9th December 2009 | Uncompleted

Tentative Design of a Cognitive Array of Geometric Elements

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Annex A of *Geometry, Topology and Dynamics of Identity* (2009)

Introduction

The concern here is with the interplay between a sense of identity and the forms through which identity is expressed and patterned by psychological processes of identification. The focus is on how the range of simpler forms identified by geometry and topology function in support of articulation of individual or group identity -- in the moment and dynamically over time. In particular the concern is with implicit forms serving this function and the degree to which they are rendered conscious and explicit, notably through their use in guiding, key and generative metaphors (*Guiding Metaphors and Configuring*, 1991).

The collective emphasis follows from arguments in a set of papers (*Metaphorical Geometry: in quest of globality in response to global governance challenges*, 2009; *Geometry of Thinking for Sustainable Global Governance*, 2009). The individual emphasis follows from exploration of the challenges of embodiment, especially their dynamic implication (*Existential Embodiment of Externalities: radical cognitive engagement with environmental categories and disciplines*, 2009; *Emergence of Cyclical Psycho-social Identity: sustainability as "psyclically" defined*, 2007).

A range of authors and disciplines have explored aspects of the possibilities highlighted here. A primary concern is however to **show the intuited cognitive importance of geometrical forms as accessible to all** -- independently of the sophisticated descriptions offered by such studies. These arguments follow from those of George Lakoff and Mark Johnson (*Metaphors We Live By*, 1980) and of George Lakoff and Rafael Núñez (*Where Mathematics Comes From: How the Embodied Mind Brings Mathematics into Being*, 2000).

In particular of interest here is how people (or groups of any size) may variously comprehend such forms and the support they offer for identity and cognition -- whether or not any more sophisticated explanations are experienced as being of assistance in this process (or a source of confusion). Identity is understood as highly dependent on the construct with which, or through which, that identity is patterned by a process of identification and embodiment

The approach has notably been inspired by the arguments of Ron Atkin with respect to comprehension of the geometry through which communication and comprehension take place (*Multidimensional Man: can man live in three dimensions?* 1981; *Combinatorial Connectivities in Social Systems; an application of simplicial complex structures to the study of large organizations*, 1977). Their implications have been summarized with respect to *Social organization determined by incommunicability of insight* (1995).

Structural outliners and conceptual scaffolding, 1995 ***

Tentative design of a cognitive array

Following from the above-mentioned use of geometric metaphors, the question here is the cognitive implication of the larger set of geometric forms and the transformations possible between them, notably as rendered explicit in design packages. What might be the cognitive implications of these transformations and the attraction of their ultimate forms as noted above with respect to the Mandelbrot fractal, the E8 group and the Monster group (*Potential Psychosocial Significance of Monstrous Moonshine: an exceptional form of symmetry as a Rosetta stone for cognitive frameworks*, 2007; *Psycho-social Significance of the Mandelbrot Set: a sustainable boundary between chaos and order*, 2005):

As mentioned, there is an extensive literature on these distinctions and their classification. The attributions in the tabular array below are necessarily tentative rather than definitive. They are primarily indicative of how such frames might be made and with what one might then identify. Such a table is a form in its own right and may be fruitfully transcended for that reason as argued by Michael Schiltz (*Form and Medium: a mathematical reconstruction*, *Image [&] Narrative*, 6, 2003) and previously discussed (*Beyond the plane: form and medium in terms of the calculus of indications*, 2006).

Any subtleties that might be derived from insights of more formal classifications would then be best included subsequently, when there is a sense of the cognitive significance of the framework and its elements. They key issue is whether the process engenders patterns of coherence with which one can identify.

Characteristic metaphors are typically associated with the forms in each cell of the table below.

Transformation options (columns): It is assumed here that the extensive articulation of transformation options on geometric forms available in design software packages (*Adobe Illustrator*, etc) have cognitive functions implicitly associated with them, if only as suggestive metaphors. These options are therefore used as indicative column headings.

Developmental complexification (rows): It is assumed here that the complexification of common geometric forms is also associated with development of comprehension, as indicated above. The suggestion however is that various sets may be tentatively associated with the rows of the table, with precise correspondences to be discovered (*Theories of Correspondences -- and potential equivalences between them in correlative thinking*, 2007):

- geometric forms: point, line, plane, polygon, circle, polyhedron sphere, torus
- characteristic metaphors of cognitive complexification, notably as depicted in Zen Buddhism by a traditional sequence of 10 ox-herding pictures, each with a brief commentary (cf D T Suzuki; Kubota Ji'un, *Ten Ox-herding Pictures with the Verses Composed by Kakuan Zenji*, 1996). These are of special interest because of their indication of a person's progressive discovery and interplay with a shadowy element denoted by an ox. In a *Commentary on the Integration of perceived Problems* in the Human Development section of the *Encyclopedia of World Problems and Human Potential*, an attempt was made to suggest how that classical sequence might be interpreted for clues to an unfolding relationship between humanity and its shadow (in the shape of the problematique as the complex of world problems). The interpretation was developed under the following succession of headings (*Progressive integration of the shadow of non-self-reflexivity*, 2007):
    - Undisciplined exploration of the problematique
    - Recognizing traces of the problematique as an integrated system
    - Focusing on the problematique as a whole
    - Encompassing the problematique
    - Orienting the problematique
    - Using the problematique as a vehicle for sustainable development
    - Transcending the realm of the problematique
    - Disappearance of both humanity and the problematique
    - Expression of essential humanity
    - Human intervention in the world
- catastrophes identified in catastrophe theory as articulated by Rene Thom (*Structural Stability and Morphogenesis: an outline of a general theory of models*, 1975), expressed in a form of value to this argument by Denis Postle (*Catastrophe Theory: predict and avoid personal disasters*, 1980) as commented in *Catastrophe Theory: Examples of Integrated, Multi-set Concept Schemes* (1984):
    - Potential functions of one active variable: Fold catastrophe, Cusp catastrophe, Swallowtail catastrophe, Butterfly catastrophe
    - Potential functions of two active variables: Hyperbolic umbilic catastrophe, Elliptic umbilic catastrophe, Parabolic umbilic catastrophe
- WH-questions: (*Conformality of 7 WH-questions to 7 Elementary Catastrophes: an exploration of potential psychosocial implications*, 2006; *Interrelating Cognitive Catastrophes in a Grail-chalice Proto-model: implications of WH-questions for self-reflexivity and dialogue*, 2006)
- characteristic cognitive processes
    - as suggested by the set of prefixes: projection, objection, subjection, interjection, dejection, abjection, ejection, rejection, injection (*New Paradigms via a Renewed Set of Prefixes? Dependence of international policy-making on an array of operational terms*, 2003)
    - potentially associated with "complex" archetypal interaction morphologies, identified in Thom's study of catastrophes, whose graphs are labelled as follows: capturing, sending, crossing, "almost", fastening, giving, rejecting, failing, taking, stirring, emitting, cutting
    - as Roget **** : elongation, collapse, explosion/expansion/growth, implosion/contraction/recession, curving, curling, encounter, disassociation, solidifying, configuration, emptying, completion, initiation, clustering

- spectrum of white light ***
-

-- and possibly transformed from one to another, or alternating between one or more of them. ***

not a question reading the literature and becoming expert in it -- flocking

through their use in metaphor that the form of what is understood can be recognized

Indicative design: see metaphor geometry table / *Towards a Periodic Table of Ways of Knowing -- in the light of metaphors of mathematics*, 2009

.....									
design operational transformations	scale uniform/ nonuniform	cluster	radial	reflect	mirror	.	.	.	.
questions	**unchanged.**	**enlarged.**	**multiplied (scattered).**	**multiplied (related).**	**extended (axially).**	**extended (non-axially).**	**divided.**	**hollowed.**	**rotated.**
what is the point bullets .	point	solid circle	several unrelated points	configuration of points	straight line	curve	segmented circle	empty circle	.
which is the line target of bullets alignment thematic pillars axes, menu Drupal taxa .	line	solid cylinder	several unrelated lines	intersecting (network, triangle, polygon)	flat plane	curved surface	polarized	tube	.
where in the matrix (set of pillars) cloth of many colours field of decision tangential where to look .	plane	beam	several planes	configuration (polygon) .	.	.	.	.	.
when timing in learning/action cycle 12 tribes roundtable implied centre ; to intervene	circle	.	.	.	.	.	.	.	.
how to construct polyhedron viable construction	polyhedron	.	.	.	.	.	.	.	.
who articulation of identity in sphere	sphere	.	.	.	.	.	.	.	.
why self-reflexivity torus / Klein	torus	.	.	.	.	.	.	.	.
umbilics	.	.	.	.	.	.	.	.	.

- columns (to the "base" of how many before completion and starting new row?):
  - more Thom-like (see Roget) -- underlying cognitive geometry:
    -
    - array
    - bullet points

Sense of static identity through cognitive elements (in an array)

The following are indicative of how thinking is channelled and focused by **static** geometric elements:

- **point**: most obviously in the case of bullet points and making a point (with further indications below)
- **line**: as with a line of thought or argument, or an ideological line, and exemplifed in use of pillars, poles and axes. This frame may be evident in reference to line of responsibility or command, thematic thread, career pathway, line of credit, or alignment within any group. Lines of communication may be established
- **matrix or table**: as the mode most fundamental to cognitive organization of projects (through spreadsheet software) and of conceptual models

- **cylinder**: emphasizing the cognitive constraint of a line and its channelling capacity for attention. Exemplified pejoratively by the sense of silo thinking and tunnel vision.
- **polygon**: as exemplified by the triangle (Christian Trinity) and the square (Masonic "on the square") -- possibly implying a 3D polyhedron
- **circle (or hole)**: implying a form of holistic containment (exemplified by the sense of security of a stockade, or a circle of trust), or an opening into another domain of thought. A hole may of course imply a weakness in any system of containment, as with a "hole" in an argument.
- **polyhedron**: as in tightening up a proof or an argument, but physically evident through the necessary tightening of guy lines and rigging. Notions associated with this are necessary balance, complementarity, symmetry and proportion.
- **sphere**: a more developed sense of completion and comprehensiveness than the circle, exemplified by "sphere of influence"
- dodecameral packing disparate domains ***

Cognitive dynamics of identity associated with elements (of an array)

The following are indicative of the **dynamics** associated with each of the above elements:

- **point**: the typical process is "making a point" (a set of points), or "pointing out"
- **line**: the associated process is constituting a line by aligning points (of an argument, or "articles" in an agreement). On the other hand a "line may be drawn" to constitute a boundary ("thus far and no further") or to make a distinction. A line, in the form of a polarity, may relate (and separate) two distinct conditions. Such a line, appropriately tensed, may "vibrate" through "resonance" with other dynamics, or may even be "plucked" to achieve vibration (*Polarities as Pluckable Tensed Strings*, 2006)
    - string theory ***
    - walking / alternation ***
- **matrix**: the dynamics may be recognized in:
    - engagement with the process of balancing input/output in a spreadsheet, namely with the interweaving pattern of flows of funds or resources
    - weaving together threads of thematic information as symbolized by the art of of textile or carpet weaving
    - any exercise in urban grid planning, whether balancing claimed attributions or traffic flows
    - cross-fertilization of ideas between sectors or disciplines, metaphorically represented by a genetic approach to cross-breeding or inter-marrying to favour emergence of fruitful traits from disparate "bloodlines"
    - ensuring fruitful co-existence of disparate perspectives and methodologies metaphorically represented by inter-planting (as in permaculture), multicultural communities, or interfaith gatherings.
    - lines of poetry ***
- **polygon**: passing patterns, roundtable, dynamics -- network? sacred dance ***
- **circle**: cyclic dynamics may be recognized in the learning/action cycles explored by Arthur Young (***), through the feedback loops of knowledge cybernetics (****), and metaphorically through:
    - the process of circling the wagons and the role of the circus ringmaster
    - the operation of a crime rings, of call girl rings, and of carousel fraud
    - the process of crop rotation (***)
    - the process of recycling
    - ****
    - making a hole (in the integrity of another)
    - dynamics of a hole are on off -- bytes
    - presages
        - ring, smoke ring, etc
        - orifice -- consumption, excretion
        - smoke ring, etc
        - orifice -- consumption, excretion
        - dyson ring (sphere?) ** fan
        - digderdoo
- **cylinder**: wormhole / rabbit hole
- activity of the day is like moving down a cognitive tunnel -- spaceship hyperdrive
    - implicit line of travel
    - visible objects passing by
- polyhedral dynamics -- tensegrity
- **sphere**: given the coherence of a globe and sphere, and their role as integrative symbols -- the "stellar" celebrities and "balls of energy" in any gathering or community -- the associated cognitive dynamics (potentially internalized) might be explored metaphorically in terms of characteristic stellar dynamics:
    - coriolis
    - convection
    - ejection (planets, etc) -- solar wind, etc
    - Bucky ***
    - accounting
    - "sphere of" -- google
        - attention
        - influence

        - defined by lines
- **torus**: the cognitive implication of toroidal dynamics may be readily comprehensible through the metaphor of smoke rings (tori ***)
- dynamics of a dodekatheon of deities understood as the archetypal metaphor of the ubiquitous roundtable (of a jury or any council of the wise), or a system of "12 tribes" (**tribes, internet). The issue is how such cognitively disparate functions interact to sustain the stability of the whoile. What might be the interaction between the appropriately organized set of perspectives of a dodecameral mind? (***)
    - dodekatheon of identity >>> 36 plots
- metaphors of: ***
    - translate
    - shear
    - reflect (glide)
    - rotation (different orientation)
    - intelligences / Ba Gua ?
    - lyre

Transformational dynamics of identity across an array

- sphere to torus transition
- sphere/torus to Klein
- transitions:
    - polygon to circle (incircle, midcircle, circumcircle)
    - polyhedron to sphere (insphere, midsphere, circumsphere)
    - sphere (event), turn in on itself
    - torus, make a hole
- enantiodromia

Such a framework points to ways in which one might be cognitively or existentially "wafted" through the geometry along "lines", down "holes", etc -- and the associated processes of reification explication/ implication. There is a sense in which the cells of the framework offer alternative cognitive "realities" between which one might "navigate" (*Navigating Alternative Conceptual Realities: clues to the dynamics of enacting new paradigms through movement*, 2002).

Cognitively it is curious that more powerful explanation suggests recognition from a perspective out of any plane -- ex-planation. This raises questions about the significance of in-planation -- and the planes in which identity is embedded.

alternation

Ralph Abraham. Dynamic Geometry

- dynamical geometry / topology

Ralph H. Abraham and Christopher D. Shaw (1992). *Dynamics -- the geometry of behavior, 2nd edition*. Addison-Wesley

dancing cognitively

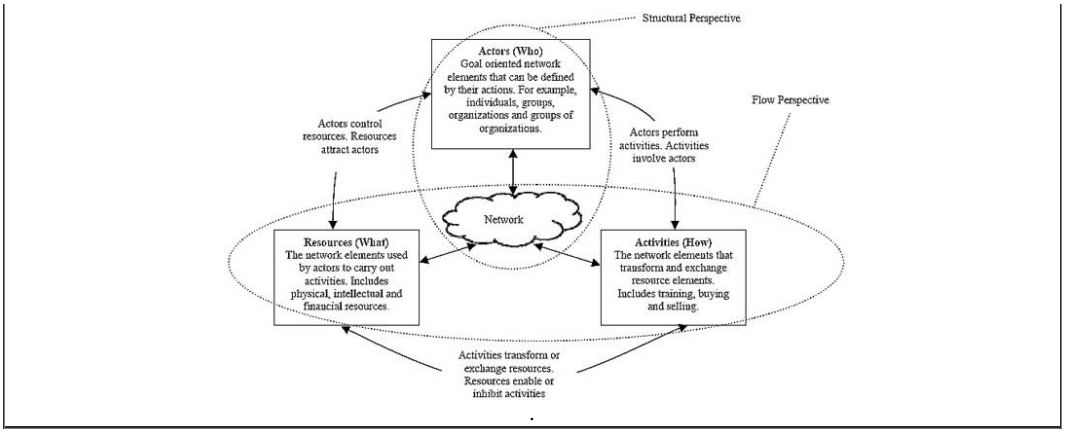
Dancing dynamic array: dialogue, sex, intercourse, violence inherent fundamental dynamic: point > line, etc; return to point (redefined)				
12 seats at roundtable? .	point	line	sphere?	Klein?
point				
line				
sphere				
torus				

12 seats at roundtable (Tribes):

- EAFM
- CFM: point (space?), line, curve?
- opposites
- triplicity
- quadruplicity
- dodecameral

Young 12, but want spatial dimension

The Relationships between Network Elements, Structures and Flows
Martin Bliemel, Ian P McCarthy, and Elicia Maine. In Search of Entrepreneurial Network Configurations: using Q-analysis to stusy network structures and flows. Proceedings of the 4th European Conference on Technology Management, 6-8 September, 2009, Glasgow [text] .



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