

Religion and Science

Some people (such as Sean of the Cosmic Variance blog) attack all religion, saying:

"... when I say over and over again that my beef with **religion** is that it's **false** ... I really mean it! ...".

On the other hand, **religion seems to be important to many people**. For example, the elected representatives of the citizens of the USA (435 members of the House of Representatives and 100 Senators of the 110th Congress being sworn in on 4 Jan 2007), a CNN web page (Reuters article) at <http://www.cnn.com/2007/POLITICS/01/03/congress.religion.reut/> gives their stated religious affiliations as: "...

- Catholic 155;
- Baptist 67;
- Methodist 61;
- Presbyterian 44;
- Jewish 43;
- Episcopal 37;
- Protestant nondenominational 26;
- Christian nondenominational 18;
- Lutheran 17;
- Mormon 15;
- United Church of Christ 7.
- Eastern Orthodox 5;
- Christian Science 5;
- Assemblies of God 4;
- Unitarian Universalist 2;
- African Methodist Episcopal 2;
- Buddhists 2;
- Evangelical 2;
- Seventh Day Adventists 2;
- Christian Reformed 2;
- Disciples of Christ 2;
- Church of Christ 2;
- Congregational Baptist 1;
- Anglican 1.
- Reorganized Mormon 1;
- Quaker 1;
- Church of God 1;
- Muslim 1;
- Evangelical Lutheran 1;
- Church of the Nazarene 1;
- Evangelical Methodist 1.
- No affiliation 6. ...".

As someone who believes in religion, and that religion is consistent with science, and, further, that religion (properly interpreted) shows a path to scientific truth, I am writing this page to describe **how I think religion and science fit together.**

Einstein (in the New York Times Magazine on November 9, 1930 pp 1-4) described **Three Stages of Human Religion:**

"... what are the feelings and needs that have led men to religious thought and belief in the widest sense of the words?"

[Stage 1 - Religion of Fear]... With primitive man it is above all fear that evokes religious notions - fear of hunger, wild beasts, sickness, death. Since at this stage of existence understanding of causal connections is usually poorly developed, the human mind creates illusory beings more or less analogous to itself on whose wills and actions these fearful happenings depend. Thus one tries to secure the favor of these beings by carrying out actions and offering sacrifices which, according to the tradition handed down from generation to generation, propitiate them or make them well disposed toward a mortal. In this sense I am speaking of a religion of fear ... stabilized by the formation of a special priestly caste which sets itself up as a mediator between the people and the beings they fear, and erects a hegemony on this basis.

[Stage 2 - Religion of Morals]... The desire for guidance, love, and support prompts men to form the social or moral conception of God. This is the God of Providence, who protects, disposes, rewards, and punishes; the God who, according to the limits of the believer's outlook, loves and cherishes the life of the tribe or of the human race, or even or life itself; the comforter in sorrow and unsatisfied longing; he who preserves the souls of the dead. This is the social or moral conception of God. ... In general, only individuals of exceptional endowments, and exceptionally high-minded communities, rise to any considerable extent above this level.

[Stage 3 - Cosmic Religion] But there is a third stage of religious experience ... I shall call it cosmic religious feeling. It is very difficult to elucidate this feeling to anyone who is entirely without it ... The individual feels the futility of human desires and aims and the sublimity and marvelous order which reveal themselves both in nature and in the world of thought. Individual existence impresses him as a sort of prison and he wants to experience the universe as a single significant whole.

... all religions are a varying blend ...

The beginnings of cosmic religious feeling already appear at an early stage of development,

e.g., in many of the Psalms of David and in some of the Prophets. Buddhism ... contains a much stronger element of this. The religious geniuses of all ages have been distinguished by this kind of religious feeling, which knows no dogma and no God conceived in man's image; so that there can be no church whose central teachings are based on it. ... Looked at in this light, men like Democritus, Francis of Assisi, and Spinoza are closely akin to one another. ...

In my view, it is the most important function of art and science to awaken this feeling and keep it alive in those who are receptive to it. ... I maintain that the cosmic religious feeling is the strongest and noblest motive for scientific research.

Only those who realize the immense efforts and, above all, the devotion without which pioneer work in theoretical science cannot be achieved are able to grasp the strength of the emotion out of which alone such work, remote as it is from the immediate realities of life, can issue.

What a deep conviction of the rationality of the universe and what a yearning to understand ... Kepler and Newton must have had to enable them to spend years of solitary labor in disentangling the principles of celestial mechanics!

Those whose acquaintance with scientific research is derived chiefly from its practical results easily develop a completely false notion of the mentality of the men who, surrounded by a skeptical world, have shown the way to kindred spirits scattered wide through the world and through the centuries. ...

It is cosmic religious feeling that gives a man such strength. ...".

Since Einstein said that the "beginnings" of Stage 3 Cosmic Religion "already appear at an early stage of development" of Human Religion, I will comment on Cosmic Religion aspects of Human Religions starting with very early times

Since Einstein referred to Spinoza as a "religious genius ... distinguished by ... cosmic religious feeling", my comments will come from a Spinoza - Pantheist - Taoist perspective. According to the Stanford Encyclopedia of Philosophy:

"... A defining feature of pantheism is allegedly that God is wholly immanent ... pantheism denies the theistic view that God transcends the world ...

the most complete attempt at explaining and defending pantheism from a philosophical perspective is Spinoza's Ethic ...

philosophical Taoism is one of the best articulated and thoroughly pantheistic positions there is ...".

So that I can discuss how such religion fits together with science, here is an outline of how I see science, taken from comments (by NC and B. and Count Iblis and me) on the Cosmic Variance blog:

NC said: "... the idea that genes drive evolution ... is stopping off at an arbitrary point in the long chain of causality. The only scientific thing ... to do, ... searching for ultimate causes, is to not stop at genes but go on a step and tell us about how 'selfish background radiation' drives evolution ...".

I said: "... Once background radiation is brought into play, from a pantheistic view, you get to Dave Rothstein's

possibility of "God intervening every time a [quantum event] measurement occurs". ...".

B. said: "... Instead of asking where the universe comes from, ask where the natural numbers 'come from'. ... Is maths the foundation for the theory of everything? ...".

Count Iblis said: "... That's a good question and that has lead some people to postulate that reality is purely mathematical in nature. ... You can define them [the natural numbers] recursively:

- $0 = \{ \}$ (empty set)
- $1 = 0 \cup \{0\} = \{0\}$
- $2 = 1 \cup \{1\} = \{0,1\}$
- etc. ...";

B. said: "... in the end you'll sit in this field of complex numbers, and every one of them is just a point in a plane. Does C have a cause? ...".

I said: "... If you want to continue the process, you might note that

- C is the real Clifford algebra $Cl(0,1;R)$, and
- you can go from there on to real Clifford algebras of arbitrarily high dimension.
- Since bivectors give you Lie algebras, you get gauge-group-type things, and
- you might think of spinors as fermions, and
- think of the vector space as spacetime, and
- even try to put such things together to form Lagrangians ... and
- see where Einstein-type faith might lead. ...".

So, my picture of science is very much like my physics model based on real Clifford algebras, which can be described (due to periodicity-8) in terms of the $2^8 = 256$ -dimensional Clifford algebra $Cl(8)$.

Given that picture of science, here are a few comments (by no means a complete listing or discussion) about how I see that **Science fits with Human Religions**:

1 - IFA: Since humans seem to have come out of Africa, the first Religion I will mention is IFA, also known as VoDou. Western views of IFA often emphasize Stage 1 - Fear Religion aspects (casting spells etc), but the IFA divination system has an important Stage 3 - Cosmic Religion aspect: It is based on a $2^8 = 256$ element structure that leads us to the $2^8 = 256$ -dimensional Clifford algebra $Cl(8)$.

2- Rig Veda: According to The Constitution of the Universe by Maharishi Mahesh Yogi "... The knowledge of

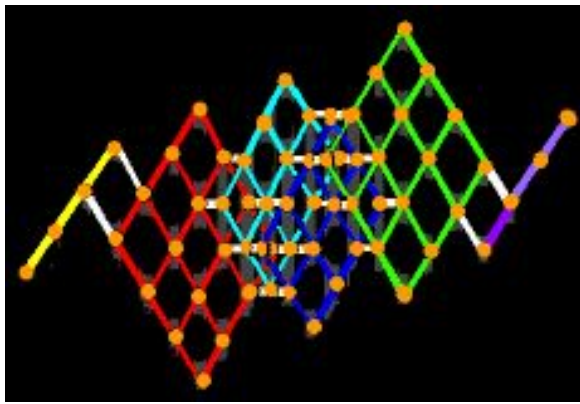
the total Ved ... is contained in the first sukt of the Rik Ved ... the eight syllables of the first pad ... provide... a further commentary on ... the first syllable of Rik Ved, 'AK'. These eight syllables correspond to the ... eight fundamental qualities of intelligence ... The first line, or 'richa', of the first sukt, comprising 24 syllables, provides a further commentary on the first pad (phrase of eight syllables) ... The subsequent eight lines complete the remainder of the first sukt ... These eight lines consist of 24 padas (phrases), comprising $8 \times 24 = 192$ syllables. ... these 192 syllables of the first sukt (stanza) get elaborated in the 192[?or is it 191?] suktas that comprise the first mandal (circular cyclical eternal structure) of the Rik Ved, which in turn gives rise to the rest of the Ved and the entire Vedic literature. ...".

Since the first richa of the first sukt has 24 syllables plus 24 gaps (if you include a silent gap at the beginning/end to close the first sukt into a circle) and those 24 gaps are made relevant by being elaborated by the following 8 richas of the first sukt, which have 192 syllables, the total number of relevant entities in the first sukt is $24 + 24 + 192 = 240$, which is the number of vertices of the root vector polytope of the E8 Lie algebra. Since the E8 Lie algebra has rank 8, it has dimension $240 + 8 = 248$, and can be seen as 120-dim Spin(16) adjoint plus 128-dim Spin(8) half-spinors, where Spin(16) is the bivector Lie algebra of the Cl(16) Clifford algebra, and $Cl(16) = Cl(8) \otimes Cl(8)$.

In my opinion, the Rig Veda may be the earliest reduction to writing of the original African-based orally transmitted early global wisdom of IFA = VoDou, and, as the earliest, it may be the most nearly complete written description of that wisdom.

3 - Shinto: The Japanese Religion named for the Spirit (Shin) of the Tao (to), whose divination system has 128 elements that call attention to the even half of the $2^8 = 256$ -dimensional Clifford algebra Cl(8).

4 - Taoism: The Chinese Religion whose I Ching divination system has 64 elements that call attention to the $2^6 = 64$ -dimensional Cl(6) subalgebra of Cl(8), and in turn call attention to the Spin(2,4) Conformal Group that describes Gravity and the Higgs mechanism. The Clifford graded structure of Cl(6) is $1 + 6 + 15 + 20 + 15 + 6 + 1$ based on a 6-dim vector space on which the Conformal Group Spin(2,4) = SU(2,2) acts linearly. However, the Conformal Group also has a non-linear, but physically significant, action on a 4-dimensional vector space corresponding to 4-dimensional physical spacetime which is related to a grading $4 + 16 + 24 + 16 + 4 = 4 + 16 + (12+12) + 16 + 4$ which in turn is based on [the Lattice I Ching structure of Billy Culver](#)



where:

- the yellow 4 correspond to physical spacetime
- the red 16 correspond to the $U(2,2) = U(1) \times \text{Spin}(2,4)$ that gives Propagator Phase, Higgs, and Gravity with respect to physical spacetime;
- the cyan 12 correspond to the $SU(3) \times SU(2) \times U(1)$ Standard Model with respect to physical spacetime;
- the blue 12 correspond to the $SU(3) \times SU(2) \times U(1)$ Standard Model with respect to momentum space;
- the green 16 correspond the $U(2,2) = U(1) \times \text{Spin}(2,4)$ that gives Propagator Phase, Higgs, and Gravity with respect to momentum space;
- the purple 4 correspond to momentum space.

5 - Judaism: As Stan Tenen has noted, the 613 Commandments given to Moses, beginning with the first Commandment given in Egypt and ending with the 613th Commandment given 50 days later at Sinai, are divided into 365 negative Commandments and 248 positive Commandments. The 365 correspond to the central number in the 27x27 Magic Square, which corresponds to the 27-dim Jordan algebra $J_3(O)$ and the 248 correspond to the 248-dimensional Lie algebra E_8 and so to $Cl(8) \times Cl(8)$.



Urim v'Tumim is for communication from the Spirit Mind of G-d to Humanity:

- Urim takes Quantum Information in the form of the Quantum Code $[[256,0,24]]$ whose word length 256 corresponds to the 256 Odu of IFA and to the dimensionality of the $Cl(1,7)$ Clifford Algebra of the D4-D5-E6-E7-E8 VoDou Physics model) and transforms it into Classical Information in the form of the Golay Code $C_{24} [24,12,8]$. Thus it is said that Urim is like the light of observation that acts to decohere the superposed Quantum State to produce an observed decohered Classical State.
- The breastplate contains an array of 72 letters on stones corresponding to 3 binary 24-bit words of the Classical Golay Code $C_{24} [24,12,8]$. Each of the 3 columns of stones would carry 1 word. Each of the columns could then be regarded as an array of 4 rows, each row being 1 stone with 6 letters, making up a 4x6 array of letters, corresponding to the 4x6 array structure of the MOG (Miracle Octad Generator) and the hexacode $C_6 [6,3,4]$, whose letters are in the 4-element Galois Field $GF(4)$ and whose $3^4 = 64$ words have 6 letters.

- Tumim corresponds to symmetry structure of the Golay Code C24 [24,12,8], including its Steiner system S(5,8,24) and its symmetry group, the Mathieu group M24 of order $24 \times 23 \times 22 \times 21 \times 20 \times 48$. The symmetry/perfection/truth of Tumim allows for determination of whether or not each of the 3 words of the breastplate/stones/letters belongs in C24 and for correction of errors. Computational techniques of Tumim include the MOG and the hexacode C6.
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6 - Stoicism: Marcus Aurelius (121-180 AD) said:

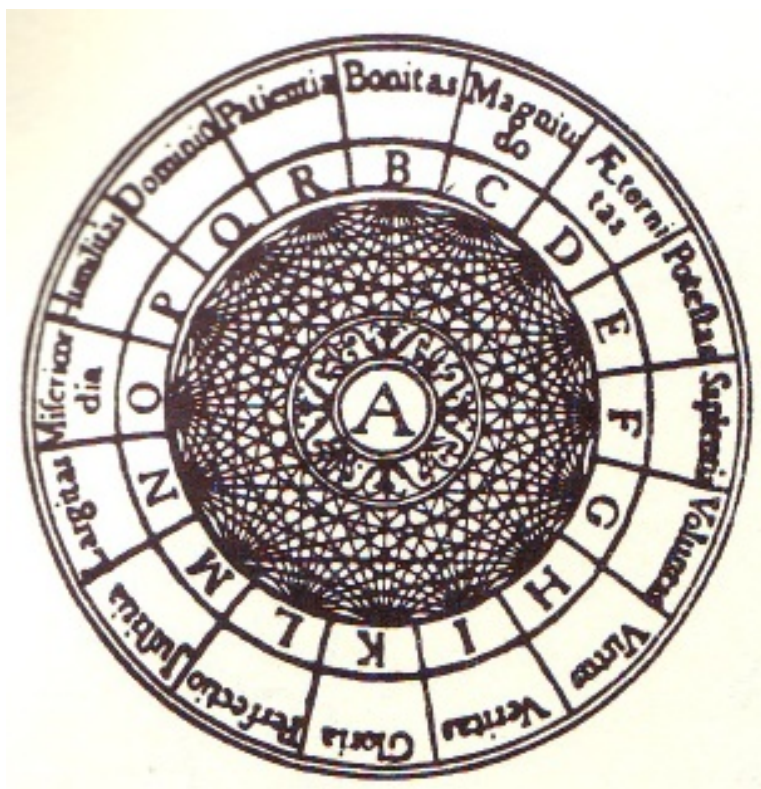
- The Mind of the universe is social. At all events, it has created the lower forms to serve the higher, and then linked together in a mutual dependence on each other. ... each and all are given their just due ... (Meditations V 30)
 - Always think of the universe as one living organism, with a single substance, and a single soul; and observe how all things are submitted to the single perceptivity of this one whole, all are moved by its single impulse, and all play their part in the causation of every event that happens. Remark the intricacy of the skein, the complexity of the web. (Meditations VII 9)
 - All parts of the Whole ... must suffer a change of form ... if dissolution is not simply a mere dispersion of the elements of which I am compounded, it must be a change of the grosser particles into earth-form, and the spritual into air-form, so that they can all be reabsorbed into the universal Reason ... (Meditations X 7)
 - It is possible to live on earth as you mean to live hereafter. But if men will not let you, then quit the house of life; though not with any feeling of ill-usage. "The hut smokes; I move out." ... (Meditations V 29)
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7 - Christianity: According to the Stanford Encyclopedia of Philosophy: "... Philosophical Taoism is the most pantheistic, but Advaita Vedanta, certain forms of Buddhism and **some mystical strands in monotheistic traditions are also pantheistic.** ... Pantheism... is antithetical to any power structure; the kind, for example, found in the Catholic church. ...". Some "mystical strands" of pantheism in Christianity have been excluded from doctrine of some power-structure Christian churches. For example:

- The Gospel of Thomas, according to which **Jesus said: "... Split a piece of wood, and I am there. Lift up the stone, and you will find me there. ..."**, was excluded from the canonical New Testament Gospels; and
- According to "The Historic Implications of the Kebra Nagast" in the book "The Kebra Nagast" edited by Gerald Hausman (St. Martin's Press, New York 1997): "... the Great Pyramid at Giza ..., as a mystical and scientific symbol and also as a practical architectural design and building structure, goes back ... to the Ethiopian roots of the world culture in Kemet. ... The authorized King James Bible, which first appeared in 1611, was ... going to include ... the Kebra Nagast ... However, the editors were told, presumably by the clergy - although it came down by royal decree - to excise the chapters which included the Kebra Nagast. ...".

According to the [Catholic Encyclopedia](#): "... Raymond Lully... **RAMON LULL** ... "Doctor Illuminatus", philosopher, poet, and theologian, b. at Palma in Majorca, between 1232 and 1236; d. at Tunis, 29 June, 1315. Probably a courtier at the court of King James of Aragon until thirty years of age, he then became a hermit and afterwards **a tertiary of the Order of St. Francis**. ... he strove to ... **expound Christian theology** in such a manner that the Saracens themselves could not fail to see the truth ... he invented a mechanical contrivance, a logical machine, in which ... causing a wheel to revolve, the propositions would arrange themselves in the affirmative or negative and thus prove themselves to be true. This device he called the *Ars Generalis Ultima* or the *Ars Magna*, and to the description and explanation of it he devoted his most important works. Underlying this scheme was a theoretical philosophy, or rather a theosophy, for the essential element in Raymond's method was the identification of theology with philosophy. ... He held that there is no distinction between philosophy and theology, between reason and faith, so that even the highest mysteries may be proved by means of logical demonstration and the use of the *Ars Magna*. This of course removed all distinction between natural and supernatural truth. ... The Church authorities, however, recognized the dangerous consequences which follow from the **breaking down of the distinction between natural and supernatural truth. Consequently, in spite of his praiseworthy zeal and his crown of martyrdom, Raymond has not been canonized.** His rationalistic mysticism was formally condemned by Gregory XI in 1376 ...". According to [a 1973 article, "Ten Men of the Church before 1500"](#), by [Bob Sander-Cederlof](#): "... Lull was himself a layman, was never ordained, and never became a monk. This certainly contrasted to the priestcraft of Catholicism ...[another]... significant contrast was Lull's desire to evangelize the Moslems rather than to conquer them by force. He abhorred the Crusades, and urged the church to begin a crusade of love. ...". According to Stephen Skinner's book "Terrestrial Astrology - Divination by Geomancy" (Routledge and Kegan Paul 1980): "... many of Ramon Lull's wheels ... look like geomantic wheels [[LoPan](#)] ...

[wheel A



is]... divided into 16 chambers ... 120 more "chambers" were formed by combining pairs ...

[Note that the 120 correspond to the adjoint part of E8, and to the 120 bivectors of Cl(16) which by real Clifford 8-periodicity is equal to Cl(8) (x) Cl(8).

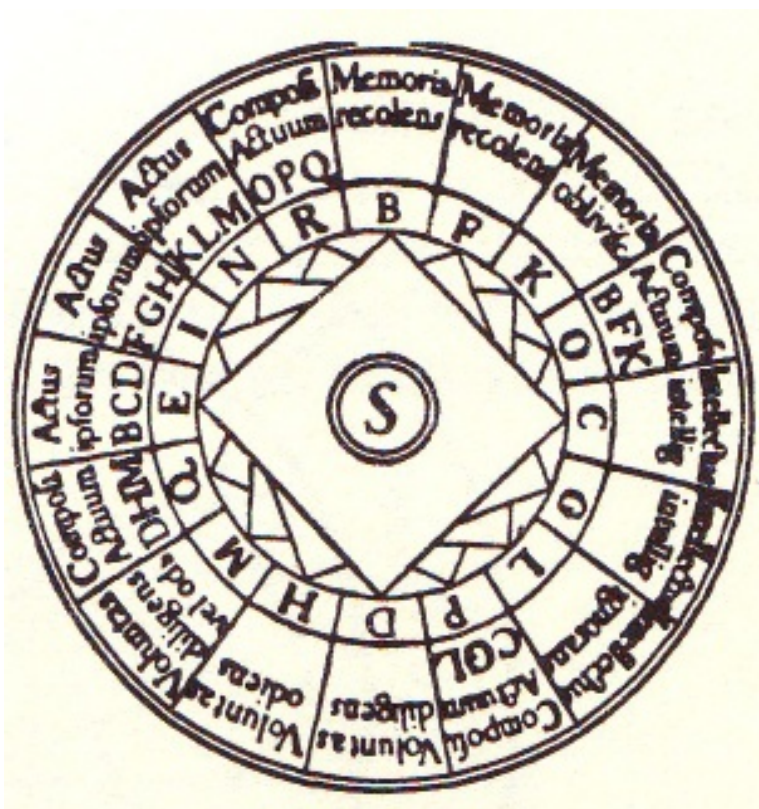
Which of the 120 Spin(16) bivectors (that act on the 16-dim vector space of Cl(16)) act naturally on the 8-dim vector spaces (that are subspaces of the Cl(16) vector space) of each of the 2 copies of Cl(8), and which of them have actions that go beyond those subspaces ?

Since $(N+N) \wedge (N+N) = (N+N) ((N+N) - 1) / 2 = N (N + (N-1)) = N^2 + 2 \times N \wedge N$ and for $N = 8$ we have $120 = 16 \wedge 16 = 64 + 2 \times 28$ so that:

$2 \times 28 = 56$ of the 120 Cl(16) bivectors act naturally on the 8-dim subspaces, and they correspond to two copies of the 28-dim Spin(8) Lie algebra, as shown by Lull's wheel X.]

... Another circle ...

[wheel S



]... shows the rational soul in the center represented by 4 squares and has its circumference divided into 16 compartments ...

[Note that 16 vertices of 4 squares correspond to the 16 vertices of a hypercube inside a 24-cell, and that the 16 of 4 squares times the 16 of the compartments gives the 256 elements of Cl(8).

Note also that here the 16-dim vector space of $Cl(16)$ is decomposed into $(4+4) + (4+4)$ so that we have $Cl(16) = Spin(4+4) \times Spin(4+4)$ and this decomposition is relevant to dimensional reduction of 8-dim spacetime by introducing a preferred 4-dim quaternionic subspace spacetime into 8-dim octonionic spacetime, so that Lull's wheel S is relevant to see how the 28 generators of $Spin(8)$ decompose when 8-dim spacetime freezes out into 4-dim physical spacetime plus 4-dim internal symmetry space.

The $4 \times 4 = 16$ vertices of the 4 squares represent 16 of the 28 $Spin(8)$ bivector gauge boson generators. They correspond to the $4 \times 4 = 16$ -dim Lie algebra $U(4) = U(1) \times SU(4)$ that is represented using the exterior algebra $\wedge(4)$ with graded structure $1 + 4 + 6 + 4 + 1$

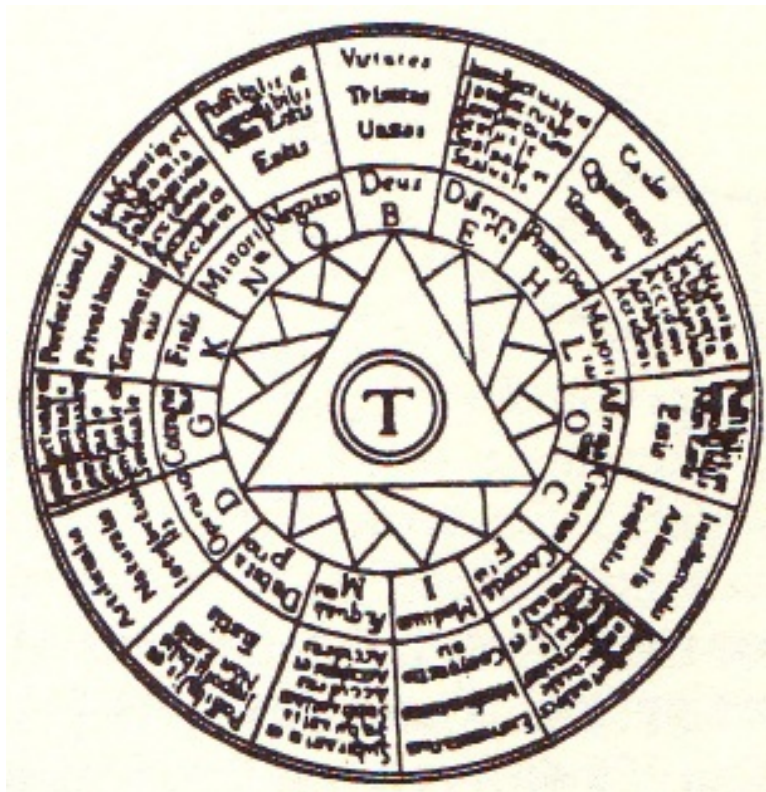
The even subalgebra with graded structure $1 + 6 + 1 = 1 + 3 + 3 + 1 = 8$ -dimensions gives the 8 gluon generators of $SU(3)$ of color force. It accounts for 2 of the 4 squares.

The other 2 squares correspond to the odd part of $U(4)$ with graded structure $4 + 4$ where the two 4 are Hodge duals of each other and are the two fundamental representations of $4 \times 4 = 16$ -dimensional $U(4)$. Since Hodge duality connects physical spacetime to momentum space, the first 4 is the only one that acts as gauge generator in physical spacetime (the other 4 acting in the dual momentum space), and it corresponds to 4-dimensional $U(2) = U(1) \times SU(2)$. The $U(1)$ represents the electromagnetic photon and the $SU(2)$ represents the 3 weak bosons.

The dual 4 (the fourth 4 of the squares) describes the $U(2)$ action in momentum space, and does not represent any further force gauge generators, so Lull's wheel S gives 12 of the 28 $Spin(8)$ generators as the $SU(3) \times SU(2) \times U(1)$ of the Standard Model.]

... A third circle ...

[wheel T



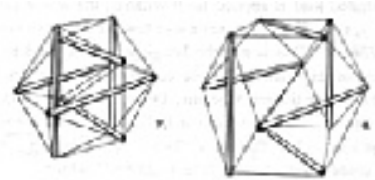
]... enclosed 5 triangles in a circumference of 15 compartments

[To find out how the remaining $28 - 12 = 16$ generators of Spin(8) work, consider that they correspond to 16-dimensional $U(2,2) = U(1) \times SU(2,2)$.

Use the U(1) to describe propagator phase, and look at the remaining 15 generators, which correspond to $SU(2,2) = Spin(2,4)$, the Conformal Lie algebra that gives the Higgs mechanism plus Gravity by a generalized MacDowell-Mansouri mechanism and the U(1) gives propagator phase.

Thus, through wheel S and wheel T, Lull shows how the Standard Model (including Higgs) and Gravity work after dimensional reduction of octonionic 8-dim spacetime to quaternionic 4-dim physical spacetime plus 4-dim internal symmetry space.

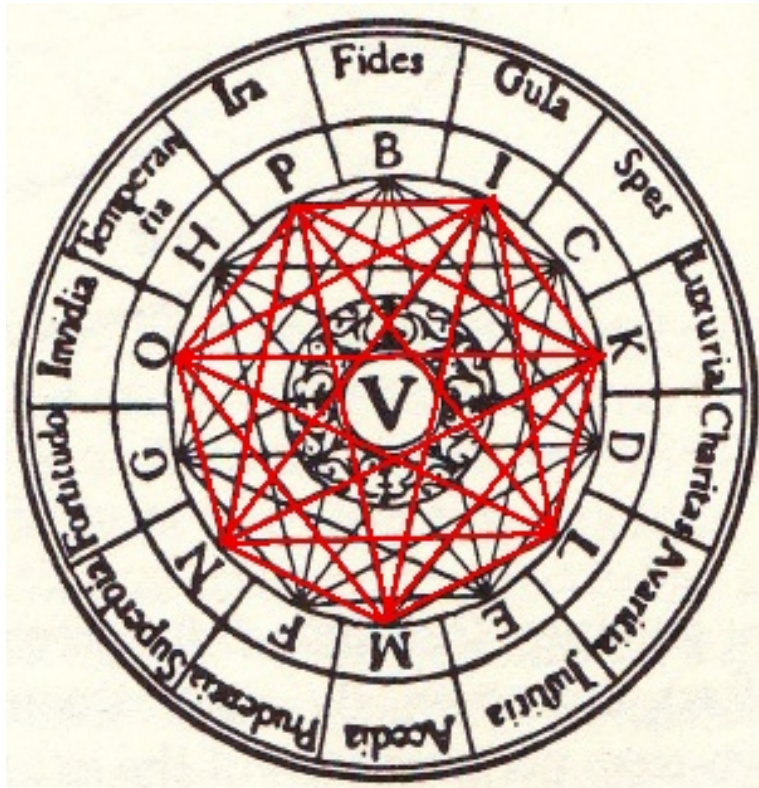
Note that the 5 triangles correspond to the pentagonal vertex figure of the icosahedron, which is related by Fuller tensegrity transformation



to the cuboctahedron which is the root vector polytope of Spin(2,4), the bivector algebra of the Cl(6) subalgebra of Cl(8), whose 15 dimensions correspond to the 15 compartments.]

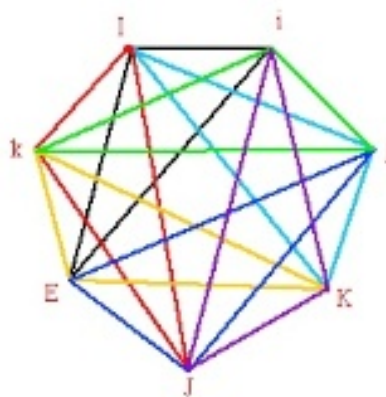
... a fourth circle ...

[wheel V



]... divided 14 compartments of its circumference between 7 virtues and 7 vices respectively rendered in blue and red ...".

[Here I have colored the wheel with black and red instead of blue and red. Compare the Heptagon of Imaginary Octonions:

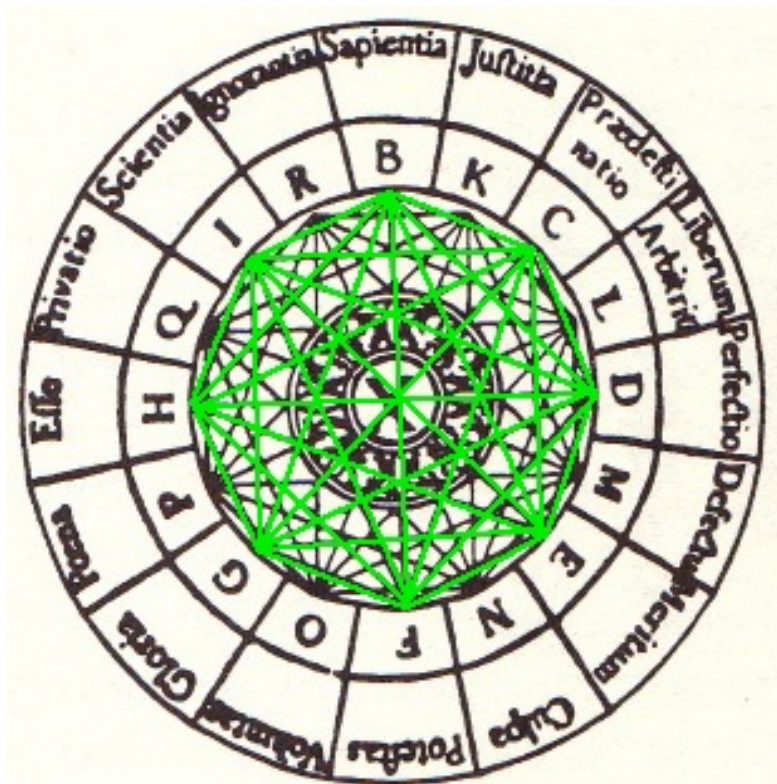


Note that the 14 compartments correspond to the 14 dimensions of the G_2 Lie group of the automorphisms of the Octonions, and that the two $7s$ correspond to the two S^7 7-spheres that, combined with G_2 , make up the 28-dimensional Lie group $Spin(8)$ of the bivectors of $Cl(8)$.

Note also that Lull shows 42 lines of pairs, made up of 2 sets of $21 = \dim \text{Spin}(7)$, where one $\text{Spin}(7)$ has the standard embedding in $\text{Spin}(8)$ due to $S7 = \text{Spin}(8) / \text{Spin}(7)$ and the other $\text{Spin}(7)$ has the Clifford embedding in $\text{Spin}(8)$ due to $S7 = \text{Spin}(7) / G2$.

There are 2 Clifford embeddings of $\text{Spin}(7)$ in $\text{Spin}(8)$, corresponding to + and - half-spinors of $\text{Spin}(8)$ as to which Lull's wheel X is relevant, and all 3 embeddings (1 standard and 2 Clifford) are related by triality. See the book "Clifford Algebras and the Classical Groups (Cambridge 1995) by Ian Porteous.]

The above images of wheels A, S, T, and V are from Martin Gardner's paper "The Ars Magna of Ramon Lull (reprinted in his book "Science: Good, Bad and Bogus (Prometheus Books 1989)) in which he says: ".. Lull's figure X



employs 8 pairs of traditionally opposed terms ... arranged in alternate blue and green compartments ...

[Here I have colored the wheel with black and green instead of blue and green. Note that the $8+8 = 16$ elements set out as two sets of 8 opposed pairs corresponds to the 8 +half spinors and their mirror image 8 -half spinors of $\text{Spin}(8)$ and $\text{Cl}(8)$.

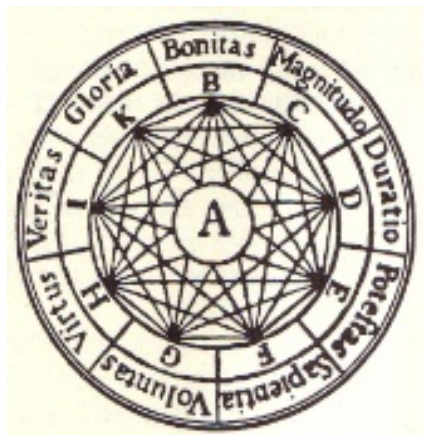
Note also that Lull shows 56 lines of pairs, made up of 2 sets of $28 = \dim \text{Spin}(8)$, where one $\text{Spin}(8)$ is the bivectors of $\text{Cl}(8)$ which act on the $\text{Cl}(8)$ vectors of 8-dim spacetime and the other $\text{Spin}(8)$ is the $\text{Cl}(8)$ Hodge dual of the bivectors, and acts in momentum space.]

Figures Y and Z are undivided circles signifying, respectively, truth and falsehood. ...

[Note that Y and Z correspond to Yin and Yang, and the basic binary duality used to construct

Clifford algebras including but not limited to $2^8 = 16 \times 16 = 256$ -dimensional $Cl(8)$.]

Some of... Lull's ... works are brief, popular versions for less intellectual readers ... For example, the categories of certain basic figures are reduced from 16 to 9 ... These simpler ninefold circles



[Note that the 9 chambers combine by forming pairs to produce 36 more "chambers" corresponding to 36-dimensional adjoint representation of the $Spin(9)$ Lie algebra, which when combined with its $8+8 = 16$ -dimensional representation of $Spin(9)$, produces the 52-dimensional Lie algebra F_4 whose Lie group is the automorphism group of the 27-dimensional Jordan algebra $J_3(O)$. F_4 can be regarded as a real version of the 78-dimensional Lie algebra E_6 .]

are the ones encountered in the writings of Bruno ... and ... in Hegel's description of the Art ...

Fifty years after Lull's death ... Dominican inquisitors ... succeeded in having Lull condemned as a heretic by a papal bull, though later church officials decided that the bull had been a forgery. Lullist schools, supported chiefly by Franciscans, flourished mostly in Spain but also in other parts of Europe. ... Bruno's first and last published works, as well as many in between, were devoted to ... the method, notably "The Compendious Building and Completion of the Lullian Art". ...".

According to [a Tarot University ArkLetters article by Christine Payne-Towler](#): "... In the late 1200's, Raymond Lully perfected from this historical welter of worlds, correspondences, and entities an alphabetic synthesizing tool in the form of wheels within wheels. ... Over time Lull adjusted his invention until he had winnowed it down to the fewest movable parts holding the maximum possible meanings. ... Marsha Schuchard quotes Lull's scientific biographer F. D. Pring-Mill, who "...thus includes Lull's ars combinatoria among the forerunners of modern symbolic logic and computer science, 'with its systematically exhaustive consideration of all possible combinations of the material, reduced to a symbolic coding.'" ... the **Tarot quite likely represents the next level of Lull's systematized combinatory style of thinking**, only this time physically untethered from any formal organizing principle such as the wheels-within-wheels format that Lull pioneered. ...".

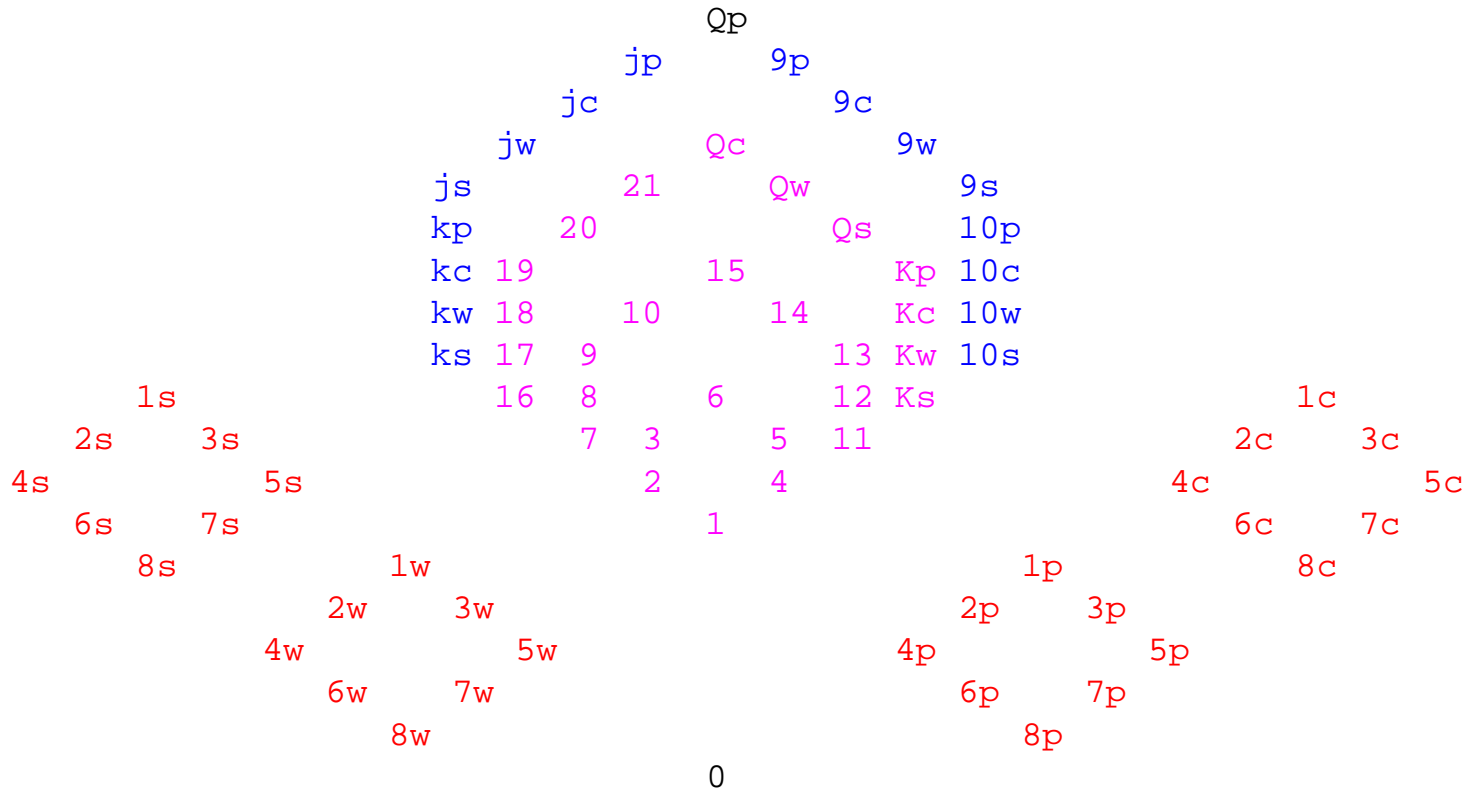
According to [a "Magic and the Early Tarot" article by Robert O'Neill](#): "... The historical evidence overwhelmingly demonstrates that the Tarot was designed in the 15th century in northern Italy. The specific symbols and the

number of cards appear to have evolved, starting about 1420 or even earlier. ... it is clear that there are many ties between the Tarot symbols and the magic of the 15th century. ... Lullism, etc. played an integral role in the everyday lives of the Italian city states. ... But it is important to recognize that the magic was not secret or pagan, it was Christian, public, and for the most part quite orthodox. ...".

Here is a 78-card Tarot Spread corresponding to E6 of my physics model:

8s, 8w, 8c, 8p, (neutrinos) and 0 and Qp (complexifications) are the E6 Cartan subalgebra elements.

The other 72 correspond to the 72 letters on the Urim v'Tumim breastplate.



- The magenta 28 are the 28 Spin(8) adjoint bivectors of Cl(8).
- The 16 blue are the 8 vectors of Spin(8) and Cl(8) and their 8 dual/conjugates.
- The 32 red are the 16 spinors (8 +halfspinors and 8 -halfspinors) of Spin(8) and Cl(8) and their 16 dual/conjugates.
- The 2 black are diagonal degrees of freedom in 26-dim traceless J3(O)o part of J3(O) Jordan algebra.

8 - Sufism: Here are some correspondences between the Sufi Ideas of Ibn Arabi and D4-D5-E6-E7-E8 VoDou Physics:

The One ([ahadiyah](#))

[the empty set](#)

or Absolute Unity
which needs no Names

Oneness ([wahidiyah](#))
or Absolute possessing
characteristics which are
the Divine Names

[binary separation into opposites](#)
described by
all real [Clifford Algebras](#)
Cl(N)

[thabita](#) are archetypes
or fixed prototypes

structures of Cl(8) = Cl(1,7)
that are fundamental components
of all Cl(8N)
[Cl\(8N\) = Cl\(1,7\) x...\(Ntensors\)...x Cl\(1,7\)](#)

The 256 elements of Cl(8) correspond
to the 256 Odu.

The structures of Cl(8) include
+/- half-spinor fermion particles
and antiparticles
vector spacetime
bivector gauge bosons

The 256 elements of Cl(8) correspond
to [the 256 Odu](#)

[mumkinat](#) are possible things

possible configurations of [archetypes](#)
forming quantum possibilities
i.e., worlds of the Many-Worlds
and Bohmian beables

[gada](#) is a decisive judgment

[dechoherence of a quantum superpostion
of possibilities](#), i.e.,
choice of which World of the [Many-Worlds](#)
at an event, or
choice made by [Bohm Guiding Potential](#)

[qadar](#) is the outcome of qada

[the World or State](#) that is seen to
come into physical existence at an event

[al-khalq al-jadid](#) is the
new world that is created at
the occurrence of every event

[the branching of the Worlds
of the Many-Worlds at each event](#)

[himmah](#) is the spiritual power
of an arif, or knower

[quantum consciousness resonant
connection](#)

[taskhir](#) bi-al-iradah is
constraining by will
whereby a higher order
constrains a lower,
taskhir bi-al-hal is
constraining by the state
or situation in which
a lower order constrains
a higher, and
both together form a cycle

[Sarfatti post-Bohm Quantum Back-Reaction](#)

[wujudiyah](#) is the cyclic ontology
of Divine self-manifestations by
new world creations

[Quantum Game of Many Fates](#)

Ramon Lull and Ibn Arabi:

According to the book "Shards of Love" (Duke 1994) by Maria Rosa Menocal: "... " ... Ibn 'Arabi and Ramon Llull lived ... from the end of the twelfth to the beginning of the fourteenth centuries. ...

the twelfth century ... provided ... a fertile base for ... the heterodox movements of kabbalists, Sufis, and varieties of Gnostics ... all at the same time in roughly the same geographical area. ... However ... a variety of repressions and isolations among the groups meant a virtually complete retreat from the various pluralisms, and it was in this reversal of climate ... that first Ibn 'Arabi and then Ramon Llull did their work. ...

Ibn 'Arabi ... born in Murcia in 1165 ... die[d] in Damascus in 1240 ... has ... been considered ... a pantheist ...

The textual similarities of Ibn 'Arabi's poetry with the poetry of the Zen tradition are striking ... Ibn 'Arabi's ... song, the most famous ... of his poems ... in the famous "pantheistic" verses toward the end ... the poet is suggesting ...

"...

My heart can take on
any form:

a meadow for gazelles,
a cloister for monks,
For the idols, sacred ground,
Ka'aba for the circling pilgrim,
the tables of the Torah,
the scrolls of the Qur'an.

I profess the religion of love;
wherever its caravan turns along the way,
that is the belief,
the faith I keep.

Like bishr,
Hind and her sister,
love-mad Qays and the lost Layla,
Mayya and her lover Ghaylan."

... that the varieties of experience of Love are not different from each other ...

Ramon Llull ... [was in 1235]... born in Mallorca ... still largely populated by Muslims and Jews ... [and]... [according to one account]... in 1316 ... was stoned to death in Tunis for preaching not just conversion but a union and re-union of opposites that no one could understand anymore. ...

Llull spent the decade after his conversion becoming ... proficient in Arabic ... and its philosophical traditions ... He emerges from those ten years ... eas[ily] ... absorb[ing] and reflect[ing] ... vibrant heterodoxies of both Islam and Judaism - the Sufis and the kabbalists ... and sets out preaching ... his ... Ars Magna, his magical book to end all books ... [in which]... he expresses his belief that all reality ... is a theophany ...

Ibn 'Arabi and Llull ... the Murcian and the Mallorcan ... believed that a reconciliation between their religions was possible ... Love, to paraphrase Ibn 'Arabi, was their religion and their text. ...".

It seems to me that such connections between Religion and Science refute the contention that "religion is false".

In conclusion, I quote with agreement and approval from the 2007 Edge commentary of Richard Dawkins

"... I [Richard Dawkins] am optimistic that the **physicists of our species will complete Einstein's dream**

[Einstein described his final theory as being "... **a theorem which at present can not be based upon anything more than upon a faith in the simplicity, i.e., intelligibility, of nature:** there are no arbitrary constants ... that is to say, nature is **so constituted that it is possible logically to lay down such strongly determined laws that within these laws only rationally completely determined constants occur** (not constants, therefore, whose numerical value could be changed without destroying the theory). ...".(see Wilczek's article in the Winter 2002 edition of Daedalus.)]

and discover the final theory of everything before superior creatures, evolved on another world, make contact and tell us the answer.

I [Richard Dawkins] am optimistic that, although the theory of everything will bring fundamental physics to a convincing closure, the enterprise of physics itself will continue to flourish ..."

and I remark that Dawkins's belief that Einstein's "cosmic religious feeling" will lead somebody (a la Newton and Kepler) to "discover the final theory of everything" shows that **Einstein's religion has a purpose (i.e., our universe is not pointless) and will fulfill that purpose (i.e., religion is not merely compatible with science, but is a moving force for advancement of science).**

[Tony Smith's Home Page](#)

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