24-fold Pattern Implied by Dynamics of the Lauburu in 3D

Visualization of the interplay of sets of voices in discourse

Introductory comment

The context for this uncompleted study is provided by several papers:

- *Improvisation in Multivocal Poetic Discourse: Basque lauburu and bertsolaritza as catalysts of global significance* (2016)
- *Cross, swastika variants and lauburu* (2008) as a section of *Sustainability through Magically Dancing Patterns* (2008)

Although the commentary to the argument of this paper has not been completed, the relevant animations have been completed, as indicated by the screen shots below -- and the links they provide to videos and 3D renderings.

<table>
<thead>
<tr>
<th>Screen shots and 3D animations of complementary &quot;voices&quot;</th>
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<tbody>
<tr>
<td>using the geometry of mutually orthogonal lauburu to frame pathways of emergence and reabsorption</td>
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<tr>
<td>Single-plane lauburu framework</td>
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<tr>
<td>8-voice dynamics</td>
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<tr>
<td>Video (mp4). Virtual reality (x3d, wrl)</td>
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The screen shots have been used as an illustration of "hyperbubbling", as discussed separately (*Psycho-social hyperbubbling: beyond one-bubble credibility and despair?* 2017). The patterns of emergence and reabsorption are variously reminiscent of the dynamics implied by the Tao symbol. The animation of the 8-bubble pattern in a single plane best clarifies the movements in the 16- and 24- bubble patterns.

Uncompleted tables

<table>
<thead>
<tr>
<th></th>
<th>kff-facing</th>
<th>both</th>
<th>right-facing</th>
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<tbody>
<tr>
<td>contract / expand</td>
<td>expand / contract</td>
<td>expand / contract</td>
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<tr>
<td>2D</td>
<td>through</td>
<td>through</td>
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| 1: single lobe  
(halfway thru transition) |  |  |
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<td>contract / expand</td>
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<td>through</td>
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<th>2: two lobes</th>
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<td>contract / expand</td>
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<td>through</td>
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<th>4: four lobes</th>
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<td>contract / expand</td>
<td>contract / expand</td>
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<td>through</td>
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<th>4: timing/phasing</th>
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<tr>
<td>3D</td>
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<th>12/24: six lobes timing/phasing</th>
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**Undigested notes**

- shading/wireframe -- shadow
- colours -- distinctions

**Construction?**

Complex relationship between

- geometry -- coordinates
- virtual reality software
- browser/view capability and norms and versions (VRML vs X3D)
- design / timing / phasing / dynamics
- interactivity
- colour distinctiveness (?)
- viewpoints
- competence

challenge of unit circle and Lauburu -- Peter Collins 2005?

**Alternatives**

- twist cylinder and put spheres on end
- use geometry of Lauburu
- use Mobius strip
- classic forms and any explorations of their 3D variants
  - Euler / Clothoid / Cornu
  - sphere rolling over
  - Fibonacci
  - log spiral
  - spiral
  - cone
  - horn (of plenty)
- whirlpool in 3D
Symbolism

cognitive wormhole white/black

transcendence of left and right preoccupation

Horn of plenty

Lauburu

4-fold: Integral quadrants, personality types, 4 stroke engine

6-fold: de Bono, 6 directions, 6 lines of hexagram, dorje, 6-stroke engine

8-fold: Ba Gua, personality types (introvert/ extrovert), 8-stroke engine

12-fold: 12 tribes (or their shadows), round-table, 12 voices

24-fold: 3x8, 6x4

24 chords/edges
24 radii—when constructed from 4 polyognal or circle planes
24 surface 60 degree angles
24 surface 90 degree angles
24 set of specific smaller right-triangles and right-angle tetrahedra
24 set of specific and larger right triangles right angle tetrahedra

Kabbalah

26-fold: 24+2 -- observation

M-theory

games

Interlocking

through merging and separating

whirlpool / blackhole / whitehole

Smith chart patterns

http://www.mathematische-basteleien.de/spiral.htm

Gur Harary, , Ayellet Tal 3D Euler spirals for 3D curve completion
(see video https://www.youtube.com/watch?v=O1wkKpyFYM0)

3D Discrete Clothoid Splines

Authors: Li Guiqing
Li Xianmin
Li Hua (http://dl.acm.org/citation.cfm?id=873343)

G2 transition

Cornu spiral 3D http://pyxplot.org.uk/examples/03d/02cornu/index.html has image

Mathematica has 3D image http://mathematica.stackexchange.com/questions/45264/plot-the-cornu-parametric-spiral

http://www.web3d.org/documents/specifications/19775-1/V3.2/Part01/components/nurbs.html

Non-uniform Rational B-Splines (NURBS)

Geogebra spline calculator
https://www.geogebra.org/m/qB1HYZSTQ

http://www.mathematische-basteleien.de/spiral.htm

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John Baez The Strangest Numbers in the Universe Scientific American, 5 May 2011

(Why 5, 8 and 24 Are

John Baez My Favorite Numbers
The Rankin Lectures, University of Glasgow
September 15-19, 2008
http://math.ucr.edu/home/baez/numbers/

The Strangest Numbers in String Theory
A forgotten number system invented in the 19th century may provide the simplest explanation for why our universe could have 10 dimensions


Before considering the following regarding John Baezs strangest and favorite numbers--- 24 being his most complex one ---I would remind the reader of the cubo(6)-octa(8)hedron aka as Fullers Vector Equilibrium and/or jitterbug/vector flexor, that, has;

Julia Galef Why you think you're right -- even if you're wrong TED Talk, February 2016

Erica Klarreich Mathematicians Chase Moonshine's Shadow Quanta, 12 March 2015
https://www.quantamagazine.org/20150312-mathematicians-chase-moonshines-shadow/

Researchers are on the trail of a mysterious connection between number theory, algebra and string theory.

Borcherds' discovery touched off a revolution in pure mathematics, leading to a new field known as generalized Kac-Moody algebras. But from a string theory point of view, it was something of a backwater. The 24-dimensional string theory model that linked the j-function and the monster was far removed from the models string theorists were most excited about. “It seemed like just an esoteric corner of the theory, without much physical interest, although the math results were startling,” said Shamit Kachru, a string theorist at Stanford University.

But now moonshine is undergoing a renaissance, one that may eventually have deep implications for string theory. Over the past five years, starting with a discovery analogous to McKay's, mathematicians and physicists have come to realize that monstrous moonshine is just the start of the story.

Since the 1990s, the connection between string theory and moonshine has led to further results in mathematics and physics.[108] In 2010, physicists Tohru Eguchi, Hirosi Ooguri, and Yuji Tachikawa discovered connections between a different sporadic group, the Mathieu group M24, and a certain version of string theory.[117] Miranda Cheng, John Duncan, and Jeffrey A. Harvey proposed a generalization of this moonshine phenomenon called umbral moonshine,[118] and their conjecture was proved mathematically by Duncan, Michael Griffin, and Ken Ono.[119] Witten has also speculated that the version of string theory appearing in monstrous moonshine might be related to a certain simplified model of gravity in three spacetime dimensions.[120]

https://en.wikipedia.org/wiki/Mathieu_group_M24
M24 is one of the 26 sporadic groups and was introduced by Mathieu (1861, 1873). It is a 5-transitive permutation group on 24 objects. The Schur multiplier and the outer automorphism group are both trivial.

The Mathieu groups can be constructed in various ways. Initially, Mathieu and others constructed them as permutation groups. It was difficult to see that M24 actually existed, that its generators did not just generate the alternating group A24. The matter was clarified when Ernst Witt constructed M24 as the automorphism (symmetry) group of an S(5,8,24) Steiner system W24 (the Witt design). M24 is the group of permutations that map every block in this design to some other block. The subgroups M23 and M22 then are easily defined to be the stabilizers of a single point and a pair of points respectively.

string -- 24 and seeing it -- discussion threads

Kabbalah and String Theory (1995)
Ten Dimensions
http://www.inner.org/string/string.htm

According to string theory, all of reality exists in (exactly) ten dimensions. There are four revealed dimensions (the three dimensions of space together with the fourth dimension of time) and an additional six concealed (spatial) dimensions.

In Kabbalah we are taught that God emanated from His infinite light (through the process of tzimtzum-the "contraction" of infinity) ten Divine lights or powers (sefirot) through which He created the universe. Each of these ten powers can be understood to be a "dimension" of reality. This is the ultimate reason that the Torah chooses the "perfect" number system to be the decimal system (as is said in the Torah: "The tenth shall be holy for God").
All ten dimensions are seen to be contained within the "point-string" (in the idiom of Chassidut, "a formed point" [in contrast to "an unformed point"], whose form resembles a tiny "string") of the letter yud = 10. The letter yud is the first letter of God's essential Name Havayah (whose full value equals 26, the sole other possible number of dimensions of the universe according to string theory).

The full spelling of the letter yud is: yud (10), vav (6), dalet (4). The two additional letters, the vav (6) and the dalet (4) themselves equal the original yud (10). The full spelling of the yud is thus to be understood as an equation: 10 = 6 plus 4. The 10 dimensions of reality divide into two categories, one of 6 and the other of 4.

In Kabbalah, the vav (6) is considered the "male" element of reality whereas the dalet (4) is considered the "female" element. The "female" principle of reality is "revelation" whereas the "male" principle is concealed within the "female." So is the relation, according to string theory, of the 6 concealed dimensions of reality to the 4 revealed dimensions.

The 6 (which "precede" the four) are in fact: 1 plus 2 plus 3. And so, 10 = 1 plus 2 plus 3 plus 4. In the terminology of Kabbalah these four stages of the Divine "evolution" of reality are referred to as: "the simple song" (1); "the double song" (2); "the triple song" (3); "the quadruple song" (4).

In the soul of man (who is a "miniature universe"), the first three concealed stages (1 plus 2 plus 3 = 6) correspond to: the power of superconscious will (1, "the simple song"); the two intellectual powers of the mind (wisdom and understanding-2, "the double song"); the three emotive powers of the heart (love, fear and mercy-3, "the triple song"). These stages are "concealed," for they are as yet unexpressed to the "other."

The fourth stage is that of the 4 "revealed" powers of the soul, which express themselves in one's actions (and words) or patterns of behavior (conviction, commitment, devotion, speech-4, "the quadruple song." The first three of these are dimensions of "space": up-down; right-left; front-back respectively. The last is the dimension of "time").

This model of 10 = the "triangle" of 4 (= 1 plus 2 plus 3 plus 4) is referred to as the "evolutionary" model of reality.

The evolutionary model of reality is subsequently transformed into the "psychic" model of 3 triplets (of "right," "left" and "middle") plus 1: 10 = 3 squared 2 plus 1 (= 1 squared). This model, in contrast to the previous model, is relatively "mature." Here, the superconscious will -- the "1" of the evolutionary model-becomes revealed as conscious "knowledge" -- the third, middle element of the first of the 3 triplets -- thereby maturing the mental powers of the soul from 2 to 3. The three mental powers then connect to the three emotive powers, which in turn connect to the three "behavioral" ("spatial") powers to equal 3 squared. The fourth, revealed dimension of time thus becomes the unique consciousness of 1 = 1 squared.

The psychic model of reality is subsequently transformed into the "Divine" model of 10 = 2 times 5 (the two prime factors of 10) = (1 squared plus 2 squared) plus (1 squared plus 2 squared). This is the model of the Ten Commandments -- five on each of the two tablets of the covenant. Similarly, with regard to the Divine image imprinted on the body of man, ten fingers (or "toes") of the two hands (or two feet), the thumb = 1 squared and the remaining four fingers = 2 squared.

This final model of 10 is considered the model of "Divine Inspiration," for here the four physical dimensions of space and time become "inspired" with consciousness of a "fifth" dimension above them and present within their midst. This is the dimension that corresponds to the third of the three emotive powers of the heart, the power of mercy (or empathy). The consciousness of Divine mercy permeating all of physical reality causes the dimensions of space and time to blend together as an awareness of freely "traveling" in time. In the soul, this reflects the consummate unity of "devotion" (drive) and expression.

Just as the five lower powers (dimensions) of the soul unite to become one, so do the five higher powers. The five lower powers, now the five revealed dimensions of reality, perfectly reflect the five higher, concealed powers. The five higher powers are only concealed in relation to "outer" reality. In relation to the "inner" reality of mind and heart, these as well (in addition to the five lower powers) become revealed.

The mental power of "knowledge" elevates to unite with the source of simple faith -- the ultimate "head" of the superconscious, which now becomes revealed to the inner consciousness of the soul. This dimension corresponds to the "concealed" 1 squared. The four powers (dimensions) of wisdom (the "right" power of the mind), understanding (the "left" power of the mind), love (the "right" power of the heart), fear (the "left" power of the heart) corresponds to the "concealed" 2 squared.

The string

Kabbalah teaches that the ten dimensions of reality were initially created in potentia by means of the "contraction" of God's infinite light, thereby resulting in the appearance of an "empty space" or "black hole" of "potential" being. Into this primordial "vacuum" enters a "ray" of Divine light, referred to as the "line" or "string." The primordial string "actualizes" the ten manifest dimensions of reality and continues to emanate within them the worlds of creation.

The initial revelation within the primordial vacuum is the revelation of light. In the words of the third verse of Genesis (the first explicit "saying" of creation): "And God said 'Let there be light,' and there was light." This primordial light refers to the Divine ray of light that permeates the vacuum, the Divine "string."


Imanol Mujica. The Baskian Swastika Lauburu, its symbolic meaning and history [text]

Arevakhach (literal translation: "Solar Cross") is one of the ancient Armenian symbols of eternity and light.[3] It is often used as
decoration on pagan monuments and Armenian cross-stones. Variants with different numbers of petals and directions of rotation are used in Armenia. In 2013 both leftward and rightward rotating symbols were included into Unicode character set standard.\[4\] Arevakhach is to date in popular use in Armenia.\[5\]

A Polish neopagan solar symbol similar to the tome or the swastika.