Towards a Logico-mathematical Formalization of "Sin"

Fundamental memetic organization of faith-based governance strategies

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Originally prepared as an annex to Seven Deadly Sins of Fundamentalism assessing memetic weapons capability of neoconservatism (2004). See selected comments

Introduction

The relatively limited number of explorations of relationships between mathematics and theology do not appear to indicate that any formalization of "sin" has been considered (see Philip J. Davis. A Brief Look at Mathematics and Theology; I Grattan-Guinness. Christianity and Mathematics: Kinds of Link, and the Rare Occurrences After 1750; Brendan Kneale. God and Mathematical Infinity, 1998; Bibliography of Christianity and Mathematics, 1983). The literature indicates that many renowned mathematicians have however been deeply religious, as well as being inspired in their mathematics by spiritual insights -- like Isaac Newton and Georg Cantor. Religious considerations have, for instance, spurred some kinds of mathematical creation and practice. Nicolas of Cusa (1450) believed that the true love of God is amor Dei intellectualis and that the intellectual act through which the divine is revealed is mathematics. There is an extensive literature on "sacred geometry". A web-based organization, utilitarian.org has articulated a Mathematics for Ethics as a guide to the use of mathematics in ethics, inspired by Jeremy Bentham's felicific calculus.

Sarah Voss (What Number Is God?, 1995; Zero: Reflections about Nothing, 1998), mathematician and minister, has responded to increasing recognition of mathematical metaphors: "I call such metaphors mathaphors; when they apply to the spiritual realm, I call them holy mathaphors. Ideas drawn from mathematics can greatly extend our spiritual worldviews" (Mathematical Theology, 2003). Voss then notes regarding Cantor, a deeply religious mathematician, that:

In the Cantorian world there also exists an entity that is infinitely many yet simultaneously infinitely sparse; the infinite both is and is not infinite; incompleteness is intrinsic to the structure of the system. What happens if something like Cantorian set theory
As a mathematician, Hermann Weyl has speculated that the presence of the infinite in mathematics runs parallel to religious intuition. Like mathematics, religions express relationships between man and the universe. Religious views of the world have posited mathematics as a paradigm of Divine thought. (cf Philip J Davis and Reuben Hersch. *The Mathematical Experience*, 1981).

The main purpose of the following is to point to resources and their relevance to more integrative approaches to engaging effectively with "sin". This would appear to be an important undertaking at a time of a strong emerging emphasis on faith-based governance, whether from a Christian or a Muslim perspective.

It could be argued that a more appropriate approach than focusing on "sin" would be to focus on "virtue", or at least on a more fruitful relationship between "sin" and "virtue". A focus on "sin" would necessarily be perceived as "negative" by fundamentalists. Unfortunately their focus on 'virtue' can easily be deceptive and avoid effective focus on "sin". In an earlier exercise on human values (*Human Values Project*), an extensive study addressed the relationship between positive and negative values as value polarities and the possibility of their configuration (see *Encyclopedia of World Problems and Human Potential*).

### Confusing variety of sins

As noted by various authors (see *Seven Deadly Sins of Fundamentalism*, 2004), it is not clear whether there are in fact precisely seven "deadly sins" (Renée Lapointe-Daoud. *The Seven Deadly Sins? Are there seven? Are they deadly? Are they even sins?* 2001). These are distinguished from "mortal sins" and from "venial sins". Nor is it clear why those identified are variously clustered together and in overlapping relation to the corresponding redemptive "virtues". It is acknowledged that several of the sins interlink, and various attempts at causal hierarchy have been made. For example, pride (disproportionate love of self) is implied in gluttony (the over-consumption or waste of food), as well as sloth, envy, and most of the others.

There are of course other kinds of difference in any comparison with equivalents to sin in other cultures, notably the Buddhist "hindrances", "fetters" and "defilements" (*Navigating Alternative Conceptual Realities: clues to the dynamics of enacting new paradigms through movement*, 2002). This situation raises the question as to whether there might not exist a logico-mathematical formalization that would give greater precision to understanding the attitudinal psycho-dynamics in play.

Would such a formalization help to articulate a clearer and more coherent set of sins? Would it help to understand more precisely the exact nature of each sin? Would that help in "composing a life" -- and living it sustainably?

### Sins and logical fallacies

In this respect, and in relation to the checklist of logical fallacies (cf *Seven Deadly Sins of Fundamentalism*, 2004), the author Stephen Downes (*Stephen's Guide to the Logical Fallacies, 1995-2001*) has separately distinguished what he terms a *Categorical Converter* (1996). This is a visual representation of all possible logical relationships between individual categorical propositions. It may be used to test the validity of an inference from one proposition to another. In other words, it represents all possible inferences using the rules of:

- Contradiction
- Contrary
- Subcontrary
- Subalternation
- Supraalternation
- Obversion
- Conversion
- Transposition

Downes describes the use of the converter through a sequence of eight structured images (*Using the Category Converter*, 1996), as well as describing how this is constructed (*Constructing the Categorical Converter*, 1996). Such work focuses the question as to whether there is some kind of mapping from the "sins", variously understood, onto the geometric framework of Downes "converter". It is interesting to note that the rules he lists above all have some significance in geometric transformations, notably in relation to images -- and at least through the terminology used [more | more | more]. In this context, any reflection on the "music of the spheres" might benefit from recognition of the suggestive relationship of these operations to the rules of harmony.

A special interpretation of classical propositional calculus has been developed by Vladimir A Lefebvre (*A Formal Approach to the Problem of Good and Evil*, General Systems, 22, 1977, pp. 183-185). He notes:

The initial and indefinite concepts are good evil conflict union. The concepts "conflict" and "union" are spiritual categories and not part of the strategy of interaction. In the formal calculus of game theory, ethical problems are completely ignored; in the given approach strategical problems are ignored. In constructing a formalization of ethical problems, one must consider human
Sins in relation to axes of cognitive bias

Elsewhere (Seven Deadly Sins of Fundamentalism, 2004) reference was made to cognitive distortions and their relation to cognitive bias. Seven axes of methodological bias have been extensively described by W T Jones (The Romantic Syndrome: toward a new method in cultural anthropology and the history of ideas, 1961).

1. **Order vs disorder**: Namely the range between a preference for fluidity, muddle chaos, etc. and a preference for system, structure, conceptual clarity, etc.
2. **Static vs dynamic**: Namely the range between a preference for the changeless, eternal, etc. and a preference for movement, for explanation in genetic and process terms, etc.
3. **Continuity vs discreteness**: Namely the range between a preference for wholeness, unity, etc and a preference for discreteness, plurality, diversity, etc.
4. **Inner vs outer**: Namely the range between a preference for being able to project oneself into the objects of one's experience (to experience them as one experiences oneself), and a preference for a relatively external, objective relation to them.
5. **Sharp focus vs soft focus**: Namely the range between a preference for clear, direct experience and a preference for threshold experiences, felt to be saturated with more meaning than is immediately present.
6. **This world vs other world**: Namely the range between preference for belief in the spatio-temporal world as self-explanatory and preference for belief that it is not and can only be comprehended in terms of other frames.
7. **Spontaneity vs process**: Namely the range between a preference for chance, freedom, accident, etc and a preference for explanations subject to laws and definable processes.

These biases are discussed elsewhere (Axes of Bias in Inter-Cultural Dialogue, 1993) and in relation to other clusterings of bias (Systems of Categories Distinguishing Cultural Biases, 1993). Jones was prompted to undertake his study by the pre-logical biases that distorted academic dialogue to the point of engendering distinct, and often antagonistic, schools of thought. It might be asked how the "seven sins" relate to such distortions of dialogue. In the case of each axis, the extreme positions necessarily reflect (preferences for) extremes of bias. These extremes might be understood as the extremes characteristic of fundamentalism.

Sins as catastrophes

A seemingly quite different approach to such a logico-mathematical formalization might be through the work of mathematician Rene Thom (Structural stability and morphogenesis, 1975), as followed by E.C. Zeeman (Catastrophe theory: selected papers, 1977), that articulated the basis for catastrophe theory. This is a topological theory describing the change of a system's structure along a continuous "morphogenetic landscape" including occasional jumps -- abrupt discontinuous changes introduced into otherwise slowly evolving systems. A critical aspect of the theory is that it considers the dynamic of the system as imposed from an external context.

The seven different types of catastrophe identified by Thom have been usefully presented in a series of interactive web applets by Lucien Dujardin (Catastrophe Teacher: an introduction for experimentalists, 2004):

### Table 1: Catastrophes (with illustrative applets)

<table>
<thead>
<tr>
<th>Number of state variables</th>
<th>Catastrophe type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systems with only one state variable</td>
<td>fold</td>
</tr>
<tr>
<td></td>
<td>cusp</td>
</tr>
<tr>
<td></td>
<td>swallowtail</td>
</tr>
<tr>
<td></td>
<td>butterfly</td>
</tr>
<tr>
<td>Systems with two state variables</td>
<td>hyperbolic umbilic</td>
</tr>
<tr>
<td></td>
<td>elliptic umbilic</td>
</tr>
<tr>
<td></td>
<td>parabolic umbilic</td>
</tr>
</tbody>
</table>

In this light it is interesting to note that Denis Postle (Catastrophe Theory: predict and avoid personal disasters, 1980) has demonstrated how catastrophe theory may be used by an individual to map his own behaviour and the critical areas on that map at which stress and breakdown are possible. Roz Carroll (Revolutionary Connections: Psychotherapy and Neuroscience, 2001) points out that the parallel between psychotherapy and chaos/complexity/catastrophe has been considered by other writers (N Field, Breakdown and Breakthrough: Psychotherapy in a New Dimension, 1996; and Manfred Eigen).

Sins and the mathematics of harmony

The relationship between harmony and mathematics has been extensively explored since Pythagoras. One of the earliest examples of what might be termed "sinful", from a musico-mathematical perspective, is the concern expressed by Pythagoras regarding the square root of 2. It is alleged that the Pythagoreans who discovered that root two cannot be a ratio of two natural numbers -- a symbolically offensive implication of Pythagoras' theorem -- was killed by other Pythagoreans.

The importance of harmony to spiritual well-being and inspiration has long been recognized. The challenge of discord and its fruitful integration, or exclusion, from music has remained a domain of creative exploration. Musical "sins" have continued to be a topic of controversy -- whether conceptually through the diabolus in musica or through evocative music perceived as excessively appealing to the senses -- to the point of dangerously obscuring any relation to the divine. The diabolus in musica ("the Devil's interval") has been of
much concern to the Catholic Church, notably in promoting the role of "sacred music". It was termed the tritone, the interval of the augmented fourth or diminished fifth, which spans three (whole) tones. In medieval times, after being rejected by the Church as the interval of the Holy Trinity due to its extremely dissonant sound, it became the interval of the Devil himself. It was banned and cursed by the Church, suggesting that it invoked the Devil. Ironically, given the Pythagorean example, the tritone has the proportion 1: root two under equal temperament. [more].

More recently Christian fundamentalists have vigorously articulated their concerns on this matter ("Christian" Rock Music: Christian or Satanic? 1999) [more].

Other than as a hypothetical set of discords, it is not clear whether the various ways in which music can distract from more harmonious spiritual inspiration lend themselves to formalization. Such formalization might then bear an interesting relation to a set of "sins".

The work of Ernest G McLain (The Myth of Invariance: the origins of the Gods, Mathematics and Music from the Rg Veda to Plato, 1978) offers important insights in clarifying the possibility of such a mathematically based formalization, governed by musical constraints, recognizing the challenge of discord.

Sins as disruptions of the seamlessness of the cosmic plenum

As suggested elsewhere with respect to metaphors of "world problems":

Problems can be understood as discontinuities in the seamless pattern of the known and predictable. As such, they lend themselves to exploration as "catastrophes" using the mathematics of catastrophe theory, or as "strange attractors" using the mathematics of chaos theory. [more]

From such a perspective, could the seamless space associated by mystics (and the born again) with continuous awareness of God, as an omnipresent continuity (the cosmic plenum, the "ground of being", the "ground of meaning"), be understood as "distorted" by sin -- much as with the distortion (curvature) of space-time by gravity wells? In which case do the various catastrophes, mathematically described, offer descriptions of the cognitive distortions of any experiential relation to the infinite -- then to be appropriately labelled as "sins"?

Referring to the insight of Paul Tillich and others [more], John A T Robinson (Concerning God as the Ground of Being, 1963):

In Tillich's words: The phrase deus sive natura, used by people like Scotus Eriggena and Spinoza, does not say that God is identical with nature but that he is identical with the natura naturans, the creative nature, the creative ground of all natural objects. God is not 'out there'. He is in Bonhoeffer's words 'the beyond' in the midst of our life, a depth of reality reached 'not on the borders of life but at its centre', not by any flight of the alone to the alone, but, in Kierkegaard's fine phrase, by 'a deeper immersion in existence'. For the word 'God' denotes the ultimate depth of all our being, the creative ground and meaning of all our existence. ...Tillich warns us that to make the necessary transposition, 'you must forget everything traditional that you have learned about God, perhaps even that word itself'...Bonhoeffer insists ...'The transcendent is not infinitely remote but close at hand.'

A particular argument in favour of such a mapping derives from the degree to which a "sin" is a form of discontinuity introduced into the morphogenetic landscape of otherwise slowly evolving psycho-dynamic systems. Sin might then be understood as a disruption of "flow" -- as identified by Mihaly Csiksztihomihay (Flow: The Psychology of Optimal Experience, 1994). As such it is a misplaced emphasis on the "local" at the expense of any appropriate recognition of the "global" of the continuum within which "we live and move and have our being" (Acts 17.28), as Paul quotes the Greek Poet Epimenides regarding the individual's relationship to God. This is equally relevant to recognition of any relation to context, whether: interpersonal, intergroup, international, interdisciplinary, intercultural, or interfaith.

In articulating an understanding of sin, Ken Wilber suggests:

The various traditions give many answers to this question, but they all essentially come down to this: I cannot perceive my own true identity, or my union with Spirit, because my awareness is clouded and obstructed by a certain activity that I am now engaged in. And that activity, although known by many different names, is simply the activity of contracting and focusing awareness on my individual self or personal ego. My awareness is not open, relaxed, and God-centered, it is closed, contracted, and self-centered. [more]

Those articulating the hindrances to the insights associated with spiritual development, notably in the terminology of Buddhism, stress the challenges of "right mindfulness" which point in this direction. One speculative exploration in sympathy with this possibility, is by John A. Mills (Space-Time: Sophia's Footprint, 1999), incidentally situating sin within a view of creation that encompasses eternity and space-time, consistent with both the new cosmology and biblical belief.

"Sins" understood through the drama of psycho-social dynamics

The traditional religious understanding of humans as inherently "sinful" is usefully explored in relation to curvature or self-curvature within a topological framework, as noted by Don Handelman (Why Ritual in its Own Right? How So? 2004). He notes that ritual is "practiced into presence by curves". Furthermore, he notes that topological descriptions of organizations might better be understood in terms of degrees of curvature. "Through their self-curvature, social forms, enclosing themselves within themselves as vectors of action,
It is the italicized unbracketed items within the cells of Table 2 that are the labels given by Young to particular measure formulae from...
It may be fruitful to explore the metaphorical parallel between navigating in the world of the spirit and that of navigating in three-dimensional space, especially given the concern in many spiritual traditions with "ascent" (cf Navigating Alternative Conceptual Realities: clues to the dynamics of enacting new paradigms through movement, 2002). From this perspective, the row and column dimensions of Table 2 hold the attitudinal skills to be variously used to control such movement under changing circumstances. Any cognitive "driver" of a conceptual or spiritual "vehicle" must necessarily be vigilant in asking appropriate questions to ensure fluid appropriate movement. Table 2 suggests how the set of WH-questions might interweave in relation to the types of attitude required at any one moment.

It is worth considering the possibility that, appropriately asked, these questions have redemptive value as "virtues" -- which may however be corrupted by inappropriate attitudes into corresponding sins. In this sense Table 2 suggests a way of interrelating the "seven deadly sins" whose attitudinal characteristics were explored in Seven Deadly Sins of Fundamentalism (2004).

This suggestion then creates the challenge of determining whether there is a meaningful mapping between the seven sins and the seven WH-questions that provide the dimensions of Table 2. One possible lead would be to distinguish a three-fold set of sins (or vices) from a four-fold set. The challenge of relating unambiguously the set of sins (cf Seven Deadly Sins of Fundamentalism, 2004) to the classic virtues may be ignored for the moment. The classic cardinal and theological virtues and their complementary virtues are then [more]:

<table>
<thead>
<tr>
<th>Table 3: Virtues and Vices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardinal</td>
</tr>
<tr>
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<tr>
<td></td>
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<td></td>
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<tr>
<td></td>
</tr>
<tr>
<td>Theological</td>
</tr>
<tr>
<td></td>
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<td></td>
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</tbody>
</table>

Can each row in Table 2 be tentatively associated with a particular style of questioning attitude -- whether "virtuously" appropriate (as with a skillful pilot), or "sinfully" inappropriate (as with a dangerous, irresponsible pilot)? Would the latter usefully indicate the nature of "sinful questions"? Would the former correspond usefully to the "higher order questions" explored elsewhere (Engaging with Questions of Higher Order: cognitive vigilance required for higher degrees of twistedness, 2004)?

If such a 3x4-fold attribution could be fruitfully made, what insights might then be usefully associated with the 12 cells of the 3x4 Table 2? One valuable lead is offered by the discussion of cognitive distortions (Seven Deadly Sins of Fundamentalism, 2004) -- or twisted "ways of thinking" that are intimately related to depressive conditions [more | more]. For example, David D. Burns (The Feeling Good Handbook, 1989) identifies Ten Forms of Twisted Thinking, namely the distortions that are the focus of cognitive therapy. Indeed one of the variants of this widely-adapted checklist in fact extends it to 11 [more] -- another to 12 (Dennis H. Congos, 12 Thinking Patterns that Limit College Success, 2002) by treating separately 2 clustered items in the 10-list.

This approach, if successful, would then order 12 forms of "cognitive disorder" at the distinct locus of "interference" of two "sins" (or "sinful questions") -- in the absence of the alleviating influence of the two corresponding "salvatory virtues". To the extent that Young's corresponding measure formulæ [more] each articulate a particular dynamic associated with physical movement of a vehicle, do they offer insight into a particular attitudinal movement vital to "psychological sustainability" -- possibly "spiritual sustainability" consistent with mystical insights? (cf Psychology of Sustainability: Embodying cyclic environmental processes, 2002).

"Sins" in the light of number theory

There is of course a long tradition of numerological speculation which is highly influential in determining the judgements by some "auspicious" ("virtuous") numbers in contrast with "inauspicious" ("sinful") numbers. For example a study by economists showed that "superstition and feng shui will endeavour to appease the spirits' by quoting prices in auspicious numbers and avoiding inauspicious numbers" (The Influence of Cultural Factors on Price Clustering, 2000). The extent of belief in the "inauspiciousness" of numbers might be said to be comparable to, or to exceed, religious belief. Christian fundamentalists are notably attentive to the symbolic significance of numbers associated with "satanic" forces as drivers (or attractors) of sins (cf concern with the "number of the anti-Christ" [more]).

Sets of numbers are central to the organization of social activity, whether as points in a strategic plan or declaration, or in segmenting any social organization for purposes of specialized action. They may also be vital to the structure of conceptual models. In this sense they may also be vital to the ordering of "sins" into sets whose meaning as a set of seven may of particular significance in contrast to a set of five or eight (cf Representation, Comprehension and Communication of Sets: the Role of Number, 1978).

Beyond the potentially negative symbolic significance of isolated numbers, there has also been a strong interest in configurations of particular numbers for magical purposes. Such sets of numbers, notably in the form of "magic squares" have been viewed with great suspicion. The topic of magic squares, and related configurations, remains an active area of essentially recreational mathematics -- irrespective of their potential positive or negative symbolic significance for some.

Magic squares have been used by many cultures to order positive, healing insight -- that might be termed virtues. They have also been used to order what might be termed "sinful" insights -- notably in "black magic". Magic as a practice has long been concerned with construction of numerically defined "gateways" to and from the "supernatural" worlds. A vast literature discourses on the appropriate use of pentacles and the various "entities" that may be contacted through them. This has long been a focus for secret societies. Such
preoccupations may be judged as inherently "sinful" -- effectively configuring propensities to sin. As exercises and operations of the imagination, the associated symbolism has been of great interest to both poets (such as Yeats) and depth psychologists (Jung, Hillman).

It is possible that such approaches can be adapted to provide a more useful formalization of sins, as with the appropriate (virtuous) response to them. One example is the experimental ordering of the insights of the Tao Te Ching in a 9x9 magic square and the consideration of further possibilities (Hyperspace Clues to the Psychology of the Pattern that Connects, 2003; Musical Articulation of the Pattern of Tao Te Ching Insights, 2003). Unfortunately, whilst the method may be of some value, the content would necessarily be anathema to Christian fundamentalists.

The research on the nature of evil from the perspective of mathematical epistemology by Xavier Sallantin (Le problème du mal à la lumière de la cyberscience, 2001) also merits careful attention.

**Trigrams: a coding system for "sins"?**

It might be asked whether a coding or notation system for sins would assist further discussion regarding more insightful ordering of them (and in relation to their corresponding virtues). This would have the advantage of reframing the debate in a new way that might have the potential to move it beyond the constraints of verbalization.

A simple approach to this, with a long history, would be the kind of visual notation used in ordering fundamentally contrasting perspectives in Chinese philosophy, namely the binary coding system of the I Ching. Seven "sins" can be represented by a three level code (a "trigram"), composed of 3 lines, whether unbroken (continuous) or broken (discontinuous). "Unbroken" may then be used to signify a degree of preservation of integrity. "Broken" may be used to signify a degree of loss of integrity. The levels may be used to signify physical, emotional and mental (or perhaps body, soul and spirit):

- A "broken spirit", or a "twisted mind" would then have the upper line broken.
- Twisted emotions would have the middle line broken.
- Over-indulgence of the body would have the bottom line broken.

However, as will be seen from Table 4, this system provides for eight "sins", rather than seven. Evagrius Ponticus (345-399), one of the earliest spiritual writers on asceticism, first identified "eight" deep-seated passions" that distort human nature (later reduced to seven by merging pride and vainglory). This offers a means of including the most fundamental of "sins", from which the others derive, namely "deception" -- through which integrity of every kind is used as a disguise for every kind of dissociation from the divine. For, in this sense, a broken line can be used to signify a "broken connection" with the divine -- with the plenum, or with the consciousness of "being in flow". The value of the coding system for distinguishing the corresponding virtues (right hand column) is discussed below Table 4.

<table>
<thead>
<tr>
<th>&quot;Sin&quot;</th>
<th>&quot;Virtue&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Deception&quot;</td>
<td>&quot;Mystery&quot;</td>
</tr>
<tr>
<td>&quot;Envy&quot;</td>
<td>Love (fortitude)</td>
</tr>
<tr>
<td>Pride</td>
<td>Humility (faith)</td>
</tr>
<tr>
<td>Lust</td>
<td>Prudence (chastity)</td>
</tr>
<tr>
<td>Anger</td>
<td>Kindness (meekness)</td>
</tr>
<tr>
<td>Sloth</td>
<td>Diligence (zeal)</td>
</tr>
<tr>
<td>Gluttony</td>
<td>Temperance</td>
</tr>
<tr>
<td>Avarice</td>
<td>Justice (liberality)</td>
</tr>
</tbody>
</table>

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Table 4: Tentative coding system for "sins" and "virtues"

"Deception" | "Mystery" Here the integrity at all levels -- physical, emotional and mental -- conceal potential through their resonance with a wider context. | Unbroken | Unbroken | Unbroken |
---|---|---|---|---|
"Envy" | Love (fortitude) Any constraints in the appreciation of others are governed by affection and sympathy | Unbroken | Unbroken | Unbroken |
---|---|---|---|---|
Pride | Humility (faith) The emotional (even devotional) strength here is central to a receptive mental approach to any wider context and an adaptive physical approach to the world. | Unbroken | Unbroken | Unbroken |
---|---|---|---|---|
Lust | Prudence (chastity) Although sensitively responsive to others, this relationship is subject to a higher discipline of the mind. | Unbroken | Unbroken | Unbroken |
---|---|---|---|---|
Anger | Kindness (meekness) A receptive responsiveness to the other, whether physically, emotionally or mentally. | Unbroken | Unbroken | Unbroken |
---|---|---|---|---|
Sloth | Diligence (zeal) Proactive responsiveness to changing physical circumstances grounded in sustained affective and mental engagement | Unbroken | Unbroken | Unbroken |
---|---|---|---|---|
Gluttony | Temperance A disciplined physical response to the world, sustained by mental discipline, creating a space for affective interaction | Unbroken | Unbroken | Unbroken |
---|---|---|---|---|
Avarice | Justice (liberality) Both material goods and | Unbroken | Unbroken | Unbroken |
through the coding system, unbroken one of the earliest magic squares

As a set of complementary conditions, the "sins" (or the "virtues") metaphors could prove equally useful with respect to any set of "sins". Respectful of the dynamics represented, "sins" (or the "virtues") could be projected onto any set of understandings of "sin" as "broken" (cf George Lakoff. Women, Fire, and Dangerous Things: what categories reveal about the mind. 1987).

The distinctions between understandings of "sin" and understandings of "virtue" can perhaps be further clarified by interpreting the notation used in the above table according to seven distinct ways (or "standards"), as indicated in Table 5 below. These range from "normal" (0) to either the highly virtuous and transparent (+3) or the highly sinful and dissimulated (-3).

| "Virtuous standards" ("Positive") | +3 | Proactive, dynamic, intentional, embodied ("Beyond temptation") | Inherently virtuous | Holding paradox. "Negative capability": capable of being in uncertainties, mysteries, doubts, without any irritable reaching after fact and reason (John Keats) | Inherently, overtly, undoubtingly virtuous ("holiness", "sanctity") |
| "Sinful standards" ("Negative") | -3 | Proactive, dynamic, intentional, embodied ("Beyond redemption") | Skillfully deceptive emulation of virtue in order to sustain corruption | Inherently "slippery" interaction | Inherently, overtly, undoubtingly deceitful ("satanic", "diabolic") |
| "Normal" | 0 | Conventional | Obvious "virtuous" quality | Obvious "sinful" quality | Official virtues: declarations, principles |
| "Sinful standards" ("Negative") | -2 | Homeostatic, dynamic, reactive response to circumstances | Basic "human" virtue occasionally exhibited by the habitually sinful | Opportunistically sinful, switching to reliance on other sins when severely challenged; wily | Self-sustaining pattern of sins |
| "Sinful standards" ("Negative") | -1 | Passive, static | Locked, habitual condition of selective sin ("human weakness") | Deliberate seductiveness. Double standards | Recognized "evils", crimes |
| "Normal" | 1 | Passive, static | Rigid condition of selective virtue ("plain") | Innocent attractiveness | "Binary": "men good, women evil" |
| "Virtuous standards" ("Positive") | +2 | Homeostatic, dynamic, reactive response to circumstances | "Tactically" virtuous switching to reliance on other virtues when severely challenged | Creative management of weakness; regression to human" sinfulness occasionally exhibited by the habitually virtuous | Self-sustaining pattern of virtues |
| "Normal" | 0 | Conventional | Obvious "virtuous" quality | Obvious "sinful" quality | Official virtues: declarations, principles |
| "Virtuous standards" ("Positive") | +3 | Proactive, dynamic, intentional, embodied ("Beyond temptation") | Inherently virtuous | Holding paradox. "Negative capability": capable of being in uncertainties, mysteries, doubts, without any irritable reaching after fact and reason (John Keats) | Inherently, overtly, undoubtingly virtuous ("holiness", "sanctity") |

The coding system of Table 4 can be further expanded from 8 to 64 conditions (Transformation Metaphors derived experimentally from the Chinese Book of Changes, 1997). Elsewhere it has been explored as a means of giving greater precision to the range of attitudes underlying psychological well-being in a psycho-social context, but from a non-spiritual perspective (Interrelationships between 64 Complementary Approaches to Sustainable Development, 2002).

The use of the broken line to signify disconnection has the merit of relating to broken, or vice versa) can be indicated as a shift to a different condition within a self-sustaining pattern. This highlights, through the coding system, the dynamic complementarity of the "sins".
Enneagram of sin

In considering the above approach to organizing "sins", reflections on the "Celtic enneagram" by J Dixon (Introducing the Celtic Enneagram, 2000) should also be considered. Dixon refers to the early role of Raymond Lull (see Werner Küntzel, The Birth of the Machine: Raymundus Lullus and His Invention) in dividing a circle into nine parts, each associated (with other categories) with one of the "Nine Deadly Sins".

As noted earlier, in Christianity there are seven "cardinal sins", but using the enneagram model, developed by a former Jesuit, there are nine personality types [more]. The enneagram of sin has recently proved popular as a framework amongst Jesuits, although its theological basis is challenged by Catholic orthodoxy [more | more]. As a set, the nine sins are described as coming from the Eastern religious tradition, although present in the Christian tradition, as noted by Kathy Hurley and Theododore Donson (What Are the Real Origins of the Enneagram?, 1998), indicating that Evagrius Ponticus (345-399) as the source of the original listing of eight "passions" figuring in the neoagram, omitted the ninth, namely "fear". The extension of the seven traditional Catholic capital sins to nine, by the addition of "deceit" and "cowardice" ("Fear", "inconstancy") following Lull, is notably contested.

The extensive literature on the enneagram (cf Anthony Blake. The Intelligent Enneagram, 1997) is especially valuable in exploring the nature of the relationships between the set of nine conditions it describes. These systemic relationships are notably absent from other approaches to sin (or virtue).

Sins inherent in value polarities

As noted earlier, in an earlier exercise on human values (Human Values Project), an extensive study addressed the relationship between positive and negative values as 220 value polarities and the possibility of their configuration (see Encyclopedia of World Problems and Human Potential).

Various approaches to clustering values were considered [commentary]:
- into 45 3-fold categories [table]
- into 5-fold categories by clustering the 3-fold categories into a 9x5 matrix of polarities [table]
- possible projection onto a spherically symmetrical 3-dimensional polyhedron [more]

The study also considered the status of values as "strange attractors" in the light of complexity theory [more ]. This work was summarized in a separate paper (Human Values as Strange Attractors: Coevolution of classes of governance principles, 1993).

In a separate focus on classifying some 30,000 "world problems" within the framework of the same Encyclopedia of World Problems and Human Potential, the possibility of "patterning the problematique" was considered. This gave rise to a tentative set of "negative value qualifiers", to cluster value polarities, organized in a 7-fold table in terms of "principles of integrity" and the standard set of seven "sins". An equivalent set of strategy "action qualifiers" was developed as a 7-fold table to cluster some 35,000 strategies in response to such problems -- but in terms of the corresponding standard seven "virtues".

"Sins" in the light of a Theory of Everything

A theory of everything (TOE) is a theory in physics that unifies the four fundamental forces of nature: gravity, the strong nuclear force, the weak nuclear force, and the electromagnetic force. Such a theory has long been the goal of researchers in quantum gravity. Other names for similarly comprehensive concepts include "grand unified theory" and "unified field theory".

Given the interest in the relationship between such fundamental theories and the nature of consciousness [more], considerable effort has been made to relate such unified field theories to comprehension of the cosmic plenum and its implications, notably by the Maharishi International University through its extensive exploration of Vedic science [more | more | more].

Whilst there does not appear to be any explicit effort at formalization of sin within such a unified framework, a strong argument is made for impeccability: "For, if there is one thing that is certain in Vedic science, it is the fact that it deals, repeat, deals only with reality. But that reality is so profound, it needs intellectual impeccability to understand its ramifications." (G. Srinivasan. Vedic Impeccability, 2004).

"Wrongness": as "sins" of structural design and aesthetic composition

The notion of "wrongness" derives from a sense of inappropriate design, whether with regard to architecture or other aesthetic compositions. It may also be applied to moral issues, as argued by John Lash (The Arch of Metahistory: Moral Design, 2004) and in a separate paper (Twistedness in Psycho-social Systems: challenge to logic, morality, leadership and personal development, 2004) where the challenge of its structure is discussed.

In America both Dick Cheney and Michael Moore have been specifically cited for their "wrongness" by their respective opponents [more | more]. The Drudge Retort specifically addresses the question of Against what standard is this wrongness measured? (2004). The US
Supreme Court decision regarding the election of George Bush has been discussed by Laurence H. Tribe under the heading of "wrongness" (see *The Unbearable Wrongness of Bush vs Gore*, 2003). Todd Bernard Weber makes a detailed argument for *Analyzing Wrongness as "Sanctionworthiness"*. Wendy McElroy (*Wherein does Wrongness Lie?*) argues:

> Any theory of natural rights implies that there are natural wrongs. Benjamin Tucker, editor of the touchstone 19th century individualist anarchist periodical *Liberty* cared passionately about what was wrong. Indeed, one of Tucker's overriding concerns throughout *Liberty* was to discover and to express a clear answer to the question, 'what is wrong?'... Without a definition of the essential nature of 'wrongness', even well intentioned reformers were likely to become muddled and harm liberty instead of furthering it. Otherwise stated, if the goal of reform was to construct social structures that promoted the well-being of human beings, then it was necessary to have a precise understanding of what constituted such well-being.

Kelley L. Ross (*The Generalized Structure of Ethical Dilemmas*, 2004) argues that: "Many moral dilemmas are dilemmas because of a certain kind of conflict between the rightness or wrongness of the actions and the goodness or badness of the consequences of the actions." However this does not easily lead to such a structure in which the forms of "wrongness" can be ordered. An attempt towards structuring a set of strategic dilemmas was however made on the occasion of the Earth Summit (*Configuring Globally and Contending Locally: shaping the global network of local bargains*, 1992). Perhaps the most systematic approach to "wrongness" in design has been made through the work on 253 patterns by Christopher Alexander (*A Pattern Language*, 1977). Although "ethics" are increasingly mentioned in relation to "pattern language", no explicit patterning is undertaken. Within the context of the *Encyclopedia of World Problems and Human Potential*, an experiment (now online) has however been made to adapt Alexander's 253 patterns to parallel domains, including the social, conceptual and psychological -- but not the ethical.

**Statistical indicators of "sin"**

Monitoring of dysfunctionality results in an accumulation of data that could be evaluated statistically as an indicator of "sin". Many indicators of dysfunctionality are produced, notably in the form of reports by the United Nations (cf *Human Development Report*, 2004). The question here is how such indicators might then be best clustered to highlight insight into "sin".

In Table 6 the clustering is done [very tentatively] to respect the identification of the consequences evoked by "sin" -- evoked so dramatically as the Four Horsemen of the Apocalypse (*Book of Revelation*, 6): *War, Famine, Pestilence, and Death* [more].

<table>
<thead>
<tr>
<th>Table 6: Consequences evoked by sin</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Individualism&quot; (self-centeredness)</td>
</tr>
<tr>
<td>Conflict</td>
</tr>
<tr>
<td>Lack / Disproportion</td>
</tr>
<tr>
<td>Dysfunction / Excess</td>
</tr>
<tr>
<td>Decay / Decline</td>
</tr>
</tbody>
</table>

From a systemic perspective, the "horsemen" are tentatively generalized to provide the rows of Table 6. The columns of Table 6 are tentatively identified so as to hold a, potentially inappropriate, focus on the individual, the group or the environment -- namely a failure to balance those perspectives. For example, excessive "individualism" is a criticism of Western perspectives characteristic of Eastern cultures, whereas excessive focus on "community" is a criticism of Eastern perspectives characteristic of Western cultures. Excessive focus on the environment is a criticism made of preoccupations with nature and the mundane. As with Table 2, the 12 dysfunctional "sinful" cells of Table 6 might then be understood as engendered by the 7 "dimensions" of the table (3 columns and 4 rows).

A related exercise and table was developed in the context of the *Encyclopedia of World Problems and Human Potential* (see *Patterning problems: patterning the problematic*, 1995).

One difficulty with a statistical indicator approach to "sin" is that the emphasis is on monitoring conditions rather than on the capacity (or intention) to respond to them (cf *Remedial Capacity Indicators versus Performance Indicators*, 1981)

**Social process triangles as a potential framework for "sins"**

In the period 1970-72, the *Institute of Cultural Affairs* (ICA) and the associated Ecumenical Institute (Chicago) undertook an extremely comprehensive survey of the range of contradictions with which society was confronted. This material was ordered in various ways in a series of unpublished studies one of which identified 385 contradictions grouped into 77 categories (*Collective strategy-making: designing a strategic array*, 1994). These contradictions were perceived as underlying problems in many sectors (economic, cultural, social, etc). From 1974-78 this material was used to guide 50 community dialogues in some 30 countries. Each of these gave rise to further sets of contradictions described in a series of internal reports. To the extent possible, the profiles of problems and strategies were incorporated into the *Encyclopedia of World Problems and Human Potential*. 
The organizing framework originally developed by the ICA was termed "social process triangles" (cf Jon and Maureen Jenkins, *The Social Process Triangles*, 2001). This was designed to hold the dynamic interrelatedness of sociality as articulated by ICA in great detail. It presents a model of the social process that offers a way of holding together anthropological social theory into a single graphic abstract. At its most generic level the graphic is a single triangle -- the "social process" (see Figure 2). Within that are nested three other triangles -- cultural commonality, economic commonality, and political commonality. Within each of those a further three triangles are nested. In each case systemic relationships have been identified amongst their constituent elements (see example in Figure 3). In total 39 triangles are nested in this way.

Such a structure may be used to identify the many forms of imbalance. These might be termed "sins" in the case of the more ethical or spiritually focused triangles. In the case of more mundane processes such imbalances might be labelled metaphorically as "sins". The focus of the ICA was however primarily on the configuration of responses to such imbalances -- possibly to be understood here in terms of "virtues" or "virtuous".

**Vector equilibrium as a dynamic configuration of tendencies to disorder or "sin"**

There is a case for exploring three-dimensional configurations that can hold -- if only as mnemonic devices -- a 7-fold variety of "sins" (and their corresponding "virtues"). There is also value in seeking structures that have natural (geometric) relationships to other potentially significant "stories" based on number, whether the story of 4, of 5, of 6, of 8 (as above, in the case of the I Ching), of 9 (as above, in the case of enneagram), and so on (cf *Patterns of Conceptual Integration*, 1984; *Energy Patterns in Conferences: a context for higher levels of integration*, 1988; *Distinguishing Levels of Declarations of Principles*, 1980).

One particularly interesting candidate is the polyhedron known as the vector equilibrium (or cuboctahedron) or its less-known inverse termed the haptihedron [image]. Its dynamic features would seem to be important to reflect the dynamics of psycho-social systems -- and notably in relation to "sin". It has seven axes of symmetry. Attention was drawn to the vector equilibrium by R Buckminster Fuller.
The vector equilibrium is a condition in which nature never allows herself to tarry. ... Ever pulsive and impulsive, nature never pauses her cycling at equilibrium: she refuses to get caught irrecoverably at the zero phase of energy. She always closes her transformative cycles at the maximum positive or negative asymmetry stages. ... The vector equilibrium is at once the concentric push-pull interchange, vectorial phase or zone, of neutral resonance which occurs between outwardly pushing wave propagation and inwardly pulling gravitational coherence^6 (440.05-06).

The dynamics associated with the vector equilibrium and its various transformations have been explored through a model named by Buckminster Fuller as the jitterbug (see Vector Equilibrium and its Transformation Pathways: Comment, 1980). The jitterbug is widely distributed as a toy (a "vector flexor"). A number of illustrative movies demonstrate the stages in this transformation and their relationship to a related structure whose significance was extensively explored by Fuller, namely the tensegrity (see Gerald de Jong. Tensegrity Jitterbug, Robert W. Gray, Jitterbug Defined Polyhedra: The Shape and Dynamics of Space, 2001) [more]. Regarding these transformations, Bonnie Goldstein DeVarco (Invisible Architecture The NanoWorld of Buckminster Fuller, 1997) notes:

An excellent mathematical study of the stages of this transformation has been made by Robert W. Gray (The Jitterbug Motion, 2002). He points out in his analysis that:

The Jitterbug motion is visually complex but simple when you focus only on the motion of one of the 8 triangles.... We first note that since the 8 triangles of the Jitterbug during its motion do not change size, and since they move radially as they rotate, the 3 vertices of any of the 8 triangles are constrained to move on the surface of a cylinder. Second, from the symmetry of the Octahedron and the Jitterbug, each of the vertices of the Jitterbug is constrained to move in a plane.... Thirdly, a plane cutting through a cylinder defines an ellipse. Therefore, each of the vertices of the Jitterbug traverses a portion of an ellipse.... Note that there are 2 diametrically opposite Jitterbug vertices per ellipse which travel in the same direction. So there are two 'Jitterbug portions' to the ellipse. Since there are 12 vertices... 6 total ellipses for the Jitterbug.

However Gray restricts his focus to a first phase between the "open" vector equilibrium and its "closure" into the octahedral position, recognizing the transitions through the icosahedron and the dodecahedron. He does however considered the possibility of a sub-octahedral zone not mentioned by others:

By removing the constraint of fixed sized, impenetrable triangles, the vertices of the Jitterbug can be made to travel along the 'sub-Octahedron Zone' portion of the ellipse. There are then 2 different ways that the vertices can traverse this part of the ellipse

1) By allowing the scale of the Jitterbug triangles to change, but still not allowing the triangles to interpenetrate each other,  
2) By allowing the Jitterbug triangles to interpenetrate each other without changing the size (scale) of the triangles.

Some of his transition diagrams are usefully reminiscent of the geometric insights of those inspired by sacred geometry. Jim Nystrom (Jitterbug and Tensegrity, 1998) usefully diagrams the transformations through a second phase to the tetrahedral form, but not onto the triangle as a final phase.

For Fuller:

Every vector equilibrium has eight tetrahedra with 12 common edges, a common central vertex, and 12 common exterior vertices. Each tetrahedron of the eight has four planes that are parallel to the corresponding four planes of the other seven. Each of the vector equilibrium's eight tetrahedra has an external face perpendicular at its center to a radius developed outwardly from the nucleus. Each of the eight external triangular faces is interconnected flexibly at each of its three corners to one other of the eight triangles. [1012.30]

In such a closest packing condition, vectors connecting the centres of contiguous spheres line up in 60 degree angular relationships. Fuller suggests that there are peripheral "barrel-hooping" vectors which we can see as tending to hold the structure together against the expansive potential of the vectors radiating from its centre. If the radial direction is reversed, the contraction of the structure is opposed by the circumferential archwork's resistance to its own compression. By generalizing these ideas, synergetics purports to enable the conceptual modelling of patterns and processes which are normally represented only in an abstract, mathematical form, as in nuclear physics, for example. [more]
Again for Fuller:

Every tetrahedron, every prime structural system in Universe, has nine separate and unique states of existence: four positive, four negative, plus one schematic unfolded nothingness, unfolded to an infinite, planar, neither-one-nor-the-other, equilibrious state. [1013.41]

Craig Lloyd Faulkner (On The Foundations of Physics and the Evolution of Consciousness, 1999, with dynamic images) explores Fuller's synergetics as symbolic of an underlying undivided wholeness (reminiscent of Paul Tillich's "ground of being" noted earlier) allowing for "various modifications or structural displacements" and then returning to its primary undifferentiated condition. Faulkner understands these transformations as symbolizing "the concomitant manifestation of consciousness and the universe, or the subject-object manifold."

The vector equilibrium (and its dynamics) is of interest because of seven distinct axes of symmetry. It is with these that "sins" would need to be associated to be the basis for a meaningful formalization of the complex of "sins". Potentially, the vector equilibrium structure then has the additional advantage of:

- holding through its axes of symmetry, the kinds of cognitive bias in W T Jones' seven axes of bias (as discussed earlier);
- holding the seven, possible "sinful", types of WH-question (through which the plenum is encountered and engaged) that provide the frame for Table 2;
- holding through its 12 apices (or common edges), the 12 zones of cognitive distortion that might be associated with the cells of Table 2 (or Table 6);
- holding through its 8 triangular faces, the 8 trigram-coded forms of "sin" identified in Table 4 (although note that the jitterbug form may also be collapsed into an octahedron);
- holding through the "nine separate and unique states of existence" of any of its component tetrahedra the 9-fold formalization of the "enneagram of sin".

Valuable insights into the psycho-social relevance of synergetics, and the manner of its interpretation, are provided by Kirby Urner (Toward a Psychology of Synergetics, 1997). He stresses the metaphorical perspective (mentioned earlier with respect to interpretation of I Ching trigrams, and notably in the light of the work of George Lakoff):

Synergetics, as a work in the humanities, consists of layer upon layer of meaning, consistently articulated with an eye towards providing access to the generalized principles. The language is self-consciously metaphoric. The teaching here, I'd say, is that the core (of generalized principles) is not, in fact, a literal one. Symbolic consciousness is able to get us closer to the core precisely because its key terms are overloaded.

Later, under the same title (Toward a Psychology of Synergetics, 2000), Urner argues that:

Although I've stated that Synergetics should not be read as a theological work (which doesn't mean it should be eschewed by theologians), I think Fuller's willingness to include terms such as 'love' and 'truth' amidst the others, to allow them 'namespace trajectories' in connection with his other more 'scientific' key terms such as 'precession', is what necessitates categorizing it as a philosophical work.

Metaphors take us on linear trajectories "around" on a "sense- making surface" (a network, a sphere -- a star). They're superficially special-case in that they have primary content, are "about something in particular". But if we take them as metaphoric, our awareness is opened to a greater field, one which eternally eludes capture (because all communications are particular) in which this special-case (whichever) ties back to more generalized realizations, and so on. You might say that a kind of "collapse" is taking place, as you "undifferentiate the special cases" back to a more primal unity of meaning -- what Buddhists might identify as the Void itself (i.e. pure context).

The transformation dynamics are especially interesting as a means of exploring ways of collapsing and expanding categorization and comprehension of a "sin-complex" -- whilst maintaining its potentially deadly "integrity". A corresponding exploration of the merits of related structures for interrelating what amounts to "virtue-complexes" has also been made (Implementing Principles by Balancing Configurations of Functions: a tensegrity organization approach, 1979) notably as a means of transcending duality (Transcending Duality through Tensional Integrity: A lesson in organisation from building design, 1978).

The semantic articulation provided by the "social process triangles" (above) may offer a means of exploring the significance of the two-dimensional "triangles" whose differently oriented movements with respect to one another in three dimensions are identified in the movies of the jitterbug transformation (as discussed earlier). Of particular interest is the manner in which the vector equilibrium can "collapse" through a helical twisting motion down to a single triangle.

Prior to the whole structure being folded into that final two-dimensional triangular form the structure takes another two-dimensional form identical to the generic social process triangle of Figure 2 (with its four nested triangles, one being inverted). In the jitterbug model (with its eight triangles), the folded two-dimensional structure has a second set of triangles overlaid on the first four. The 12 centres of the vector equilibrium are collapsed down to 3 at the external vertices, and 3 overlaid at the middle point of each line between them. In this sense the set of social process triangles holds an implicate ordering of the explicate detail required to interface with mundane dynamics and comprehension.

Given the complexity of the many jitterbug transformations (see Vector Equilibrium and its Transformation Pathways: Comment, 1980),
it is worth distinguishing three modes of collapse, or contraction, that may be of mnemonic or symbolic significance:

- the collapse through the icosoahedron to the octahedron (along a helical pathway, around an axis of symmetry through two opposing triangles that rotate minimally in relation to one another), then continuing the motion down to a large 2-D triangle (composed of 4 triangles), which may then be folded, via a tetrahedron, to form a single triangle
- the collapse (along a helical pathway, around an axis of symmetry through two opposing triangles that rotate maximally in relation to one another) down to a large 2-D triangle (composed of 4 triangles) without passing through the octahedron, which may then be folded via a tetrahedron, to form a single triangle
- the collapse down (without any helical twist) to a square with triangles on each side, which can then be folded up into a pyramid - and then flat to delineate an octagon within a square

Day of Judgement: multi-dimensional accounting for sin?

A number of religions provide specifically for a process of "accounting" on a "Day of Judgement" or a "Day of Reckoning". Muslims believe that on that day (Yaum al-din) all people of the world throughout the history of mankind till the last day of life on earth, are to be brought for accounting, reward and punishment -- a resurrection accounting and weighing of deeds. For Christians, Jesus teaches that the Day of Judgement includes measurement, assessment, examination, and accounting (Mathew 25: 31-46). In Judaism, the crtical message of Yom Kippur involves the process of Heshbon HaNefesh (an accounting of one's life).

On such a day it is expected that sins would be appropriately weighed and measured. Given the complexity of human behavior, and the variety of forms of sin, it might be expected that this would necessitate a multi-dimensional accounting system appropriate to the subtlety of divine perspective, rather than a simple system immediately obvious from a human perspective. Given this possibility, there is a case for exploring the insights emerging from an understanding of the mathematics of multi-dimensional accounting.

This concern has been explored in a separate paper (Spherical Accounting: using geometry to embody developmental integrity, 2004) which draws attention to the work of David Ellerman (Double Entry Multidimensional Accounting, 1986). He proposes a model of double entry multidimensional accounting using vectors of property rights. He notes that:

There is, in modern algebra, a standard construction called the group of differences [or 'Pacioli group']... the intuitive algebra of T-accounts used in double entry bookkeeping is precisely equivalent to that group of differences construction... The T-accounts of double entry bookkeeping are the ordered pairs of the group of differences construction... Double entry bookkeeping lives in group theory, not in matrix algebra.

Such vector accounting (or property accounting) provides a valuation-free description of the property transactions underlying the value transactions of ordinary accounting, thus avoiding their valuation controversies. According to Ellerman, it is called property accounting because it keeps accounts directly in terms of the stocks and flows of the underlying property rights. It attempts to stake out the objective territory that involves no valuation in order to delineate the real issues of valuation. This may point to a better understanding of the nature of the accounting processes, with respect to a variety of sins, on the Day of Reckoning.

Ellerman states:

...vector accounting shows that an accounting equation can still be used in the presence of incomparability between dimensions by using vector equations. This is a mathematical fact independent of the content. the content of the vector accounting formalism could be property accounting, social accounting, accounting for physical inventories at different locations, and so forth.

Bonnie Goldstein DeVarco (Energetic Architecture - Buckminster Fuller's Geometry of the Sphere, 1997) notes the anticipation of some of Fuller's geometric insights by the so-called "Father of Accounting", Luca Pacioli (De Divina Proportione, 1509, illustrated by Leonardo da Vinci). A glass rhombicuboctahedron half-filled with water is the focus of a widely analyzed contemporary painting of Pacioli held to epitomize the deep Renaissance connection between art and mathematics. Pacioli is a key figure in the recognition of centro-symmetrical polyhedra [more]. As a monk his insights into the relation between accounting, geometry and "sin" would have been most valuable.

Given David Ellerman's approach to "vector accounting" [above] -- using directed graph theory to handle distinct forms of property ("property accounting") -- it is tempting to forsee a link to Fuller's formalization of polyhedral energy systems in terms of vectors (Synergetics: Explorations in the Geometry of Thinking, 1975: 420.00, 513.00, 521.00). However any such approach needs to be set in the context of other formal approaches to polyhedra (cf Branko Grünbaum. Are Your Polyhedra the Same as My Polyhedra?).

Also of great potential interest, in comprehending the emergent spherical balance, is the related approach of Stafford Beer (Beyond Dispute: The Invention of Team Syntegrity, 1994) from a perspective of management cybernetics.

Pacioli's own work had been preceded by Leonardo of Pisa, (1170-1250), also called Fibonacci, who had a vital role in collating for Europeans the Arab and Indian insights into mathematics (Liber abaci, 1202). Although the relevance of Fibonacci series has been widely explored, there do not appear to be any direct references, in relation to "sin", to the shared concern of Fibonacci and Pacioli with the Golden Mean (the ratio of any two consecutive numbers in the Fibonacci sequence; a proportion that is an important phenomenon in music, art, architecture and biology), notably as represented in polyhedra.

With respect to the associated sense of "balance", however, and in discussing the American constitutional "Golden Mean" from a
Christian, right-wing perspective, Fred Hutchison (Utopia: The perpetual delusion of the Left, 2004) argues:

Utopia is a romantic fantasy of a perfect future secular society on earth built by man with God left out...Why is utopia a false hope? Original sin

The Founding Fathers discovered the "sweet spot" in which both tyranny and anarchy can be avoided. They wisely realized that utopia is beyond our reach but the virtue of the golden mean is not. America has bred a moderate and temperate people with an intuitive sense of balance.

"Redemption of sins" and "healing"

The exploration of Faulkner regarding synergetics, and the dynamics of the vector equilibrium, suggests the possibility that what is understood as a "fall into sin" may be modelled as a particular kind of transformation. In theological terms this is especially interesting because in its most collapsed form the jitterbug is a triangle -- any expansion from that form may be viewed as the introduction of additional perspectives, possibly to be understood as "distorted" and (geometrically) dissociated from the primal "omnidirectional" perspective.

The jitterbug expands on a helical pathway, through a number of intermediary forms, to the vector equilibrium -- corresponding to the 12 closest packed spheres with a seven-fold axis of symmetry. Again from a theological perspective, and in the light of the concerns regarding the "inauspiciousness" of 13, the vector equilibrium as the most manifest or "fallen" condition, has the 12 spheres configured around a thirteenth. In Fuller's words:

We have here a pumping model of the vector equilibrium. It consists only of the vector lines of the system formed by 12 uniradius spheres closest packed around one sphere of the same radius. The interconnecting lines between those 13 spheres produce the pumping vector equilibrium model's skeleton frame. [1012.30]

In terms of Fuller's formalization in Synergetics: Explorations in the Geometry of Thinking (1975), the "redemption of sins" might possibly then be described as:

It is found that the whole vector equilibrium external-vector framework can contract symmetrically, with the four pairs of the eight external triangles moving nontorquingly toward one another's opposite triangle, which also means toward their common nucleus. As they do so, each of the four pairs of exterior triangles approaches its opposite. When the eight separate but synchronously contracting tetrahedra diminish in size to no size at all, then all eight planes of the eight triangles pass congruently through the same nuclear center at the same time to form the four planes of the vector equilibrium [1012.30].

Buckminster Fuller has commented on the significance of the expansion-contraction, pulsation ("pumping", or "breathing") of the system modelled by the jitterbug [more | more]. But Fuller's reference to "no size at all" is reminiscent of theological perspectives -- notably the experience and significance of "nothingness" (or emptiness, or void) in mystical states (cf Sarah Voss. Zero: Reflections about Nothing, 1998).

This is a state of 'pure consciousness', recognised in many spiritual disciplines, in which the mind has been emptied of all particular objects and images; also, the undifferentiated reality (a world without distinctions and multiplicity) or quality of reality that the emptied mind reflects or manifests (cf Jean-Paul Sartre. Being and Nothingness : A Phenomenological Essay on Ontology). [more]. Robert W Gray (Limits vs Levels) offers insightful imagery based on the jitterbug transformation to show how: "Our minds are constantly in flux. Ideas fade in and out. Associations are made and forgotten" -- insights he relates to understanding of what is "Buddha mind".

In this light, the state of perfection denoted by the term "redemption" is one in which the theological geometry is contracted to a triangle - - the trinity, or further -- a form of "implicate order" in David Bohm's terms (Wholeness and the Implicate Order, 1980). Any expansion of that geometry into "explicate order" must necessarily constitute a "fall" into a degree of "sin" -- exemplified by configuration of the 12 emergent perspectives around the thirteenth. In the mundane world of manifestation, the "pumping" action, and the associated "twisting" motion that sustains that manifestation, may be understood as exemplifying the "fall". Given their Freudian connotations, they then justify fundamentalist reservations about sexual relations.

The cycle of pumping, expansion-contraction, or explication-implication, may also be understood in spiritual terms as one of emergence of "attachment" to the mundane (in its archetypal 12-fold variety) potentially followed by stages of "detachment" from it -- the classical process of spiritual "ascent". In this sense particular sins are particular forms of attachment to features of the expressed geometry. A merit of the vector equilibrium is to render explicit the challenge of the refocusing the cognitive "centre of gravity" within the geometry -- in contrast with pointing to "sins" from a perspective assumed in some way to be external to that geometry.

From the perspective of Ken Wilber (The Marriage of Sense and Soul: Integrating Science and Religion, 1998) in macrohistorical terms there has been a devolution or falling away from God: "So in the unfolding of Spirit we humans were once close to God but through a series of separations, sins and contractions Spirit gradually has become less available". But then:

Having fallen into the manifest or material world, Spirit begins the process of returning to itself, and the process of the return of Spirit to itself, and the process of the return to Spirit is simply development of evolution itself. The original descent (or involution) is a forgetting, a fall a self-alienation of spirit; and the reverse movement of "ascent" or evolution is thus the self-remembering and the self actualisation of Spirit. And yet, the Idealists emphasized all of Spirit is fully present at each and every
stage of evolution as the process of evolution itself.

In this geometric transformation, the "seven deadly sins" might be said to govern the transformation pathways along which the "fall" takes place. However it is those same pathways, in the reverse direction, that may be understood as the pathways of "redemption" -- associated with the corresponding "seven salvatory virtues". The "healing" is the "making whole" associated with the contraction into "implicate order", modelled from the vector equilibrium into a triangle.

A major challenge of any formalization is the loss of semantic content. This is particularly evident in relation to the distinction between variants that are otherwise well modelled by geometry. In such a case the distinction between the variants is embodied in orientation of distinct emergent forms and the various perspectives from the distinct parts. More challenging, as with any rose window or mandala, is the distinction held by the "inner" structure from the "outer" or "peripheral" structural elements -- as implied by the collapsed versus expanded stages of the vector equilibrium. Further difficulties are associated with the various possibilities of interpretation indicated in Table 5. All such difficulties increase the challenge of understanding "in which direction" lies "redemption" and how the potential of any "fall into sin" is to be recognized.

Whilst this formalization of the relations between "sins" and "virtues" may be considered abstractly, there is also a case for exploring their experiential, personal, existential significance -- namely how the process is embodied. How might the vectoral equilibrium transformation process be understood personally? What indeed does this "twisting" imply for reorienting awareness to different frames of reference of different dimensionality (cf Patrick A Heelan. The Logic of Changing Classificatory Frameworks, 1974)? What is "sacrificed" through this process as notably explored by Antonio de Nicolas (Meditations through the Rg Veda: Four-Dimensional Man, 1977)?

**Implications for faith-based governance**

Within these possibilities for formalization of "sin", how is fundamentalism to be understood? It could be understood as a privileged orientation towards the kind of more intrinsic structure symbolized by the compact phases of the vector equilibrium -- oriented away from what is symbolized by its most expanded form in which the greatest variety is exhibited. Such expanded forms are anathematized as more dissociated and disconnected from the divine perfection of the more implicate. The expression of that perfection through diversity is then unrecognized. This is tantamount to a total failure to understand Paul Tillich's insight (cited earlier), namely that the phrase deus sive natura, used by people like Scotus Eriggena and Spinoza, does not say that God is identical with nature but that he is identical with the natura naturans, the creative nature, the creative ground of all natural objects. Hence the fundamental importance attached in many religions to "remembering God" -- or "remembering Allah" -- at all times. But at what point does inappropriate rejection of the natural world make of fundamentalism an "abomination" in its own very terms -- as a rejection of God? How is the subtle quality of such "inappropriateness" to be assessed?

In this extraordinary period, "faith-based" governance is explicitly distinguishing itself from "reality-based" governance [more | more]. The following comment on Martin Heidegger (What is Called Thinking? 1968), by physicist and philosopher, Patrick Heelan (After Post-Modernism: The Scope of Hermeneutics in Natural Science, 1977) is therefore pertinent:

Heidegger feared that, to the extent that scientific inquiry is successful in the construction of explanatory theories, it would turn the focus of philosophical inquiry away from 'meditative thinking' about the lifeworld as the cultural arena for human life fulfillment, that is, away from meaning and meaning change, and toward (what Aristotle called) 'calculative thinking' ordained toward management and control; in the latter, things are treated as means to ends within... the assumed 'objective' frame of 'objective reality'. No minimizing is intended, however, of the great benefits that can and do flow from the 'calculative thinking' of scientific inquiry. Nevertheless, Heidegger foresaw that such benefits could have a human cost, for they affect the way cultural life teaches people to be human and communicates to them the sense of the wholeness, integrity, and goodness of the world, the self, and human communities.

The challenge for faith-based governance is then:

- a degree of rigidity, which in a respiratory metaphor would be understood as an inability to breathe out -- a dangerously unbalanced respiratory cycle.
- in terms of W T Jones' axes of bias, one extreme of any axis is emphasized -- with very limited ability to relate to the other
- in terms of a dancing metaphor, the possibility of shifting flexibly between extremes is perceived as inappropriate -- only one orientation or posture is celebrated

A formalization like the vector equilibrium suggests the direction of "sin" and the direction of "redemption". This might be understood as a geometric equivalent to the widespread mountain metaphor for spiritual insight -- providing that "there are many ways to the top of a mountain but the view from the top is the same". A variant is the wheel metaphor -- whose spokes metaphorically signify the different "ways" to the common hub. Such metaphors privilege exclusivist perspectives.

As noted elsewhere (Spontaneous Initiation of Armageddon: a heartfelt response to systemic negligence, 2004), the constraints of the mountain / wheel metaphor have been put forward by Jacob Needleman (Why philosophy is easy in: The Indestructible Question, 1994) through articulation of a contrasting geographical metaphor as follows:

Our simile shall be geographical, we locate the center at some' point on the surface of the earth, say at the top of a particular mountain. Instead of spokes, we shall speak of paths or routes proceeding from a number of locations quite distant both from each other and from the mountain, and which therefore exhibit great differences with respect to climate, terrain, social and
Faith-based governance is framing the "end times" challenge of the security systems. Mathematics in general would not be expected to value efforts to associate the Role of mathematics in support of faith-based governance

Geometry configuration of the organization of psycho-social organization sensitive to different dimensions of knowledge in a knowledge society, as exemplified by the web, may also provide the source of our being makes hierarchical rankings of spiritual traditions appear misconceived, but also re-establishes our direct connection with the dynamic and indeterminate spiritual power. This participatory understanding of "perennial philosophy" as advanced by "perennialists" -- and more subtly by Needleman: It is very reassuring to think that all the different religions and spiritual traditions in the world are aimed at sharing the same basic truths -- and that we are all heading in the same direction..... I would like to suggest that human spirituality emerges from our co-creative participation in an always dynamic and indeterminate spiritual power. This participatory understanding not only makes hierarchical rankings of spiritual traditions appear misconceived, but also re-establishes our direct connection with the source of our being and expands the range of valid spiritual choices that we as individuals can make.

It is possible that faith-based governance will need to organize itself in direct response to the dimensions of sin -- and to any action out of "sinful" understanding -- as might be more precisely formalized. In this respect, the strengths and limitations of the mathematically-inspired past efforts of the World Government of the Age of Enlightenment (1976) might be reviewed (cf David Leffler, Invincible Defense Technology is the Ultimate Homeland Security Strategy). To what extent has faith-based governance of the past (whether Christian, Muslim, or otherwise) been successfully organized structurally in terms of direct recognition of the articulation of sins and of the complementary pathways of redemption? Faith-based governance might also seek to articulate developmental transformation in terms that reflect insight from such formalization. Indeed the notion of "paradigm change" might be articulated in new ways in the light of the kind of formalization modelled mathematically by the transformations of the jitterbug. Of particular interest is the non-linear nature of that transformation as reflected in the necessary "twisting" of perspective in the helical transition between various forms of organization (Engaging with Questions of Higher Order: cognitive vigilance required for higher degrees of twistedness, 2004). This may well be found necessary to the transition between forms of psycho-social organization sensitive to different dimensions of faith and insight or in "sinful" opposition to them.

Such organizational preoccupations may follow from increasing concern with giving form to "spirit in business". Their implications for the organization of knowledge in a knowledge society, as exemplified by the web, may also provide a focus -- especially given various fundamentalist agendas to "control the web". The possibility for a "macro-organization of knowledge", through faith-based approaches to the emerging "semantic web", also bear consideration (cf From Information Highways to Songlines of the Noosphere: Global configuration of hyperertext pathways as a prerequisite for meaningful collective transformation, 1996; Sacralization of Hyperlink Geometry, 1997; The Iskum of the Wisdom Society: Embodying time as the heartland of humanity, 2003).

Role of mathematics in support of faith-based governance

Mathematicians in general would not be expected to value efforts to associate their discipline with any formalization of "sin" -- or with recognition of an ethical framework, or any related spiritual insight. They may however find themselves "encouraged" towards such exploration through future funding priorities of faith-based governance. It should not be forgotten the extent to which mathematicians are coopted and funded as a consequence of the "faith" of secular governments in the development of new weapons, defence and other security systems.

Faith-based governance is framing the "end times" challenge of the very immediate future as the encounter with the forces that oppose it.
These forces are necessarily to be understood as "demonic" -- effectively the embodiment of the set of "sins", appropriately disguised to perpetrated the highest forms of deception. If these forces make cunning use of mathematics to better organize and deploy "sinful" memetic agents, then mathematicians will be rapidly drawn into the analysis of such memetic weapons systems and the design of appropriate counter-measures.

Any formalization of "sin" offered above would then be quickly perceived as trivial compared to what is possible with more sophisticated branches of mathematics capable of designing memetic weaponry of a far higher order of complexity -- a degree of multidimensionality reflecting comprehension of "sacred geometry" that might make mystics weep for joy! Weapons systems are necessarily designed to damage and destroy opponents as well as protecting against counter-measures. Such conflicts are necessarily binary and offer many interesting opportunities for mathematical analysis.

Rather than providing for mutual destruction in a binary conflict, mathematics also has a remarkable capacity to enable the design of the most elegant "bridges" across the most challenging abyss -- separating two territories hitherto unjoined. Just as the most sophisticated mathematics is called into service for "defence" and "security" purposes (including "code-breaking" of the secret communications of opponents), the question is whether circumstances call for equally sophisticated mathematics to design such a bridge. Just as the challenge of opposition calls for the most sophisticated mathematics, it might be expected that the basic mathematics used to construct a conventional bridge would be understood to be totally inadequate. What is effectively required is a "bridge" across a multi-dimensional chaotic space. This is not a challenge to which ordinary bridge builders could hope to respond. Metaphorically it is close to some of the space-time bridges envisioned by science fiction.

In this respect Richard S. Kirby (The Future of Mathematical Sociology, 2003) points to the emergence of a hybrid social science reflecting insights analogous to those of quantum mechanics. He notably refers to the work of Kenneth Miller (Vibrational Relativity Theory, 2003), noting that:

> If, as is increasingly seen in such fields of study as ontology, personology, and theology, the Personal is seen as having a greater degree of epistemological ultimacy than the impersonal, then it would follow that a fundamental revolution of thought within the social sciences, or to be more exact the socio-politico-ethical sciences, would imply a breakthrough in all of science, as it would then be seen that the Cosmo-human parameters of all thought of science would be an expression of, or a journey towards, the deepest imaginable reality relevant to the human condition.

The irony is that it is the most spiritually inspired mathematicians who have recognized the dimensionality of the challenge. But the deeper irony is that they may well be of quite different faiths -- and have not yet been "encouraged" to apply their skills and insights to design a bridge capable of maintaining its integrity through the necessary transformations between the different modes of organization of knowledge-space at each end.

Given the symmetry between "sin" and "virtue" in any formalization that may be envisaged, there is every possibility that this may offer insights into the nature of a transformational pathway between perspectives that would otherwise appear to be inherently incommensurable.

It may prove to be the case that faith-based governance in a multi-faith society calls for a much higher order of mathematics to enable and sustain meaningful communication, dialogue and organization. Mathematicians may well be called upon in ways they had not envisaged (cf And When the Bombing Stops? Territorial conflict as a challenge to mathematicians, 2000). As noted in the introduction, in the words of Sarah Voss (Mathematical Theology, 2003):

> A Cantorion perspective offers another option: The part may have the power of the whole. When we use Cantorian set theory as a metaphor for thinking about contemporary religious pluralism, we find a wonderful precedent for accepting what might appear to be unacceptable contradictions between religions. In other words, many different religious traditions may independently be "equivalent" to the one whole truth.

Any such verbal conclusion runs the extreme risk of being understood as in conflict with sacred writings that warn against syncretism and "false gods". As noted with respect to Sayyid Qutb by Luke Loboda (The Thought of Sayyid Qutb: Radical Islam's Philosophical Foundations, 2004), this tendency is readily labelled by the Arabic term *shirk*, meaning "associating false gods with Allah" -- a sin most severely condemned:

> "For a certainty, God does not forgive that partners should be associated with Him, but He forgives any lesser sin to whomever He wills. He who associates partners with God has indeed gone far astray" (Qur'an 4:16).

Similarly, Christian fundamentalists would refer to injunctions which include the first of the Ten Commandments:

> "I am the first, the last, the only God; there is no other God but me". (Isaiah 44:6 ) "Thou shalt have no other God but me," (Exodus 29).

The question is whether more sophisticated forms of mathematics would enable the emergence of new understandings of the nature of the "unity" between seemingly distinct spiritual perspectives -- that would transcend those that can be articulated in words. It would seem that only by addressing the challenge of fundamentalism in these terms that the scope of such unity can be appropriately honoured intellectually -- with all that would then imply for faith-based institutions and governance.