



# laetus in praesens

Alternative view of segmented documents via Kairos

9 November 2015 | Draft

## Salvation Enabled by Systemic Comprehension

### Via aesthetics of magic squares?

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Annex to: *Dying to Live, Living to Die, Lying to Live, and Living a Lie* (2015)

#### Introduction

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Magical salvation implied by the sense of coherence?

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## Introduction

The sense of coherence associated with magic squares, in the light of the influential role of two iconic polymaths, is explored in an annex.

As one of the Founding Fathers of the United States, [Benjamin Franklin](#)'s widely remarked skill in the elaboration of magic squares raises questions as to the extent to which their organization featured in the formulation of the American Constitution, in which he was so directly involved -- especially given their relevance to the Freemasonry of the time, in which he played a prominent role. In the case of the Omar Khayyam, the question is whether his remarkable poetic skills were associated with his equally remarkable mathematical skills in the development of algebra -- so fundamental to an understanding of the magic squares which were a focus of attention in Arabian cultures of his time.

## Magic square integrity and implications for the US Constitution

In this spirit, this suggests the possibility of a higher order of significance through the manner in which it recalls the organization of so-called [magic squares](#). These have long been explored by mathematicians in the form below and through far more complex variants. The underlying theory is significant to the development of algebra, to which Omar Khayyam was a notable contributor (*Treatise on Demonstration of Problems of Algebra*, 1070).

Example of the simplest magic square  
(of order 3)

Example of the simplest magic square (of order 3)

15	4	9	2	15
	3	5	7	15
	8	1	6	15
15	15	15	15	

A magic square has the same number of rows as it has columns, and in conventional math notation, "n" stands for the number of rows (and columns) it has. Thus, a magic square always contains  $n^2$  numbers, and its size (the number of rows [and columns] it has) is described as being "of order n". A magic square that contains the integers from 1 to  $n^2$  is called a *normal magic square* (Charles Kelly, *The Maths of Magic Squares, Plus Magazine*, 15 September 2014).

The earliest known magic squares were recognized in China but have long been known in Persia, India, Arabia, and Europe. They have notably adorned chapels and have fascinated centuries of mystics, philosophers and polymaths, including Benjamin Franklin (1706-1790).

**Magic squares and the constitutional foundation of the USA:** As one of the *Founding Fathers of the United States*, Franklin was a recognized polymath (like Omar Khayyam) and one of the most influential personalities of his time. He is recognized as having been the most intimately involved in the elaboration of the US Constitution.

One of Franklin's far less recognized accomplishments, however, was his exploration of magic squares, and even *magic circles*, as noted by Paul Pasles (*Franklin Squares* 2006; *Benjamin Franklin's Numbers: an unsung mathematical odyssey*, Princeton University Press, 2007) and by Maya Mohsin Ahmed (*Unraveling the secret of Benjamin Franklin: constructing Franklin squares of higher order*, 23 September 2015).

Mention of Franklin is of relevance to this argument precisely because of his dual role as "Founding Father" of the USA and his "unsung" preoccupation with magic squares. The question is then whether the latter insights have since been of unrecognized relevance to his constitutional and strategic skills, as indicated by his direct involvement in the elaboration of the US Constitution. There is a degree of probability that Franklin's insights into magic squares may have subtly informed both the formulation of the US Constitution and the freemasonry in which the Founding Fathers are controversially held to have been significantly complicit (David Barton, *The Question of Freemasonry and the Founding Fathers*, 2005; *Masonic Myths of the Founding Fathers, Meta-Religion*).

Might these skills offer valuable clues to any process of "salvation", whether of lives or lies? One approach to a response is through further insight into what makes the experience of magical squares so "magical".

**Greater "magic"?** Franklin called his 16x16 magic square *the most magically magical of any magic square ever made by a magician* -- with which many mathematicians and mystics would now be held to agree (Peter Loly, *Franklin Squares: a chapter in the scientific studies of magical squares*, University of Manitoba, 2006; William H. Richardson, *Ben Franklin's Amazing Magic Square* [including animation], Wichita State University; *Ben Franklin's 8x8 Magic Square*, Wichita State University).

The methods by which he generated such squares so readily, characterized by so-called bent diagonals, remain unknown (Harvey Heinz, *Most-perfect Bent diagonal Magic Squares*, 2009; Daniel Schindel, et al., *Enumerating the bent diagonal squares of Dr Benjamin Franklin*, *Proceedings of the Royal Society*, 462, 2006), pp. 2271-2279; Paul Pasles (*The Lost Squares of Dr. Franklin*, *The American Mathematical Monthly*, 108, 2001, 6).

Franklin's 16x16 magic squares: animations of movement of selected bent diagonals																																															
Vertical movement					Combined movement						Horizontal movement																																				
200	217	232	249	8	25	40	57	72	89	104	121	136	153	168	185	200	217	232	249	8	25	40	57	72	89	104	121	136	153	168	185	200	217	232	249	8	25	40	57	72	89	104	121	136	153	168	185
58	39	26	7	250	231	218	199	186	167	154	135	122	103	90	71	58	39	26	7	250	231	218	199	186	167	154	135	122	103	90	71	58	39	26	7	250	231	218	199	186	167	154	135	122	103	90	71
198	219	230	251	6	27	38	59	70	91	102	123	134	155	166	187	198	219	230	251	6	27	38	59	70	91	102	123	134	155	166	187	198	219	230	251	6	27	38	59	70	91	102	123	134	155	166	187
60	37	28	5	252	229	220	197	188	165	156	133	124	101	92	69	60	37	28	5	252	229	220	197	188	165	156	133	124	101	92	69	60	37	28	5	252	229	220	197	188	165	156	133	124	101	92	69
201	216	233	248	9	24	41	56	73	88	105	120	137	152	169	184	201	216	233	248	9	24	41	56	73	88	105	120	137	152	169	184	201	216	233	248	9	24	41	56	73	88	105	120	137	152	169	184
55	42	23	10	247	234	215	202	183	170	151	138	119	106	87	74	55	42	23	10	247	234	215	202	183	170	151	138	119	106	87	74	55	42	23	10	247	234	215	202	183	170	151	138	119	106	87	74
203	214	235	246	11	22	43	54	75	86	107	118	139	150	171	182	203	214	235	246	11	22	43	54	75	86	107	118	139	150	171	182	203	214	235	246	11	22	43	54	75	86	107	118	139	150	171	182
53	44	21	12	245	236	213	204	181	172	149	140	117	108	85	76	53	44	21	12	245	236	213	204	181	172	149	140	117	108	85	76	53	44	21	12	245	236	213	204	181	172	149	140	117	108	85	76
205	212	237	244	13	20	45	52	77	84	109	116	141	148	173	180	205	212	237	244	13	20	45	52	77	84	109	116	141	148	173	180	205	212	237	244	13	20	45	52	77	84	109	116	141	148	173	180
51	46	19	14	243	238	211	206	179	174	147	142	115	110	83	78	51	46	19	14	243	238	211	206	179	174	147	142	115	110	83	78	51	46	19	14	243	238	211	206	179	174	147	142	115	110	83	78
207	210	239	242	15	18	47	50	79	82	111	114	143	146	175	178	207	210	239	242	15	18	47	50	79	82	111	114	143	146	175	178	207	210	239	242	15	18	47	50	79	82	111	114	143	146	175	178
49	48	17	16	241	240	209	208	177	176	145	144	113	112	81	80	49	48	17	16	241	240	209	208	177	176	145	144	113	112	81	80	49	48	17	16	241	240	209	208	177	176	145	144	113	112	81	80
196	221	228	253	4	29	36	61	68	93	100	125	132	157	164	189	196	221	228	253	4	29	36	61	68	93	100	125	132	157	164	189	196	221	228	253	4	29	36	61	68	93	100	125	132	157	164	189
62	35	30	3	254	227	222	195	190	163	158	131	126	99	94	67	62	35	30	3	254	227	222	195	190	163	158	131	126	99	94	67	62	35	30	3	254	227	222	195	190	163	158	131	126	99	94	67
194	223	226	255	2	31	34	63	66	95	98	127	130	159	162	191	194	223	226	255	2	31	34	63	66	95	98	127	130	159	162	191	194	223	226	255	2	31	34	63	66	95	98	127	130	159	162	191
64	33	32	1	256	225	224	193	192	161	160	129	128	97	96	65	64	33	32	1	256	225	224	193	192	161	160	129	128	97	96	65	64	33	32	1	256	225	224	193	192	161	160	129	128	97	96	65

Franklin's 8x8 magic squares: animations of movement of selected bent diagonals		
Vertical movement	Combined movement	Horizontal movement

52	61	4	13	20	29	36	45
14	3	62	51	46	35	30	19
53	60	5	12	21	28	37	44
11	6	59	54	43	38	27	22
55	58	7	10	23	26	39	42
9	8	57	56	41	40	25	24
50	63	2	15	18	31	34	47
16	1	64	49	48	33	32	17

52	61	4	13	20	29	36	45
14	3	62	51	46	35	30	19
53	60	5	12	21	28	37	44
11	6	59	54	43	38	27	22
55	58	7	10	23	26	39	42
9	8	57	56	41	40	25	24
50	63	2	15	18	31	34	47
16	1	64	49	48	33	32	17

52	61	4	13	20	29	36	45
14	3	62	51	46	35	30	19
53	60	5	12	21	28	37	44
11	6	59	54	43	38	27	22
55	58	7	10	23	26	39	42
9	8	57	56	41	40	25	24
50	63	2	15	18	31	34	47
16	1	64	49	48	33	32	17

**Freemasonry?** What of those explorations might Franklin have brought to bear on the integrative process of founding the USA? This would be consistent with the widely acknowledged role of Freemasonry amongst the founding fathers -- notably including Franklin -- and the importance it has attached to the [square](#) as one of its most significant symbols (exemplified by reference to being "on the square", otherwise recognized as "all square", "being square", or the conclusion that something "does not add up").

Less known is the preoccupation of masonic symbolism with [magic squares](#) (as noted in the *Masonic Dictionary*; see also *Speculation on the symbol of the Square and Compasses: the Freemasons' Magic Square Square*, *Review of Freemasonry*). Especially intriguing is use of Franklin's 16x16 square in masonic lodge floor layout and apron design.

Of particular interest is both the formal resemblance between the "horizontal pattern" of bent diagonals and the masonic symbol of "squares and compasses", as well as the limited reference to the complementary "vertical pattern". As argued further in the main paper, the contrast between these emphases can be usefully related to issues arising from freemasonry as an exclusively male fraternity -- seemingly challenged by its relationship to feminine qualities and what they may symbolize. Reference to "lost squares" might even imply that consideration of the vertical pattern had been deliberately repressed in some way..

## Magical salvation implied by the sense of coherence?

Are such insights of current relevance to the salvation of America, however that might be understood? More generally it might be asked, from a global perspective, whether the summation to the so-called [magic constant](#) of 15 of a magic square (of "order 3") bears any relation to the distinction by the [Millennium Project](#) of [15 Global Challenges](#) facing humanity, in support of the [8 UN Millennium Goals](#), now transformed into the [17 UN Sustainable Development Goals](#).

As discussed in the main paper, the 15-fold pattern can be fruitfully compared with the distinction by [Christopher Alexander](#) of [15 transformation principles](#), as discussed separately (*Harmony-Comprehension and Wholeness-Engendering: eliciting psychosocial transformational principles from design*, 2010; *Thematic Streams and their Integration*, 2015).

There is a case for exploring whether **the process towards the nature of the consensus required for global governance can be seen as a collective struggle with an intuition of coherence suggested by organization somehow associated with "8-fold" or "15-fold"**. This struggle could be understood as a consequence of the constraint identified in the much-cited paper by [George Miller](#) (*The Magical Number Seven, Plus or Minus Two: some limits on our capacity for processing information*, *Psychological Review*, 63, 1956, 2, pp. 81-97) -- as discussed separately (*Representation, Comprehension and Communication of Sets: the role of number*, 1978).

The "struggle" is with regard to whether the focus is on a 3x3 pattern (with a magic constant of 15), a 16x16 pattern, or otherwise. The nature of the requisite consensus may prove to be "magical" rather than of a kind which could be described either as rational or as a delusion (*The Consensus Delusion: mysterious attractor undermining global civilization as currently imagined*, 2011).

## "Magic" as aesthetic connectivity

The experience of the "elusive" integration offered by a magic square -- especially though its elaboration -- can be more readily understood through the experience of [sudoku](#), to which it bears various degrees of resemblance (as with the crossword puzzle, scrabble, or Rubik's cube). Widely popular, sudoku is indeed but a recent offshoot of the magic square, as variously described (Hardeep Aiden, *Anything but Square: from magic squares to Sudoku*, *Plus Magazine*, 1 March 2006; Seymour S. Block and Santiago A. Tavares, *Before Sudoku: the world of magic squares*, Oxford University Press, 2009).

Could it be argued that the "magic" experienced elusively through those patterns has much to do with a form of aesthetic connectivity? This may be more obviously recognized otherwise in poetry and song -- **the appeal of rhyme as much as that of reason** (*Magic, Miracles and Image-building: poetry-making and policy-making*, 1993).

Curiously "magic" is strongly deprecated by science, religion and governance, and yet it is this quality which is widely presented in relation to romance, entertainment (especially for the young), design, and in the marketing of tourist locations. The widespread recognition of this quality is consistent with that explored by Christopher Alexander as the sense of "home", as the ["quality without a name"](#), which he identified as the quality of "a place to be" (*The Timeless Way of Building*, 1979) -- associated with his elaboration of *A Pattern Language* (1977).

Given the long-standing appeal of magic squares, such a possibility contrasts with the hypothesis advanced by [Marcel Danesi](#) (*The Appeal of Sudoku: why is sudoku an obsession?* *Psychology Today*, 19 June 2009; *Magic Squares: a touch of mysticism and a lot of brain-challenging fun!* *Psychology Today*, 29 June 2009). Although consistent with one understanding of salvation, his hypothesis in that regard can be deprecated as trivializing the experience which many find meaningful, even of mystical significance:

I believe that we need to escape from the realm of daily life, where solutions rarely seem to exist, into an imaginary realm that has definite solutions, where mysteries are deciphered, and where order is restored. Puzzles are, in a word, a form of escapism

It is appropriate to ask to what extent global governance can in any way be associated with enabling the "magic" which is such a powerful attractor. Are the set of UN Sustainable Development Goals to be understood as "magical" in any way? Do they together frame a sense of a "magical place to be" in the future? If not, why not? Why might they be perceived as inherently boring by so many -- especially of the younger generations? If that is the case, how can such articulations frame any hopes for global "salvation"?

**Magical speculation:** The argument in the main paper suggests a degree of conflation between embellishing the truth and distorting it -- between dyeing and lying. The conflation can be recognized in the widespread fascination with stories involving magic (*The Lord of the Rings*, *Harry Potter*, etc). It extends into occult speculation. Religious beliefs may well be framed in relation to "stories", most notably those of the Bible.

Magic may be valued by secret societies, including the Freemasons -- but with little possibility of distinguishing truth from imaginative fantasy.

**Word squares:** In introducing the poetic dimension, it is appropriate to note an alphabetic analogue to the magic square of numbers, namely the [word square](#) consisting of a set of words written out in a square grid, such that the same words can be read both horizontally and vertically. The number of words, which is equal to the number of letters in each word, is known as the "order" of the square.

Examples of word squares (of order 5)										
Presented in <i>Wikipedia</i>						Sator Square in Latin				
H	E	A	R	T		S	A	T	O	R
E	M	B	E	R		A	R	E	P	O
A	B	U	S	E		T	E	N	E	T
R	E	S	I	N		O	P	E	R	A
T	R	E	N	D		R	O	T	A	S

The first magic squares of order 5 and 6 appeared in an encyclopedia from Baghdad, the *Encyclopedia of the Brethren of Purity* (*Rasa'il Ihkwan al-Safa*, circa 983).

The question might be taken even further in the light of the innovative algebraic skills of Omar Khayyam -- as a polymath renowned for his poetry -- in a period in which magic squares were a preoccupation of Arab mathematicians and Islamic culture (*Bibliography of Mathematics in Medieval Islamic Civilization*, 1999; *Mathematics in Medieval Islam*, *Wikipedia*; *Buduh: Magic square in Islamic Civilization*, *Hypernumber*, January 2015). In the latter case, the numbers were written in the *abjad* letter-numerals, and because the four corners of this 3x3 square contained the letters *ba*, *dal*, *waw* [or *u*], and *ha*, this particular square became known as the *buduh* square. The *Wikipedia* description includes images of 4x4 magic squares from Persia and Arabia.

As noted by Mohamed Teymour and Thomas J. Osler (*The Quadratic Equation as Solved by Persian Mathematicians of the Middle Ages*, Rowan University, 2005):

...we need to understand the restrictions under which these mathematicians worked. First, the condensed mathematical symbolism as seen in the equation  $x^2 = 3x + 4$ , was unknown to them. They would have expressed this equation in literal terms as: *If three times an unknown added to 4 is equal to the square of that unknown, what is the value of the unknown*

A further constraint is evident from the Islamic tendency of the times to prosecute nonconformist influential thinkers like Omar Khayyam. He was later appreciated in Persia for his agnostic views, as illustrated by Norman Berdichevsky (*Omar Khayyam's Rubaiyat: an antidote for Islamic fundamentalism*, *New English Review*, November 2007). Citing the preeminence of Omar Khayyam, helpful indications on the formal constraints significant to both poetry and mathematics in different cultures and epochs are provided by a commentator (*Poetry and Mathematics, Mathophilia or the Love of Math*, 13 March 2013).

Commercial advertising may be seen as using many of the techniques previously confined to spell-casting. . There is a lot of "magic" in public relations and in what the "spin doctors" of political campaigns endeavour to achieve (Maltese, 1992). Provocatively it could be asked whether the articulation of global declarations should be explored as modern form spell-casting , especially in terms of the illusions thereby cultivated -- as with the UN Sustainable Development Goals. Is the agreement governing the [Transatlantic Trade and Investment Partnership](#) to be understood as a mega-spell -- to engender a "caliphate of normality"? As a spell of 6,000 pages, should it be considered as a clunky effort at spell-casting by the international community (*International Community as God or Sorcerer's Apprentice?* 2015)?

As argued separately (*Magic, Miracles and Image-building*, 1993), charismatic leaders have been studied as "spellbinders" by A R Willner (1984). Like it or not, spells as an aspect of magic seem to be closely associated with the overlap between poetry and policy. Concern is expressed at continuing popular interest in spells and the related persistent practices in many countries. Related arguments could be made with respect to chants to motivate competing teams.

Janet and Stewart Farrar (1990) indicate: *"A spell can be as simple or as complicated as the occasion demands. But be it simple or complex, three factors are essential: precise visualization of intent, concentration and will- power"* (p. 31). Many of the spells and incantations to which they refer take poetic form, including two embodied in the Kalevala, the Finnish national epic. Many are of course designed to "solve problems".

Are such cultural initiatives to be contrasted with "spells" that "unsing" conventional illusions? This might be said of *The Development Set* (1976) of [Ross Coggins](#), with stanzas such as:

*The Development Set is bright and noble,*

*Our thoughts are deep and our vision global;  
 Although we move with the better classes,  
 Our thoughts are always with the masses.*

**Underlying patterns of integration:** Contrasting numbers with letters in discussion of magic squares readily obscures the nature of the symbols which may be used in the non-Western cultures in which the magic square had been previously recognized. It is therefore appropriate to note the recent generalization in the form of [geometric magic squares](#) by [Lee Sallows](#) (*Geometric Magic Squares: a challenging new twist using colored shapes instead of numbers*, Dover Publications, 2013).

Potentially far more provocative is the possibility that the [quatrains](#) for which Omar Khayyam is renowned might well constitute an articulation in poetic form of magic squares of order 4 (namely 4x4). The argument is problematic given the continuing debate as to which of the quatrains were Khayyam's own and which derived from, or combined, the poetry of others. However it could well be argued that it is the appreciation of a range of quatrains which is an indication of their inherent magic -- and potentially a guarantee of their originality.

With respect to his highly influential algebraic articulations, as noted above, he was constrained to make use of words *in extenso* rather than benefitting from the symbolic facilities now available to mathematicians. Of specific relevance is the study by Daniel May (*Complete Graphs in the Rubáiyát*, *Journal of Mathematics and the Arts*, 8, 2014, 1-2, pp. 59-67) in a special issue on poetry and mathematics. May discusses how graph theory can be used to explore the connections between the various quatrains contained in Edward FitzGerald's several translations of the Rubáiyát -- an argument he [subsequently elaborated](#).

As further indication of the engagement of Omar Khayyam with magic squares, two of his quatrains serve as preambles to the introduction to the study by John J. Watkins (*Across the Board: the mathematics of chessboard problems*, 2004)

*We are no other than a moving row  
 Of Magic Shadow-shapes that come and go  
 Round with the Sun-illuminated Lantern held  
 In Midnight by the Master of the Show*

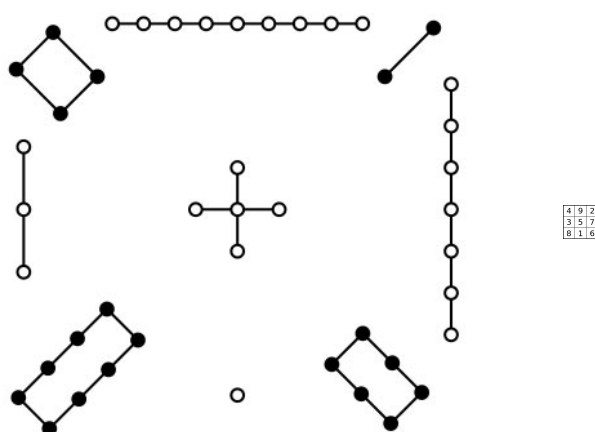
*But helpless Pieces of the Game He plays  
 Upon this Chequer-board of Nights and Days; Hither and  
 thither moves, and checks, and slays,  
 And one by one back in the Closet lays.*

Argued in this way, the question is what is to be placed in the squares such as to engender an experience of insight characterized, or caricatured, as "magical"? Letters and numbers are recognizable to the West, but the hieroglyphs so placed in the script of other cultures may well encode more complex significance readily associated with words, rather than individual numbers or letters. Hence the question: **can memorable poetic associations be encoded in this way -- potentially of relevance to patterns of global preoccupation such as any set of Sustainable Development Goals?**

## Chinese articulation of magic square insight

Histories of development of magic squares make repeated reference to their first recognition in China as the [Lo Shu square](#) ([Schuyler Cammann](#), *The Magic Square of Three in Old Chinese Philosophy and Religion*, History of Religions, 1, 1961, pp. 37-80; [Frank J. Swetz](#), *Legacy of the Luoshu: the 4,000 year search for the meaning of the magic square of order three*. A K Peters, 2008).

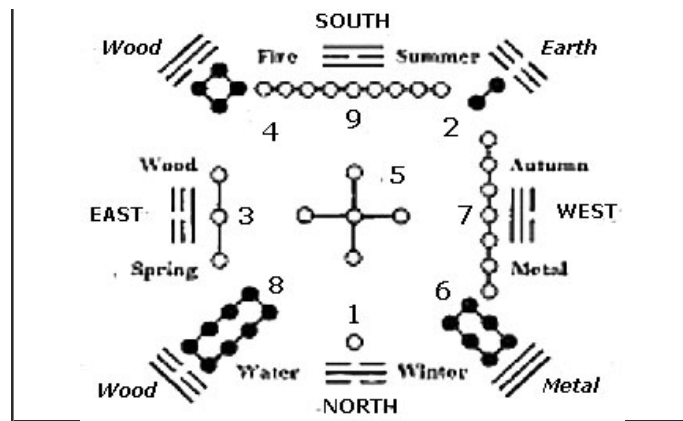
**Juxtaposition of Lo Shu square with conventional 3x3 magic square**  
 (images from Wikipedia)



Their representation within that culture necessarily transcends the conventional Western distinction between numbers and letters, given the nature of the script. Of particular interest is the transformation of the Lo Shu square into the long-valued [Ba Gua](#) pattern of 8 trigrams, with its extensive metaphorical associations typically expressed in poetic form, elaborated further within the *I Ching* of 64 hexagrams.

The following correspondences feature in an extensive discussion by [Quincy Robinson](#) and Paul Martyn-Smith (*Evidence of Modern Physical Knowledge from Asiatic Antiquity: Re-integration: Nine Realms of Middle Earth*, 2015).

**Correspondences between Lo Shu, Ba Gua  
 and 3x3 magic square patterns**



In considering the relevance of Chinese cultural insights, there is a strong case for recognizing the associated subtlety, as helpfully articulated in texts regarding the [Literati Tradition](#) (*The Origins of Chinese Philosophical Thinking*; *Analogical Understanding and Translation*; *The Conceptual Scheme of Chinese Philosophical Thinking*).

With respect to analogical understanding, the concluding argument made is:

Beyond the good intentions of missionaries and sinologists, and the increasing awareness of divesting interpretations of Chinese philosophy of Western preconceptions, the recent archaeological findings challenge the authority of existing translations on Chinese philosophical thinking. To the extent the newly unearthed texts written on silk scrolls and bamboo strips now provide us with a compelling clarity to the over all Chinese cosmology, and thus enable us to understand Chinese philosophical thinking in a way that has not been possible before. [Frederick Mote](#) notices that Chinese *history, culture, and people's conceptions of their ideal roles all must be explained in terms of Chinese cosmology, and not -- if we really want to understand Chinese civilization -- by implicit analogy to ours... hence, the records of Chinese culture must be interpreted, and the texts translated and retranslated until our inadvertent uses of historical and cultural analogy are detected, weighed, and if necessary, corrected...*

However, one cannot divest the Western interpretations of Chinese culture of Western cultural analogies simply by translating and retranslating the texts, nor can one do so by using the more abstract and specializing -- no less culturally biased -- language of the professional philosopher. [Sarah Allan](#) suggests that one *must begin by exposing the metaphors that underlies the Chinese terminology and imbue it with meaning...* In other words, one begins to understand the conceptual scheme of Chinese philosophical thinking more accurately by recognizing the conceptual scheme of Chinese thought, or "the root metaphors" within the socio-cultural contexts from the viewpoints of not only historical and epistemological but also anthropological perspectives, and aesthetic and literary criticism.

Of some relevance to these points are the arguments of Martin Svensson Ekstroem (*Illusion, Lie, and Metaphor: the paradox of divergence in early Chinese poetics*, *Poetics Today*, 23, 2002, 2, pp. 251-289).

As discussed separately, the term "[correlative thinking](#)" was a characterization of Chinese thinking by Joseph Needham (*History of Scientific Thought*, 1956). It referred to a general propensity to organize natural, political/social, and cosmological information in highly ordered arrays or systems of correspondences. His characterization was very influential as a subsequent focus of sinological studies. (A C Graham. *Yin-Yang and the Nature of Correlative Thinking*, Singapore Institute of East Asian Philosophies, 1986). A degree of equivalence is now to be found in the Western expression "[joined-up thinking](#)", as articulated by [Stevyn Colgan](#) (*Joined-Up Thinking*, 2008).

Related arguments have been developed by [Susantha Goonatilake](#) (*Toward a Global Science: mining civilizational knowledge*, 1999), as discussed separately (*Enhancing the Quality of Knowing through Integration of East-West metaphors*, 2000).

To what extent are the UN Sustainable Development Goals a reflection of correlative thinking -- any more than the pattern articulated in *Agenda 21* (1992)?

## Recognizing the existence of an aesthetic "missing link"

**Vital significance of the absent and the missing?** The argument to this point suggests that the challenge of engaging with an existential process of living, lying/dyeing, dying is necessarily challenging. Articulation in terms of a 3-fold, 4-fold, 8-fold or 12-fold pattern may be necessary, but it is not sufficient at this time. This also applies to efforts to encompass these through global initiatives, such as the UN's Sustainable Development Goals -- or questionable exercises at hemispheric integration, as currently represented by TPP \*\*\* hemispheric integration / TPP

Given the appalling failures of global governance in a time of crisis, it is appropriate to ask whether there is a failure to recognize critical factors, as suggested by the arguments of the neuroanthropologist [Terrence Deacon](#) with regard to the role of the "missing" (*The Symbolic Species: the co-evolution of language and the brain*, 1997; *Incomplete Nature: how mind emerged from matter*, 2011). He explores the consequence of deliberately omitting, or unconsciously missing, a dimension essential to systemic viability. The encompasses the paradoxical incompleteness of semiotic and teleological phenomena in terms of information to demonstrate how specific absences (or constraints) play the critical causal role in the organization of physical processes that generates these properties.

As discussed separately, with respect to *Necessary Incompleteness* (2014), for Deacon (in introducing his argument):

The problem is this: *Such concepts as information, function, purpose, meaning, intention, significance, consciousness, and value are intrinsically defined by their fundamental incompleteness.* They exist only in relation to something they are not.... The "something" that each of these is not is precisely what matters most. But notice the paradox in this English turn of phrase. To "matter" is to be substantial, to resist modification, to be beyond creation or destruction -- and yet what matters about an idea or purpose is dependent on something that is not substantial in any obvious sense. So what is shared in common between all these phenomena? In a word, nothing -- or rather, something not present. (p. 23, *emphasis in original*)

**"Nothing" as a missing analogue to zero?** The fundamental value of focusing on what is "absent" from conventional explanation is introduced by Deacon by comparing it to the vital role of **zero** in the number system -- itself a great discovery (cf. Charles Seife, *Zero: the biography of a dangerous idea*, 2000; Robert Kaplan and Ellen Kaplan, *The Nothing that Is: a natural history of zero*, 2000). For Deacon:

Basically, it means that our best science -- that collection of theories that presumably comes closest to explaining everything -- does not include this one most defining characteristic of being you and me. In effect, our current "Theory of Everything" implies that we don't exist, except as collections of atoms. So what's missing? **Ironically and enigmatically, something missing is missing.** (p. 1, *emphasis added*)

## Existential implication in magic squares

This understanding could be usefully applied to the focus of science and governance on living and dying -- and the marked incapacity to encompass processes of lying/dyeing in which both are embedded. It could also be applied to the remarkable capacity of religions to accuse each other of colouring the truth misleadingly (to the point of justifying violence) -- in the course of their typical preoccupation with the larger significance of living and dying.

Whether science, governance or religion, whatever is missing could indeed be assumed to be vital at this time. It could be provocatively framed in terms of "soul", given the lack of meaning this has in practice for science and governance. Arguably the violence of the quarrels between religions is an indication of fundamental misunderstandings of "soul" -- usefully understood as variously "coloured".

The argument with respect to magic squares is therefore useful as a device for exploring further -- in the sense that what is missing from the practice of science, governance and religion is the "magic" which people find in other domains. Sudoku, music, song and poetry offer examples of a kind.

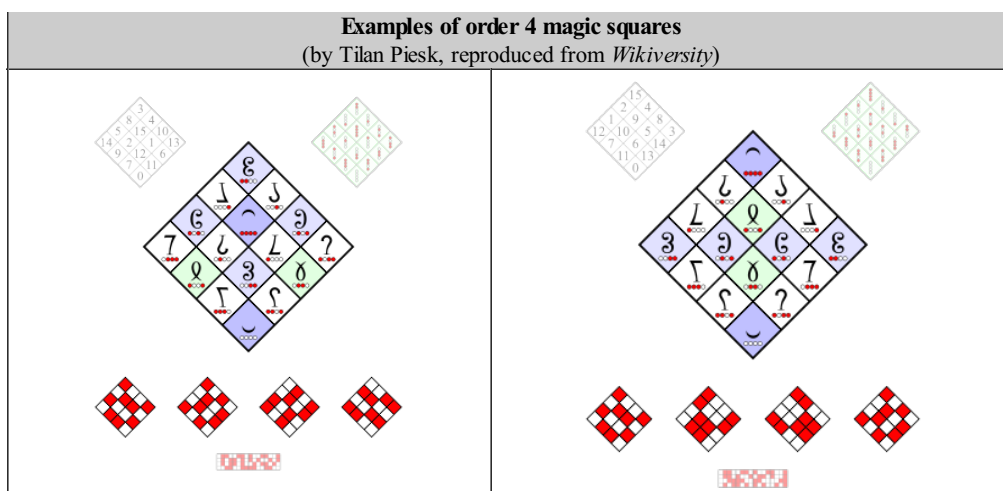
It was suggested above that there was a strange possibility that Omar Khayyam might well have encoded his insights into magic squares into the quatrains of his poetry -- and that Benjamin Franklin might have embodied his in the Constitution of the USA. Such possibilities, consistent with their creative genius, seem not to have been explored or imagined.

**Challenging magic squares of order 4:** In taking the argument further, it is appropriate to note the rich literature on magic squares of order 4 (Kathleen, Dame Ollerenshaw and Herman Bondi *Magic Squares of Order Four, Philosophical Transactions of the Royal Society of London*, 1982). There are 880 basic magic squares of order-4 (first compiled by Bernard Frénicle de Bessy before 1675), subsequently verified by many. these have been classified into 12 groups by **Henry Dudeney**, *Amusements in Mathematics*, 1917).

The 12 patterns, and their transformations, are especially accessible in the work of Harvey Heinz (*Order 4 Magic Squares*, 2009; *Order 4, Transformations and Patterns*, 2009).

12 Dudeney classification of magic squares of order 4 (reproduced from Harvey Heinz, <i>Order 4 Magic Squares</i> , 2009)					
Group I: 48 pandiagonal	Group II: 48 semi-pandiagonal	Group III: 48 semi-pandiagonal	Group IV: 96 semi-pandiagonal	Group V: 96 semi-pandiagonal	Group VI: 96 semi-pandiagonal
Group VII: 56 simple	Group VIII: 56 simple	Group IX: 56 simple	Group X: 56 simple	Group XI: 8 simple	Group XII: 8 simple

**Glyphs as a challenge to the focus on numbers or letters:** More challenging is the remarkable articulation by **Tilman Piesk** (*Order 4 magic squares, Wikiversity*). What is especially striking, and relevant to this argument, is the use of glyphs in the distinctions made in the 4-fold patterns. This is consistent with his specific recognition of the extensive *Wikipedia List of Logic Symbols*. However the unique set of glyphs used by Piesk (see images below) strangely recalls the scripts of the Arab world -- notably at the time of Omar Khayyam, and the issue of how (and whether) "numbers" and "letters" are distinguished -- with the cognitive and epistemological implications noted above with respect to Chinese manner of thinking.



With respect to the use of glyphs, it is appropriate to recall the [geometric magic squares](#) mentioned above. Together these suggest that the distinctions in question are cognitive rather than dependent on the manner of their representation. The point is further emphasized in the applet enabling changing patterns, as presented by H. B. Meyer (*Magic Squares of Order 4 and Patterns*).

## Magical organization of patterns of words?

The question here is whether the distinctions and transformations could be made with words (as noted above) -- as might be evident in the quatrains of Omar Khayyam or in patterns embodied into the American Constitution by Benjamin Franklin to ensure its coherence. With a pattern of numbers, the columns, rows and diagonals variously sum to the same number. By contrast, **the question is whether a qualitative analogue would "sum" to an analogous pattern of integration.**

This would be most comprehensible in aesthetic terms -- hence the possibility of its comprehension through poetry and the use of rhyme. This raises the interesting issue of how the "truth" of rhyming ("ringing true") is related to any lie which exploits it -- as in mocking chants.

How is the design of a constitution to be articulated and appreciated in aesthetic terms? What makes for its appropriateness and the "goodness of fit" of its various elements (*Comprehension of Appropriateness*, 1986). What makes a pattern "magical" whether in a work of art, a place, or the organization of a group?

Could policy-making be fruitfully "informed" by poetry-making, as explored separately (*Poetry-making and Policy-making: arranging a marriage between Beauty and the Beast*, 1993)? Might such a framing enable unexplored forms of engagement with cultures which attach much higher value to poetry (*Poetic Engagement with Afghanistan, Caucasus and Iran: an unexplored strategic opportunity?* 2009)?

How might it be imagined that a renowned poet of Persian culture would have chosen to articulate the insights of the variety of order-4 magic squares with which he was familiar as a mathematician? The question applies equally, if not more strongly, to those in Chinese cultures of the past -- especially given the poetic (metaphorical) articulation of the distinctions symbolically encoded in the Ba Gua and the major [Chinese classics](#): *Yi Jing* (*Book of Changes*), *Tao Te Ching*, *Tai Xuan Jing* (*Canon of Supreme Mystery*). In all such cases, the concern might have been to enable more profound comprehension more widely through "rhyme" than was possible through "reason".

With respect to their symbolic encoding (in trigrams, quadgrams and hexagrams), it is appropriate to recall the inspiration it constituted for the early investigations of [Gottfried Leibniz](#) into binary coding -- later to be fundamental to computer operations, as noted separately (topology. \*\*\* dancing

Further indications into the poetics of magic squares are provided by Western experimental association of poetry with magic squares, as indicated by *Magic Square : Poetry Practice* and *Poetry with Magic Squares*. Given the many explorations of computer-generated poetry, of relevance are the experiments of Roman Bromboszcz (*The Variations for Magic Square: a cybernetics poetry*, 2009).

**Comprehension of magic through music?** Clearly the Dudeney groups, as depicted above, are highly suggestive of possible patterns of associations in any poem -- which might be recognized in the work of Omar Khayyam. They also recall the patterns explored in music in the *Goldberg Variations*, as extensively discussed by [Douglas Hofstadter](#) (*Gödel, Escher Bach: an Eternal Golden Braid*, 1979) and specifically by [Wilfrid Mellers](#) (*Bach and the Dance of God*, Travis and Emery, 2009).

A number of composers are specifically cited by Tom Service (*Magic numbers: composers and their clandestine codes*, *The Guardian*, 2 July 2010), commenting that: *composers have, over the centuries, used their own codes for the cognoscenti to decipher, notably Bach*. Work on the latter encoding by Albert Clement has been usefully [reviewed](#) for the American Bach Society.

A continuing pattern of notes is presented experimentally by Adam Scott Neal (*Magic Square Music*, *You Tube*, 2009) -- with the numbers in a 4x4 magic square determining most aspects of the music (voices, chords, tempo, length). The numbers in a 4x4 magic square determine most aspects of the music. Links are given to related experiments with magic squares of 3x3 (Lo Shu) and 5x5 (Vedic). A detailed explanation is offered of an 8x8 magic square by Gareth Roberts (*Composing with Numbers: Sir Peter Maxwell Davies and Magic Squares, Math, Music and Identity*, 2015). This focuses on the use of such a square by Davies in his composition of *A Mirror of Whitening Light* (1977) derived from the plain chant *Veni Sancte Spiritus*, as presented below:

**8-note phrase used in a magic square in *A Mirror of Whitening Light***  
(reproduced from Gareth Roberts, *Composing with Numbers*, 2015)



G <sub>1</sub>	E <sub>2</sub>	F <sub>3</sub>	D <sub>4</sub>	F <sup>#</sup> <sub>5</sub>	A <sub>6</sub>	G <sup>#</sup> <sub>7</sub>	C <sub>8</sub>
E <sub>9</sub>	C <sup>#</sup> <sub>10</sub>	D <sub>11</sub>	B <sub>12</sub>	D <sup>#</sup> <sub>13</sub>	F <sup>#</sup> <sub>14</sub>	F <sub>15</sub>	A <sub>16</sub>
F <sub>17</sub>	D <sub>18</sub>	E <sup>b</sup> <sub>19</sub>	C <sub>20</sub>	E <sub>21</sub>	G <sub>22</sub>	G <sup>b</sup> <sub>23</sub>	B <sup>b</sup> <sub>24</sub>
D <sub>25</sub>	B <sub>26</sub>	C <sub>27</sub>	A <sub>28</sub>	C <sup>#</sup> <sub>29</sub>	E <sub>30</sub>	E <sup>b</sup> <sub>31</sub>	G <sub>32</sub>
F <sup>#</sup> <sub>33</sub>	D <sup>#</sup> <sub>34</sub>	E <sub>35</sub>	C <sup>#</sup> <sub>36</sub>	F <sub>37</sub>	G <sup>#</sup> <sub>38</sub>	G <sub>39</sub>	B <sub>40</sub>
A <sub>41</sub>	F <sup>#</sup> <sub>42</sub>	G <sub>43</sub>	E <sub>44</sub>	A <sup>b</sup> <sub>45</sub>	B <sub>46</sub>	B <sup>b</sup> <sub>47</sub>	D <sub>48</sub>
G <sup>#</sup> <sub>49</sub>	F <sub>50</sub>	F <sup>#</sup> <sub>51</sub>	D <sup>#</sup> <sub>52</sub>	G <sub>53</sub>	A <sup>#</sup> <sub>54</sub>	A <sub>55</sub>	C <sup>#</sup> <sub>56</sub>
C <sub>57</sub>	A <sub>58</sub>	A <sup>#</sup> <sub>59</sub>	G <sub>60</sub>	B <sub>61</sub>	D <sub>62</sub>	C <sup>#</sup> <sub>63</sub>	F <sub>64</sub>

Roberts cites Davies to the effect that:

And if you go across that square of the numbers arranged in a particular way, they make very interesting patterns. And I see these patterns, in the first place, possibly as dance patterns; and one gets to know them by heart. One doesn't in fact deal with numbers at all. One deals rather as somebody who is dealing with **bell-changes**, with actual patterns with changes [emphasis added].

A very comprehensive summary of the role of magic squares in music is provided by [Liana Alexandra](#) (*Musical Composition: an ineffable act between fantasy and arithmetical and geometrical rigor*, 2005). The possibility of using magic squares to order the insights of a Chinese classic is presented separately (*Musical Articulation of Pattern of Tao Te Ching Insights: experimental sonification based on magic square organization*, 2003). Consideration has been given by Johann Hasler to *Generating Pitch Material from the Magical Sigils of the Western Esoteric Tradition*. Magic squares feature in experimental music (Paul A. Oehlers and Christopher H. Mich, *MSC: a computer assisted system integrating music and video through magic squares as compositional models*, International Computer Music Association, 2006)

**Pattern of response to allegations of encoding:** There is of course a fascination with hidden codes and the possibility of their discovery, as illustrated by the controversial popularity of the novels of [Dan Brown](#) (*The Da Vinci Code*, 2003, etc) The genetic code offers a model. More intriguing with respect to the argument above is the manner in which claims to have discovered such a code in various classical texts are readily subject to different styles of criticism. An example is provided by the so-called [Bible code](#) (or Torah code), and on the [Quran code](#), on which *Wikipedia* provides extensive references.

A recent example is provided by a mathematical ordering of the works of Plato according to a 12-note musical scale, as detected by [Jay Kennedy](#) (*Plato's forms, Pythagorean Mathematics, and Stichometry*, *Apeiron*, 3, 2010, 1). This has been the focus of various descriptions and critical commentaries (Julian Baggini *Plato's stave: academic cracks philosopher's musical code*, *The Guardian*, 29 June 2010; Rose Mary Salum, *Plato's Musical Structure: Jay Kennedy Literal Magazine*, 24; Martin Cohen and Thomas Scarborough, *Man, the Measure of All Things? New efforts to deconstruct the writings of the Ancient Greeks*, *The Philosopher*, 102, 2; Sue Roberts: *Plato's Hidden Musical Code? Philosophy Now*, August/September 2010).

For one commentator:

In sum, **Kennedy's secret hidden musical code is absolute nonsense, as any music theorist (modern or ancient Greek) could have told him at first glance.** (*Summary of Claims Against Jay Kennedy and Plato's Code*, *Heraclitean River*, 24 July 2010) [emphasis added]

As noted by Kennedy with respect to the popular elaboration of his discovery:

This book has been creating a stir among classicists and philosophers. It claims to vindicate the ancient view that Plato's writings were in some way symbolic. It contains several independent lines of evidence that musical symbols are inserted at regular intervals through each genuine dialogue to form a musical scale. These symbols form a running commentary on the narrative and shift interpretations of Plato's philosophy. (*The Plato Code*, Penguin, 2010)

Kennedy has also presented a more focused response to critics (*The Ultimate 'Esoteric' Reading of Plato: Jay Kennedy Replies to Critics*, *Leiter Reports*).

Curiously missing is the self-reflexive sense in which the debate constitutes a pattern in its own right -- calling for detection of a seemingly "hidden code". Articulated as a "truth" -- Kennedy's model is embedded in a pattern in which the variety of responses is somewhat predictable, especially including the declaration that it is "nonsense" (and therefore a "lie").

In the case of academic debate such a pattern has been explored as a set of seven axes of bias by the philosopher [W. T. Jones](#), who applied it to the long-standing pattern of disagreements regarding the so-called romantic period (*The Romantic Syndrome: toward a new method in cultural anthropology and the history of ideas*, Martinus Nijhoff, 1961), as presented [separately](#). Those biases can of course

be detected in many other debates as he suggests.

Especially questionable is the apparent lack of attention to whether the implication of the purported encoding by Plato does in fact offers new insight. This indifference might be contrasted with the insights offered by [Ernest McClain](#) (*Myth of Invariance: the origins of the gods, mathematics and music from the Rg Veda to Plato*, Nicolas-Hays 1976; *The Pythagorean Plato: Prelude to the song itself*, Nicolas-Hays 1978).

The question regarding the predictability of the pattern of responses to any claim could be explored within frames proposed by various authors, in addition to that of Jones, as discussed separately (*Systems of Categories Distinguishing Cultural Biases*, 1993). Missing is the kind of self-reflexivity identified by the philosopher Antonio de Nicolas (*Habits of Mind: an introduction to clinical philosophy*, 2000)

## Psychosocial dimension missing from discussion of magic squares

As noted., there is a very extensive literature on magic squares, typically as a preoccupation of so-called "[recreational mathematics](#)". Whilst according that they are "magical", there is seemingly no comment on their psychosocial implications -- other than as a distraction for the mathematically inclined (Clifford A. Pickover, *The Zen of Magic Squares, Circles, and Stars: an exhibition of surprising structures across dimensions*, Princeton University Press, 2002).

Clearly such organization has a function, as explored by composers -- and upheld as of significance by architects (Jenny Kile, *The Sagrada Familia Magic Square Designed by Josep Subirachs*. *Mysterious Writings*).

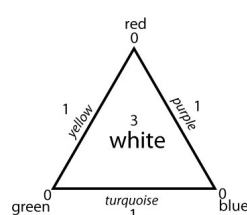
It is of course the case that the theme invites a wide variety of imaginative speculation (Michael Ross, *The Nature of the Occult within the Zhuangzi: an analysis of the sage, shaman, and esoteric geomancy*, *Sacred Ladder*, 15 July 2010; Hans Konstapel *Magic Square*, Constable Research; Marty Leeds: *Eleventy One and the Magic Square of the Sun*, *World Mysteries*, 14 March 2013). Such speculation is readily deprecated by mathematicians -- whilst the attitude of [speculative freemasonry](#) in that regard remains necessarily unknown.

**Irresponsibility of mathematicians?** It is much to be regretted that, as the discipline most skilled in the study of relationships, mathematics is currently most closely associated with enhancing military and invasive security initiatives -- typically resulting in ever greater numbers of fatalities. Most research in mathematics is directly or indirectly funded as defence research.

Applications for peaceful purposes are a far lower priority and scarcely recognized (Johan Galtung and Dietrich Fischer, *Peace Mathematics: mathematics of, by and for peace*, Transcend University, 2012; Paul Ernest, *Values and the Scoail Responsibility of Mathematics*, 1998; Susan Landau, *Mathematicians and Social Responsibility*, *Notices of the American Mathematical Society*, 1997). Potentially especially fruitful at this time are the articulation of matters of belief in mathematical terms (*Mathematical Theology: Future Science of Confidence in Belief*, 2011).

**Incommunicability of what is missing?** Of particular relevance to what is missing is the study from a mathematical perspective by [Ronald Atkin](#) (*Mathematical Structure in Human Affairs*, 1974; *Multidimensional Man: can man live in 3-dimensional space?* 1981). The argument of the latter is discussed separately in relation to a colour triangle (*Systematic Analysis of Incommunicability*, 2008).

The perceptual significance of Atkin's approach through [Q-analysis](#) is well-illustrated by visual sensitivity to colours resulting from the three primary hues (red, green and blue). These may be represented on a simple triangle. Here the vertices (O-simplexes) represent the primary hues, the sides are twofold combinations (1-simplexes), and the combination of the three hues makes the central white (2-simplex).



### 0-dimension vision:

--- Red, Green or Blue

### 1-dimension vision:

--- Yellow (=Red/Green);

--- Purple (=Red/Blue); or

--- Turquoise (=Blue/Green)

### 2-dimension vision:

--- White (=Red/Green/Blue)

Now to be able to see all the colours, including white, a person's vision needs to have the ability to function within the triangle as 2-dimensional "traffic" on that geometry, moving from location to location adjusting to the complexity of the geometrical structure which carries the visual traffic. If the person's vision is 1-dimensional, then white could not be perceived because the visual traffic of seeing is restricted to the edges and vertices only.

If the person's colour vision is 0-dimensional, then it is restricted to the vertices. It can only see one vertex colour at a time and never a combination (as represented by an edge). If vision was 3-dimensional, it would allow traffic throughout the geometry, but would perceive other colours as well, calling for a fourth vertex (forming a tetrahedron) in order to contain the full range of combinations.

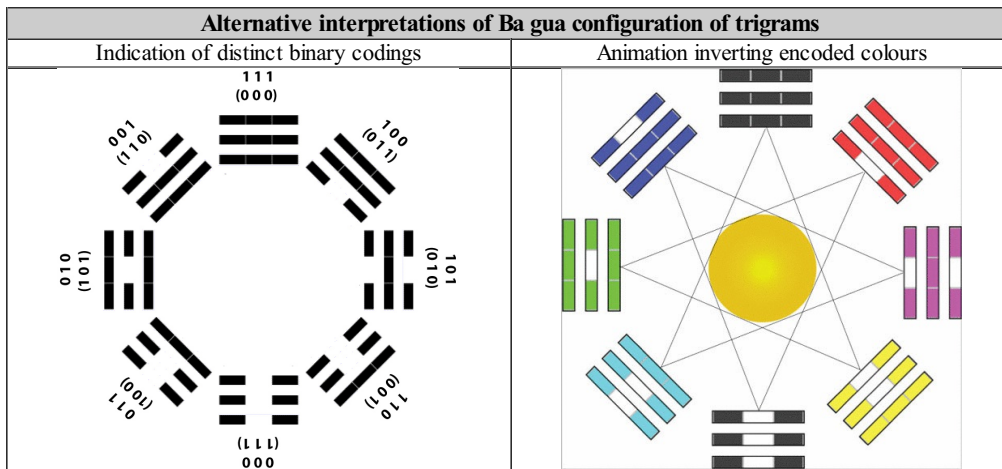
The approach is of especial relevance to the manner in which issues of governance navigate "around" issues calling for higher dimensional comprehension, thereby circumventing any need to engage with them, as discussed separately (*Lipoproblems: Developing a Strategy Omitting a Key Problem -- the systemic challenge of climate change and resource issues*, 2009). Any such "truth" is inherently inconvenient (*An Inconvenient Truth about any inconvenient truth*, 2008).

## Appreciating lying as dyeing

One means of clarifying this is offered by a configuration of trigrams in the *Ba Gua* pattern. The trigram lines can be represented by a binary code (1 or 0), recognizing that "1" can be attributed either to a full-line or to a broken-line -- giving alternative encodings. The

configuration of three full-lines (*yang*) could then be associated with "truth", with the three broken-lines associated with "error" (*yin*) -- reflecting a common cultural deprecation of the feminine (*yin*) by the masculine (*yang*).

However the ambiguity of use of such encoding can be usefully illustrated by recognition that "truth" could be more appropriately indicated by 0, with falsehood by 1 -- the inversion of the previous interpretation. The ambiguity can be further illustrated by using the 3-fold RGB colour coding convention whereby 8 basic colours can be defined by triplets (black = 000, white = 111, red = 100, etc). This is used in an animation (on the right below) -- exploiting the facility of inverting the colours (in Photoshop) to alternate between two colours for each of the trigrams in the configuration



Fortuitously the alternation between black and white coloration of the top-most and bottom-most trigrams offers a grey colour rather than pure white -- indicative of the problematic interpretation of either as "true" or "false", rather than "shades of grey". The right-hand animation is further augmented by insertion of a central circle suggestive of a form of truth which transcends those interpretations.

Shifting metaphor, this is reminiscent of the more fundamental "truth" associated with the Sun in contrast with the periodic "truth" or "falsehood" associated with "light" and "darkness" in the diurnal cycle -- and the degrees of shading ranging from sunrise to sunset. The lines tangential to the "Sun" then suggest possibilities of distinguishing how "truth" may be "coloured" from various perspectives, with invisible positions ("in the dark") being necessarily associated with "falsehood". The situation is of course analogous to the perception from one "side" of the world that it is midday, with that on the other side being in absolute darkness.

The animation gives form to understandings of "shades of grey" and degrees of "lying". This is consistent with the "best answer" proposed by *Yahoo Answers* for the question: *What does "white lie" and "black lie" mean?* (2005):

Whats the difference between a white lie and a black one. Little, if anything. A white lie for someone is someone else's black lie... But it is a white lie people will say, because it doesn't impact people's lives does it? .... There is no white lie, or no black lie. Every lie is a grey lie. Some lies are greyer than others, but every lie is a shade of grey, because just like Black and White TV was always grey, life is the same. A multitude of greys. Lies are the same.

The animation also offers a framing of the sense of "colourful lies" -- or "colourful tales" -- and the question *Why would anyone lie? The truth is always more colorful....???*

## Knight's move thinking in relation to magic squares

The argument can be taken further through understanding of the movement of a Knight over a chess board (and its equivalent, *Keima*, in the game of *go*). In contrast with other pieces in chess, the movement is non-linear. It includes a bend, with the final move being at right angles to the previous three. This non-linearity is variously appreciated as emblematic of creative originality and deprecated as a **thought disorder**, as discussed separately (*Knight's move thinking: appreciated or deprecated*, 2012). The appreciation is evident from its use on the coat of arms and insignia of several of the U.S. Army **Military Intelligence Battalions** -- some of which were allegedly involved in the questionable processes in the **Abu Ghraib prison**. The 312th, for example, has as its motto: *Semper Veritas* (Always the Truth).

The argument is developed here by exploiting a widespread degree of familiarity with chess -- also known as the Great Game. Chess is a framing notably used in the much-translated study by **Zbigniew Brzezinski** (*The Grand Chessboard: American primacy and its geostrategic imperatives*, 1998). Related arguments could be developed in terms of other board games, notably checkers/draughts or *go*. The latter bears comparison in the light of the work of **Scott Boorman** (*The Protracted Game: a wei ch'i approach to Mao's revolutionary strategy*, 1971) -- which demonstrated that with respect to Vietnam, China was playing *go* strategically against the American expertise in playing chess.

Animation of possible Knight's moves on 3x3 magic square (columns, rows and diagonals total to 15)	
Counter-clockwise	Clockwise

4	9	2
3	5	7
8	1	6

4	9	2
3	5	7
8	1	6



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