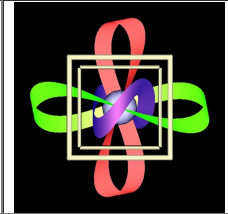
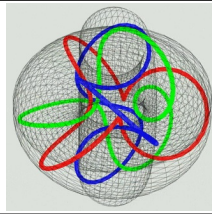
Rather than "destruction", it could be usefully argued that it is the cognitive "deconstruction" of the ring that is the challenge. Unrecognizably embedded within theorem, theology and theosophy, the singular O-ring -- as a "nose ring" -- could indeed be understood as instrumental to "in the darkness bind them". Given their cognitive incommensurability, more intriguing is however a sense in which the ring is strangely 3-fold, as 3 rings "mystically" intertwined.

Borromean rings? A highly suggestive possibility is offered by the paradoxical 3-ring [Borromean ring](#) configuration, of which the 3D variant is presented above as the emblematic logo of the International Mathematical Union. Of particular relevance is the manner in which the 3 rings are mutually orthogonal, as discussed separately (*Borromean challenge to comprehension of any trinity?* 2018). They then exemplify the challenge of comprehending "unity" from any singular perspective -- and the misleading cognitive closure which may then result. That challenge can be explored through the problematic configuration in 3D of symbols of the Abrahamic religions (*Mutually orthogonal Abrahamic symbols from the perspective of projective geometry*, 2017). There one or both of the other symbols may be "invisible" from certain perspectives and confusing from other perspectives.

Other explorations of global comprehension as a mistaken quest for closure are reproduced below from earlier exercises using Möbius strips in a Borromean ring configuration (*Engaging with Elusive Connectivity and Coherence*, 2018; *Towards a higher order of coherent global strategic organization?* 2018; *Confusion in Exchanging "Something" for "Nothing"*, 2015; *Encoding meaningful psychosocial complexity otherwise*, 2018).

In the image on the left, Borromean rings used to indicate interlocking of 3-part Club of Rome report (*Come On! Capitalism, Short-termism, Population and the Destruction of the Planet*, 2018)t. The animation on the right uses 3 mutually orothogonal tori with a 3-loop

helix moving over each of them.

Experimental use of three mutually orthogonal rings				
3-part strategy	Use of Möbius strips towards a Borromean ring configuration			Tori and 3-loop helix
				
Reproduced from critique (2018)	Interactive (x3d ; wrl); video (mp4);	Interactive versions (x3d , wrl)		Interactive (x3d , wrl); video (mp4).

The challenge to comprehension is delightfully clarified and illustrated in an extensive analysis of how [Dante Alighieri](#) describes the three rings (*tre giri*) of the Holy Trinity in *Paradiso* 33 of the *Divine Comedy* (Arielle Saiber and Aba Mbirika, *The Three Giri of Paradiso XXXIII*, *Dante Studies*, 131, 2013, pp. 237-272). As the authors summarize:

... we analyze one particularly suggestive arrangement for the *giri*: that of three intertwined circles in a triangular format. Of the many permutations of this figure, we isolate two variations -- a Brunnian link commonly called the Borromean rings and a (3,3)-torus link -- to show how they more than any other possible arrangement offer unique mathematical, aesthetic, and metaphoric properties that resonate with many of the qualities of the Trinity Dante allusively described in *Paradiso* 33. We propose these as a possible configuration, rich with mystery in themselves, out of a number of Trinitarian models that Dante knew and contemplated. (p. 239)

References

Christopher Alexander:

- Notes on the Synthesis of Form. Harvard University Press, 1964
- The Timeless Way of Building. Oxford University Press, 1979 (vol. I)
- A Pattern Language: towns, buildings, construction. Oxford University Press, 1977 (vol. II)

Sander Bais. The Equations: Icons of Knowledge. Harvard University Press, 2005

Gregory Bateson. Mind and Nature: a necessary unity. Hampton Press, 1979

Gregory Chaitin. Metamaths: the quest for omega. Atlantic Books, 2005

Rich Cochrane. The Secret Life of Equations: the 50 greatest equations and how they work. Firefly Books, 2016

Philip Davis and Reuben Hersh. The Mathematical Experience. Birkhauser, 1981

Philip Davis, Reuben Hersh and Elena Anne Marchisotto. The Mathematical Experience, Study Edition. Birkhäuser, 2012

John Derbyshire. Prime Obsession: Bernhard Riemann and the Greatest Unsolved Problem in Mathematics. Plume, 2004

Marcus du Sautoy:

- The Music of the Primes: why an unsolved problem in mathematics matters. Fourth Estate, 2003
- The Music of the Primes: Searching to Solve the Greatest Mystery in Mathematics. Harper Perennial, 2012
- Finding Moonshine: a mathematician's journey through symmetry. Fourth Estate, 2008
- What We Cannot Know: from consciousness to the cosmos, the cutting edge of science explained. Harper Collins, 2016
- The Creativity Code: art and innovation in the Age of AI. Belknap Press, 2019

Graham Farmelo. It Must Be Beautiful: great equations of modern science. Granta Books, 2003

Frank A. Farris. Creating Symmetry: the artful mathematics of wallpaper patterns. Princeton University Press, 2015

Craig Fraser:

- Mathematics in Classification Systems. Encyclopedia of Knowledge Organization, 2019 [[text](#)]
- Mathematics in Library and Review Classification Systems: an historical overview. *Knowledge Organization*, 47, 2020, 4 [[text](#)]

R. Buckminster Fuller with E. J. Applewhite:

- Synergetics: explorations in the geometry of thinking. Macmillan, 1975 [[text](#)]
- Synergetics 2: explorations in the geometry of thinking. Macmillan, 1979 [[text](#)]

John Taylor Gatto. Dumbing Us Down. The Hidden Curriculum of Compulsory Schooling. New Society Publishers, 2005

Douglas Hofstadter:

- Gödel, Escher, Bach: an Eternal Golden Braid. Basic Books, 1979 [[summary](#)]

- I Am a Strange Loop. Basic Books, 2007 [[summary](#)]
- Douglas Hofstadter and Emmanuel Sander. Surfaces and Essences: analogy as the fuel and fire of thinking. Basic Books, 2012 [[summary](#)]
- Mark Johnson. The Meaning of the Body: aesthetics of human understanding. University of Chicago Press, 2007
- Stephen Cole Kleene. Introduction to Metamathematics. Generic, 1952 [[contents](#)]
- Thomas Kuhn. The Structure of Scientific Revolutions. University of Chicago Press, 1962 [[summary](#)]
- George Lakoff and Mark Johnson. Philosophy In The Flesh: the embodied mind and its challenge to western thought. Basic Books, 1999
- George Lakoff and Rafael E. Núñez. Where Mathematics Comes From: how the embodied mind brings mathematics into being. Basic Books, 2000 [[summary](#)]
- Ernest G. McClain. Myth of Invariance: the origins of the gods, mathematics and music from the Rg Veda to Plato. Nicolas-Hays, 1976
- Arthur I. Miller:
- 137: Jung, Pauli, and the pursuit of a scientific obsession. W. W. Norton, 2010
 - Deciphering the Cosmic Number: the strange friendship of Wolfgang Pauli and Carl Jung. W. W. Norton, 2009
- Ivo Mosley (Ed.). Dumbing Down: culture, politics, and the mass media. Imprint Academic, 2000
- Thamer Naouech. Prime Numbers: the Holy Grail of mathematics. ndependently published, 2020
- Diarmuid O'Murchu. Quantum Theology: spiritual implications of the new physics. Crossroad Publishing Company, 2004
- Daniel Parrochia. Mathematics and Philosophy. ISTE/Wiley, 2018 [[contents](#)]
- John Polkinghorne. Quantum Physics and Theology: an unexpected kinship. Yale University Press, 2008
- Stephen Prothero. God Is Not One: the eight rival religions that run the world -- and why their differences matter. HarperOne, 2010
- Helena Rasiowa and Roman Sikorski. Mathematics of Mathematics. Polish Scientific Publishers, 1970
- Nicholas Rescher. The Strife of Systems: an essay on the grounds and implications of philosophical diversity. University of Pittsburgh Press, 1985
- Wolff-Michael Roth:
- The Mathematics of Mathematics: thinking with the late, Spinozist Vygotsky. Brill, 2017 [[review](#)]
 - The Mathematics of Mathematics. *The Mathematics of Mathematics. New Directions in Mathematics and Science Education*, 2017 [[abstract](#)]
- Denis H. Rouvray and R. Bruce King (Eds.):
- The Periodic Table: Into the 21st Century. Research Studies, 2005
 - The Mathematics of the Periodic Table. Nova Science Publishers, 2005 [[contents](#)]
- Maxine Sheets-Johnstone:
- The Primacy of Movement. John Benjamins, 1999
 - The Corporeal Turn: An Interdisciplinary Reader. Imprint Academic, 2009
- Ian Stewart:
- In Pursuit of the Unknown: 17 equations that changed the world. Basic Books, 2012 [[summary](#)]
 - Professor Stewart's Cabinet of Mathematical Curiosities. Basic Books, 2009
 - Why Beauty Is Truth: a history of symmetry. Basic Books, 2007 [[summary](#)]
- Marie-Lousie von Franz. Number and Time; reflections leading towards a unification of psychology and physics. Rider 1974.
- Sarah Voss. What Number Is God? Metaphors, Metaphysics, Metamathematics, and the Nature of Things. State University of New York Press, 1995 [[review](#)]
- Michael Witzel. The Origins of the World's Mythologies. Oxford University Press, 2010
- Frances Yates.(The Art of Memory. Routledge, 1966



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

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