



# laetus in praesens

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## Strategic Complexity Attracting Consensus

### Klein is beautiful -- Sustaining identity in time

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## Introduction

Recent events continue to demonstrate that the probability of achieving global agreement on conflict-inducing issues and emergencies is low -- within the frameworks and worldviews currently considered appropriate in negotiations to that end. Temporary compromises are primarily conducive to subsequent dysfunctional game-playing and collapse of any consensus. This is an exploration of the possibility of subtler and minimalist patterns capable of eliciting unconventional forms of consensus. It follows an earlier effort to frame the complexity of the current condition (*Imagining the Real Challenge and Realizing the Imaginal Pathway of Sustainable Transformation*, 2007).

It is profoundly curious, in a time of evident challenges to effective global governance, that it is considered so laudable to invest vast resources in military systems based on far more sophisticated mathematics than is applied to issues of governance, or in use of such mathematics in risk management on a stock market by which the global system is currently destabilized. It is equally curious that science is funded so extensively to engage in costly multinational experiments in fundamental physics in the pursuit of elusive particles, or in the construction in 2011 of various massive radio telescopes capable of detecting signals over 10 billion light-years in distance -- a view of the beginning of the universe.

Is it to be assumed that the clearly inadequate processes of governance call for no such investment, or that their dynamics are systematically avoided as being too complex for the capacities of science, or that there is an implicit collective preference for learning from catastrophic failure? There is a profound irony to the characteristics of such scientific investments -- the annihilation of humans in warfare, the examination of the infinitely small, and the detection of the infinitely distant -- when no such capacity is applied to the challenges of decision-making and governance on matters "close to home" and capable of ensuring civilizational collapse.

It would appear that there is a case for the attitude implicit in the title of the study of the Chinese classic by [Chu Hsi](#) (*Reflections on Things at Hand*). In the spirit of the title and theme of the prize-winning book by [Arundhati Roy](#) (*The God of Small Things*, 1997), the following exploration therefore focuses on a minimalistic possibility by which people could choose to enhance their lives. Strategically this might be echoed by the articulation of [Duane Elgin](#) (*Voluntary Simplicity: toward a way of life that is outwardly simple, inwardly rich*, 1981).

The focus here is on a paradoxical topological form, the [Klein bottle](#), in enabling a more fruitful approach to governance -- effectively a catalytic "surface" for appropriate cognition. That surface makes evident the possibility of bridging between "inside" and "outside", or "right" and "left", for those obliged to live "between" (*Living as an Imaginal Bridge between Worlds: global implications of "betwixt and between" and liminality*, 2011). The use in the title of 8 as a conjunction is intended to recall the [Möbius strip](#), a topological relative of

the Klein bottle, but more readily comprehensible, as discussed separately (*Defining the objective ∞ Refining the subjective ?! Explaining reality and infinity Embodying realization*, 2011).

In the same spirit, the subtitle of this exploration is a play on the title of the influential book by E. F. Schumacher (*Small Is Beautiful: a study of economics as if people mattered*, 1973) -- as a contrast to a seemingly fruitless mega-science whose creativity and insights are poorly adapted to the challenges of the times. In anticipation of Rio+20 -- the anniversary conference of the Rio Earth Summit (1992) -- the situation with respect to global governance, and the benefits it derives from science, might well be adapted from the title of another book (James Hillman and Michael Ventura, *We've Had a Hundred Years of Psychotherapy - And the World's Getting Worse*, 1992).

The argument which follows is presented during yet another dramatic crisis -- the Palestinian request to the UN for recognition of long-promised statehood -- in the intractable dynamics between two cultures with the strongest mathematical traditions, namely Judaism and Islam. Their incapacity to apply these insights in order to transcend an age-old conflict is itself as remarkable as the seeming inability of mathematicians to advocate techniques commensurate with the complexity of the issue (*And When the Bombing Stops? Territorial conflict as a challenge to mathematicians*, 2000; *Reframing Relationships as a Mathematical Challenge: Jerusalem -- a parody of current inter-faith dialogue*, 1997).

The same might be said of the simultaneous dramatic challenge to the eurozone -- engendered and exacerbated by the mathematical complexities of trading in derivatives (*Uncritical Strategic Dependence on Little-known Metrics*, 2009). Of the IMF Summit, at the time of writing, one commentator indicated (Heather Stewart, *Pressure mounts on eurozone ministers as debt crisis dominates IMF summit*, *The Observer*, 25 September 2011):

... this weekend's latest bout of summiting ended with few concrete achievements, apart from ratcheting up the mood of urgency: reminding eurozone ministers that the rest of the world is looking over their shoulders, and that time is running out.

## Intractable binary issues

These are usefully understood in terms of sustainable boundaries and identities regarding which debate has proven endlessly fruitless, as exemplified by:

- **Middle East**, exemplified by Jerusalem in particular: Framed in terms of encroachment by settlements, recognition of boundaries, identity of "Palestine" and "Israel", with Jerusalem as their respective "capitals".
- **China / Taiwan**: as a long-standing, potentially explosive confrontation
- **Brussels**: The city has long been the remarkable focus for controversy relating to the boundaries and identities of the Flemish and Walloon communities of Belgium, a country without a government for over a year. Brussels as "European capital" is also the focus of controversy in relation to the requirement that meetings of various European institutions be transferred periodically during the year, at considerable cost, between Brussels and Strasbourg.
- **Immigration**: The evident pressures on populations resulting in economic immigration with its controversial consequences have been framed in terms of territorial integrity along various borders (USA/Mexico, Europe/Africa, etc), the challenges to national identity of multicultural societies, and the associated mutual intolerance
- **Employment**: The challenge of unemployment, especially for the young, can be understood as raising issues about the very nature of employment and the identity traditionally enabled by it.
- **UNCED Earth Summit** (Rio 1992, Johannesburg 2002, Rio de Janeiro 2012): Framed in terms of the sustainability of development, now faced with the evident resource challenges of unchecked population increase, consequences of global warming, environmental degradation, and disagreement about responsibilities, and how to negotiate for credible action on these matters

Underlying and reinforcing these issues are the boundary disputes and mutual deprecation of disciplines, inhibiting any effective transdisciplinary approach in practice -- and notably of any relevance to governance. A similar pattern is to be seen in the relation between institutional sectors of administration, most frequently manifest in the subsequent recognition of "lack of coordination" in response to emergencies. The pattern is of course evident in interfaith discourse -- effectively unable to respond to the conflicts between radically different worldviews. Despite the claims of science and atheists, adherence to extraordinary worldviews is increasing, as documented by editors of *The Economist*, John Micklethwait and Adrian Wooldridge (*God Is Back: how the global revival of faith is changing the world*, 2009).

The intractability of all such disputes might be fruitfully understood in terms of the estimate by experts that some five percent of international conflicts become intractable: highly destructive, enduring and resistant to multiple good-faith attempts at resolution (Peter T. Coleman, *The Five Percent: Finding Solutions to Seemingly Impossible Conflicts*, 2011). Curiously the challenge of engaging with the "intractable" is as poorly explored as is the case with surprises in general (*Engaging with the Inexplicable, the Incomprehensible and the Unexpected*, 2010).

It might be asked what level of sophistication is currently considered credible and appropriate to the analysis of "intractable" conflicts -- and what hypothesized benefits might result from the more sophisticated forms of analysis currently framed as irrelevant. Is it for example possible that the very nature of "disagreement" is the key to understanding higher forms of order (*Using Disagreements for Superordinate Frame Configuration*, 1992)?

The question with respect to the ongoing crisis in the Middle East, and focused on Jerusalem, might also be asked with respect to the financial system. As noted above, whilst complex mathematics is central to the trading patterns from which the crisis has emerged, the mathematics used to analyze and represent the crisis comprehensibly is of the simplest kind -- and seemingly inadequate to the needs of governance, as separately discussed (*Monkeying with Global Governance: emergent dynamics of three wise monkeys in a knowledge-*

*based society*, 2011).

The pattern is also to be seen in the sophistication of the mathematics applied to meteorological **modelling**, and the power of the "supercomputers" required. Again the quality of mathematics applied to the systemic **decision-making** relating to climate change can only be described as simplistic (*Insights for the Future from the Change of Climate in Copenhagen*, 2010). There is little capacity to analyze global systems to identify unexplored windows of opportunity, as separately highlighted (*Simulating a Global Brain -- using networks of international organizations, world problems, strategies, and values*, 2001).

This creates a situation in which global governance is primarily characterized by a vast pattern of assertions, denials and blame-gaming (Charlie Campbell, *Scapegoat: a history of blaming other people*, 2011). The pattern is increasingly recognized to be vacuous, without substance, and without ability to engage effectively with the issues. Worse still, it might be said that there is a marked tendency to use skills on call to "design around" intractable issues. in a process of systematic avoidance exacerbating systemic negligence (*Lipoproblems -- Developing a Strategy Omitting a Key Problem: the systemic challenge of climate change and resource issues*, 2009).

With respect to the current financial crisis, it is noted that investors are losing patience with windy declarations about the determination of governance. Commentators cite the words of Churchill with respect to the politicians of today as being: "resolved to be irresolute, adamant for drift, solid for fluidity and all-powerful for impotence." As stated with respect to the crisis by the current UK Prime Minister: *We are not quite staring down the barrel but the pattern is clear.* (22 September 2011).

It is questionable whether one can understand the nature of the solution required unless -- self-reflexively -- one understands how one is part of the problem. The question explored here is whether clues are to be derived (notably from the Klein bottle), to highlight unexplored possibilities, both from the "intractable" dynamics themselves and the "vacuous" characteristic of governance in response. As discussed separately, the possibility might be described in terms of discovering mnemonic catalysts of requisite complexity (*In Quest of Mnemonic Catalysts -- for comprehension of complex psychosocial dynamics*, 2007).

## Eliciting a minimalistic approach informed by indirection

Relatively unsuccessful efforts to respond to such issues, and to many others -- globally or otherwise -- highlight the possibility that governance as traditionally envisaged may be inadequate to the challenges of the future (*Ungovernability of Sustainable Global Democracy? Towards engaging appropriately with time*, 2011). The lack of consensus on this conclusion might even be said to be part of a more fundamental issue (*The Consensus Delusion: Mysterious attractor undermining global civilization as currently imagined*, 2011). Remedial strategic proposals, as conventionally made, are typically the victim of recurring cycles and patterns of controversy.

The approach taken in what follows endeavours to reframe the strategic opportunity in order to avoid this "strategic trap". The emphasis is on a "style", itself eluding definitive articulations such as those separately endeavoured (*Focus Subtleties: Meeting Magic Towards Transformative Conferencing and Dialogue*, 1984). The comments derive from initiatives, perhaps under special circumstances, in which meetings "come together" and "take off" as if by magic. It might be called serendipity. There is very little indication of why this comes about or how it is to be described objectively. It can happen when every care has been put into arranging the initiative and selecting the participants, or it can happen under extremely non-ideal circumstances.

As indicated in that comment, such initiatives are commonly described with terms such as: indirection, paradox, incompatibility, attunement, "chemistry", aesthetic, elegance, drama, "invisible hand", non-action, non-conscious, humorously quixotic, innocence, and magical shifts of perspective

As noted elsewhere (*Resonances between Challenging Psychosocial Change Initiatives*, 2007), the challenge in determining what is "relevant" to a strategic initiative, or to its reconciliation with others, might be understood as any of the following, whether singly or in some combination:

- reconciling modalities:
  - the **conceptual** challenge of reconciling different models, proposed by distinct constituencies
  - the **"political"** challenge of determining with which other initiatives to partner, which to invite as participants, and which to avoid
  - the **religious** and theological challenge of reconciling different belief systems committed to the initiative
  - the **spiritual** challenge of reconciling different experiential understandings and practices
- compromising:
  - the compromises required to ensure the **financial viability** of the initiative
  - the compromises required to ensure the **media exposure** of the initiative and the dissemination of its insights
  - the **psychosocial dynamics** and **contrasting preferences** between the central personalities instigating and undertaking the initiative or active in its processes
  - compromising on location between **symbolic value** and constraints on participation (travel costs, security, visas, etc)
- engaging:
  - the compromises required to ensure the involvement of **people of authority** endorsing the initiative
  - ensuring appropriate **participation** and **empowerment** of wider circles of people
  - **representing** the perspectives of those involved in the process to the authority structures of the world
  - ensuring the appropriate degree and quality of **impact** and practical outcomes
- enabling: humour
  - making best use of the latest **technology** to facilitate the dialogue between participants at the event and remotely located
  - use of appropriate **facilitation**, recognizing the constraints on cultural preferences and enthusiastic use of particular processes

- appropriately **registering emergent insights** during the process to facilitate its evolution
- use of **non-verbal and non-textual** means of articulating and communicating emergent insights in a memorable manner (song, poetry, music, art, etc)
- positioning:
  - engaging appropriately with **critics, opposition** and those with reservations -- or engaged in **alternative initiatives** effectively competing for resources, participants, speakers, or claims to representation
  - **learning from past initiatives** with similar aspirations -- their strengths and weaknesses
  - **simplifying and prioritizing** the above into a viable comprehensible strategy

## Questionable assumptions based on conventional geometric metaphors

Curiously, from a geometrical perspective, strategic discussion is characterized by the making of "**points**" (ultimately embodied in the "points" of any agreement), respectful of a "**line**" of argument (possibly precluding some alternative "line"), typically elaborated by one "**side**". Curiously it is assumed in a democracy that if a majority agree on a "point", then the minority is effectively expected to "toe the line". Failure of some to do so results in criticism to the effect that they are "out of line".

The result of a degree of consensus may take the form of a "**plan**" -- respectful of the planar mindset of urban planning (cf. *Geometry of Organizations, Policies and Programmes*, 1992). Efforts are made to formulate more complex agreements such as to hold the perspectives of several distinct "sides", effectively framing a minimal "**space**" of consensus. The implications for governance of even more complex polyhedral forms are neglected (*Towards Polyhedral Global Governance: complexifying oversimplistic strategic metaphors*, 2008).

Although consideration is given to curves, represented by performance graphs providing coherence to sets of data points, no attention is given to the relevance of curvature with respect to agreement or the coherence of discourse. Remarkably however, the catastrophes with which governance is frequently confronted are usefully represented by the complex curves of **catastrophe theory**. Currently styles of governance might then be caricatured as an attempt to engage adequately with curvature using linear thinking -- a curious echo of the archetypal encounter between male and female, or between sperm and ovum.

It is profoundly curious, in a time of evident challenges to effective global governance, that it is so readily assumed that these simple geometrical metaphors can be adequately deployed to engage with the challenges faced by governance now and in the future. As noted above, this contrasts strikingly with the expenditure of vast resources on military systems requiring much more sophisticated mathematics, or with the use of such mathematics in risk management on the stock market.

It also contrasts with the expenditure of resources on major multinational experiments in fundamental physics in the pursuit of elusive particles (eg **CERN Large Hadron Collider**) and with the multiple initiatives in 2011 to construct "the largest" radio telescopes capable of detecting signals from close to the beginning of the universe China (*Five hundred meter Aperture Spherical Telescope*), Africa or Australia (*Square Kilometre Array*), Russia (*RadioAstron*), and Chile (*Alma*). These recall the acclaim attached to the curiously competitive efforts to construct the **tallest building** in the world.

As stated by **Martin Rees**, Astronomer Royal (*Britain needs schools for science*, *The Guardian*, 19 September 2011) in his inherently contradictory clarification of the "blazingly irrelevant":

Indeed, I'm gratified and surprised that so many people are interested in dinosaurs, the Large Hadron Collider or alien life - all blazingly irrelevant to our day-to-day lives... But there are reasons to be cheerful. There is a huge educational upside from computers and the web, allowing young people to participate in frontier science. For example, in the **Galaxy Zoo project**, images of 3m galaxies can be viewed, and the labour-intensive task of classifying them is being shared by thousands of keen amateur astronomers, many of school age.

Coincidentally, at the time of writing, experiments have indicated that the **speed of light** -- long-assumed to be a **universal physical constant** -- may not be as constant as assumed, potentially calling for radical rethinking regarding the standard model of physics (*Speed-of-light results under scrutiny at Cern*, *BBC News*, 23 September 2011; *Results from Cern show particles 'exceeded speed of light'*, *BBC News*, 23 September 2011; *Light speed: Flying into fantasy*, *BBC News*, 23 September 2011). Physicists are now awakening to the possibility that the universe is not as they thought it ought to be.

In a time of dramatic crises -- resulting from "experiments in governance" -- it is to be hoped that such human rethinking capacity could be applied to the standard model of governance and human awareness (*Beyond the Standard Model of Universal Awareness: Being Not Even Wrong?* 2010). As indicated by Mahmoud Abbas at the UN General Assembly (*Abbas Rules out 'Business as Usual' Peace Talks With Israel*, *Bloomberg Business Week*, 24 September 2011):

It is neither possible, nor practical, nor acceptable to return to conducting business as usual, as if everything is fine.

Equivalent large-scale projects with respect to the challenges of governance are primarily limited to surveillance and the detection of unrest by simulation -- although there is the possibility that they might become "dual use" initiatives. Is it to be expected that global simulation projects like the **Sentient World Simulation** (SWS) and **FuturICT** -- as envisaged -- will enable the emergence of extraordinarily fruitful forms of governance, or will they merely enable the systematic suppression of forms that show promise? None appears to be designed to explore more appropriate strategic formulation to reconcile incommensurable positions (*Superquestions for Supercomputers*, 2010; *From ECHELON to NOLEHCE: enabling a strategic conversion to a faith-based global brain*, 2007). The

situation might be caricatured as effective investment in systematic avoidance and denial -- leading naturally to the surprises consequent upon systemic neglect (Nassim Nicholas Taleb, *The Black Swan: the impact of the highly improbable*, 2007).

As has been widely remarked, history will no doubt record the expenditure of over \$1 trillion on intervention in Afghanistan as being the epitome of strategic stupidity in a period of complex global crises. This is perhaps matched by efforts to disarm the Afghan people to ensure the emergence of democracy -- by a society which considers the right to bear arms as fundamental to democracy (*Arming Civil Society Worldwide: getting democracy to work in the emergent American Empire?* 2003).

## Engendering a catalytic holding form of requisite complexity

The question worthy of exploration is whether there is some kind of "form" capable of holding an appropriate degree of global consensus -- a "surface" on which it might be "enscribed" or "projected" -- if only hypothetically or in simulations of possible options were these to be explored. Characteristics of such a form might include:

- adequate simplicity but adequately encompassing complexity. The transition from a flat earth world view to recognition of the earth as a sphere exemplifies both simplicity and complexity, suggesting the nature of the transition that is now appropriate
- accessibility as a mnemonic catalyst, namely offering the possibility of ready comprehensibility rather than promoting levels of complexity understandable only to the few
- requiring only a minimum of succinct (textual) explication, notably by offering ready comprehension through essentially compact imagery
- capable of functioning as a nexus for a variety of seemingly incompatible understandings -- effectively as a kind of Rosetta stone
- reframing the nature of boundaries and distinctions where these call for comprehension otherwise -- namely offering a comprehension "upgrade"
- offering a new geometric template or surface with which identity can be associated / written / DNA / heraldic shield
  - identity -- as point, line, square, cube
- providing a "lens" through which integrative "globality" can be more fruitfully comprehended
  - recursion
- providing a holding pattern connecting a diversity of perspectives and worldviews
- transcending the strategically dysfunctional distinctions between "right" and "left" political orientations, and recognition of "insiders" and "outsiders"

Of particular interest is the reason why such systemic research is so systematically avoided.

## "Reformulation": Klein bottle as a catalyst for cognitive enhancement

Arguments can be made for extending the overly simplistic geometrical approach into other forms supportive of yet more integrative strategies -- more adequate to the more complex challenges of governance. These can be variously framed in terms of:

- **simplicial complexes** and **q-analysis** as applied to social communications: This is an approach extensively explored by Ron Atkin (*Mathematical Structure in Human Affairs*, 1974; *Combinatorial Connectivities in Social Systems; an application of simplicial complex structures to the study of large organizations*, 1977; *Multidimensional Man; can man live in 3-dimensional space?* 1981). A summary is provided separately (*Social organization determined by incommunicability of insights*, 1995).
- role of the **torus** in the relationship between form and medium: This is an approach developed by Michael Schiltz (*Form and Medium: a mathematical reconstruction, Image [&] Narrative*, 6, 2003) in relation to the calculus of indications of **George Spencer-Brown** (*Laws of Form*, 1969/1994). Its relevance to this argument is summarized elsewhere (*Beyond the Plane: form and medium in terms of the calculus of indications*, 2006) within a more general theme (*Comprehension of Requisite Variety for Sustainable Psychosocial Dynamics: transforming a matrix classification onto intertwined tori*, 2006)
- **tensegrity** and **polyhedra**: The former underlies the analysis of management cybernetician **Stafford Beer** (*Beyond Dispute: the invention of team syntegrity*, 1994) and is discussed in a series of papers (*Documents relating to Networking, Tensegrity, Virtual Organization*), as with the related potential of the latter (*Towards Polyhedral Global Governance: complexifying oversimplistic strategic metaphors*, 2008).

Whilst potentially valuable under certain conditions, these initiatives fail to engage with the root challenge of the inadequacies of binary thinking and its consequences, namely the support it gives to strategic modes which are inadequate to the current challenge. Formally those examples might appropriately be understood as derivative of forms associated with subtler mathematical formulation -- exemplified by topology. It is in this sense that the "globality", associated symbolically with the sphere, can be seen more generally as derivative of a torus generically understood \*\*\*. Hence the merit of Schiltz's reflections, and of those he cites.

Potentially of even greater interest, and the focus of this argument, is the form of the Klein bottle -- whose paradoxical properties are more readily discussed through the simpler, and better known, **Möbius strip**. However the following useful comment was retrieved (at the time of writing) from the [discussion page with respect to Klein bottle](#) in *Wikipedia* entry:

The Klein bottle is important - if you need an image to help you solve a 'philosophical problem' - because it gives an actual example of a surface that is continuous and unitary and yet appears to display the features of 'inside/outside'. The age-old 'problem' of the relationship between 'one and many' requires that difference is possible. How do you get One to self-differentiate? An apparent distinction between 'inside/outside' would be one way. In other words, in terms of your actual experience, this amounts to the distinction between yourself (as the good old classical 'subject') and the 'outside world' (as the

good old classical 'object').

Like the Moebius Loop, the Klein Bottle indicates, in concrete (and mathematical - that's important, because we need both kinds of discourse) terms, how you can have the logical appearance of 'twoness' (duality) where you actually have only a unity and continuity. Of course, Moebius Loops and Klein Bottles are still 'objects' of logic, of logical intellect: and that means (paradoxically, as it would seem) that they are 'objects' constructed by dualistic thinking that indicate what must ultimately be transcendent (and this means: transcendent to dualistic thinking itself).

So, in effect, they are excellent meditative devices, a bit like Zen koans, but their paradoxical value for meditation is obviously not mathematical (mathematically, there is no great problem about them, no paradox) but comes into play when you begin to ask: if the experience of my 'self' is like one apparent surface of a Moebius Loop or a Klein Bottle, and if the experience of my 'world' is like the other apparent surface of one of these topological figures, then what does this tell me about what my experience of self/world is really all about? One more thing: a 'shape' in space means that there must be a 'space' for the 'shape': what, in experience, is this 'space', if it is not the 'shape' itself, but prior to it?

The Sphere for a long time was a symbolic figure of Totality; but a Sphere actually presupposes two incommensurable surfaces. The Moebius Loop and the Klein Bottle are far more interesting and useful symbols for Totality (or Unity, Oneness).. Make of this what you will! Happy journeys on the one surface of being.

Their implications have been extensively explored from the perspective of phenomenological philosophy by [Steven M. Rosen](#) (*Topologies of the Flesh: a multidimensional exploration of the lifeworld*, 2006; *Bridging the "Two Cultures": Merleau-Ponty and the Crisis in Modern Physics*, 2008).

In the latter paper, Rosen addresses the intractable problems of uncertainty and subject-object interaction in physics, arguing that these can only be addressed by shifting its philosophical base from objectivism to phenomenology, as [Maurice Merleau-Ponty](#) had suggested:

Merleau-Ponty's allusion to "topological space" in *The Visible and the Invisible* [1964] provides a clue for bridging the gap between "hard science" and "soft philosophy." This lead is pursued in the present paper by employing the paradoxical topology of the Klein bottle. The hope is that, by "softening" physics and "hardening" phenomenology, the "two cultures" (cf. C. P. Snow) can be wed and a new kind of science be born.

Rosen cites the demonstration by the philosopher [Maxine Sheets-Johnstone](#) (*The Roots of Thinking*, 1990, p. 42) that, whereas Euclidean geometry involves practices that are largely disembodied, "topology...is rooted in the body". Rosen then argues:

One curious topological structure proves especially promising in mediating between theoretical physics and phenomenological intuition: the *Klein bottle*. An ordinary bottle conforms to conventional intuition regarding inside and outside. It is a container whose interior region is clearly set off from what lies outside of it. If we fill such a bottle with liquid, for instance, and seal its cap, the fluid will remain enclosed -- unless the surface is broken, in which case it will pour out. Although conventional containers are thus either open or closed, let us try to imagine a vessel that is *both*. I am not merely referring to a container that is *partially* closed (such as a bottle without its cap), but to a vessel that is completely closed and completely open *at the same time*. The liquid contents of such a strange vessel would be well sealed within it, and yet, paradoxically, they would freely spill out! The Klein bottle... is a container of this sort. Its paradoxical structure flagrantly defies the classical intuition of containment that compels us to think in either/or terms (closed or open, inside or outside, etc.).

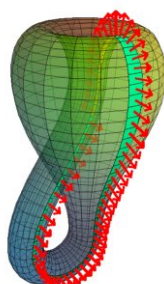
The topological property of the Klein bottle that is responsible for its peculiar nature is its *one-sidedness*. More commonplace topological figures such as the sphere and the doughnut-shaped torus are two-sided; their opposing sides can be identified in a straightforward, unambiguous fashion. Therefore, they meet the classical expectation of being closed structures, structures whose interior regions *remain* interior. In the contrasting case of the Klein bottle, inside and outside are freely reversible.

The further implications of Rosen's arguments are discussed [below](#) in relation to the cognitive skill required to benefit from this topological insight.

### Representations of the Klein bottle

Konrad Polthier (*Imaging Maths: inside the Klein bottle*,  
+*Plus Magazine*, September 2003;  
View Polthier's [animated version](#) (997K) or explore his [java applet](#)

Screenshot from video of formation of Klein bottle  
developed by University of Hannover  
([available](#) with others on YouTube)



## Klein bottle as an ordering principle advocated within the social sciences

**Anthropology:** As a much acclaimed anthropologist, [Claude Lévi-Strauss](#) showed how the the mathematical model of the Klein bottle could be found in Jivaro Indian myths. In a commentary regarding Lévi-Strauss, (Robert K. Blechman, [Claude Lévi-Strauss Celebrates his 100th Birthday This Month! BlogCritics/SciTech](#), 5 November 2008) the author cites, and develops, the argument of Patrick Wilcken that his three dimensional approach to myth analysis was itself like a Klein bottle:

Mathematically generated, but with an organic feel, the Klein bottle's bulbous, undulating form is self-consuming and conceptually difficult to grasp. It has no true inner or outer surfaces. Like Lévi-Strauss's oeuvre, it eternally feeds back through itself. (*Times Literary Supplement*)

Blechman indicates:

What Wilcken is referring to is the recursive nature of Lévi-Strauss' technique. A myth cannot be understood by itself, but only as part of the complete body of a culture's mythology. According to Lévi-Strauss, such an analysis is necessary because the reasoning taking place within a myth defies what we understand as logic. It is not linear thinking, but rather a metaphoric leap of faith that finds connections where there aren't any and achieves the reconciliation of the irreconcilable

**Psychoanalysis:** With respect to the social and psychological sciences, Jacques Lacan pointed out the key role played by differential topology, allegedly giving the thinking of Sigmund Freud the formalization it merited:

This diagram [the Möbius strip] can be considered the basis of a sort of essential inscription at the origin, in the knot which constitutes the subject. This goes much further than you may think at first, because you can search for the sort of surface able to receive such inscriptions. You can perhaps see that the sphere, that old symbol for totality, is unsuitable. A torus, a Klein bottle, a cross-cut surface, are able to receive such a cut. And this diversity is very important as it explains many things about the structure of mental disease. If one can symbolize the subject by this fundamental cut, in the same way one can show that a cut on a torus corresponds to the neurotic subject, and on a cross-cut surface to another sort of mental disease. (Jacques Lacan, *Of structure as an inmixing of an otherness prerequisite to any subject whatever*. In: Richard Macksey and Eugenio Donato (Eds.): *The Languages of Criticism and the Sciences of Man*, 1970, pp. 186-200)

Ironically it could be argued, given the controversial status of psychoanalysis amongst the "social sciences", that it might itself be fruitfully understood in topological terms in relation to those sciences. Even as a "mental disease"?

**Reciprocal extraterritoriality and human rights:** In 1993, offering new insight into human rights and their territorial implications, [Giorgio Agamben](#) suggested:

This space would coincide neither with any of the homogeneous national territories nor with their topographical sum, but would rather act on them by articulating and perforating them topologically as in the Klein bottle or in the Möbius strip, where exterior and interior in-determine each other. In this new space, European cities would rediscover their ancient vocation of cities of the world by entering into a relation of reciprocal extraterritoriality. (*Beyond Human Rights*, extract from *Means without End. Notes on Politics*, 2000)

Agamben specifically related this to the Israel-Palestine situation in 1993:

As I write this essay, 425 Palestinians expelled by the state of Israel find themselves in a sort of no-man's-land. These men certainly constitute, according to Hannah Arendt's suggestion, 'the vanguard of their people'. But that is so not necessarily or not merely in the sense that they might form the originary nucleus of a future national state, or in the sense that they might solve the Palestinian question in a way just as insufficient as the way in which Israel has solved the Jewish question. Rather, the no-man's-land in which they are refugees has already started from this very moment to act back onto the territory of the state of Israel by perforating it and altering it in such a way that the image of that snowy mountain has become more internal to it than any other region of Eretz Israel. Only in a world in which the spaces of states have been thus perforated and topologically deformed and in which the citizen has been able to recognize the refugee that he or she is - only in such a world is the political survival of humankind today thinkable.

In the same document, variously reproduced subsequently, Agamben indicated:

One of the options taken into consideration for solving the problem of Jerusalem is that it become - simultaneously and without any territorial partition - the capital of two different states. The paradoxical condition of reciprocal extraterritoriality (or, better yet, aterritoriality) that would thus be implied could be generalized as a model of new international relations. Instead of two national states separated by uncertain and threatening boundaries, it might be possible to imagine two political communities existing on the same region and in a condition of exodus from each other - communities that would articulate each other via a series of reciprocal extraterritorialities in which the guiding concept would no longer be the *ius* (right) of the citizen but rather the *refugium* (refuge) of the singular.

In an analogous way, we could conceive of Europe not as an impossible 'Europe of the nations', whose catastrophe one can already foresee in the short run, but rather as an aterritorial or extraterritorial space in which all the (citizen and noncitizen) residents of the European states would be in a position of exodus or refuge; the status of European would then mean the being-in-exodus of the citizen (a condition that obviously could also be one of immobility). European space would thus mark an irreducible difference between birth [*nascita*] and nation in which the old concept of people (which, as is well known, is always a minority) could again find a political meaning, thus decidedly opposing itself to the concept of nation (which has so far unduly usurped it).

This text was notably cited by Stephen Kelly (*The Island that is Nowhere: or, cultural translation -- a utopian project?* 2007).

It is unclear how "reciprocal extraterritoriality" might be understood in relation to the "condominium" proposals with which there is a degree of practical international experience, as with Andorra, New Hebrides, etc. The formula has been proposed by John V. Whitbeck in relation to Jerusalem (*Middle East Policy*, December 1994, pp. 110-118; *Jerusalem Times*, 15 March 1996, pp. 8-9; *International Herald Tribune*, 17 November 1994).

**Nondeterminacy:** Some 17 years after they presented, Agamben's arguments were cited by Molly Anne Rothenberg (*The Excessive Subject: a new theory of social change*, 2010) in discussing an innovative theory of social change implicit in the writings of radical social theorists, such as Pierre Bourdieu, Michel de Certeau, Judith Butler, Ernesto Laclau, and Slavoj Žižek. Labeling this paradigm "extimate causality", Rothenberg demonstrates how it produces a nondeterminacy, so that every subject bears some excess; paradoxically, this excess is what structures the social field itself. Whilst other theories of social change, subject formation, and political alliance invariably conceive of the elimination of this excess as necessary to their projects, the theory of extimate causality makes clear that it is ineradicable. To imagine otherwise is to be held hostage to a politics of fantasy.

Rothenberg refers to the above-mentioned insights of Giorgio Agamben (*Means Without End: notes on politics*, 2000) as follows:

Guided by these reflections on the exposure of the fiction that sovereignty depends upon nativity -- the dismantling of the "trinity of state-nation-territory" [Agamben] sees a possibility for a "new model of international relations" based on the figure of the refugee... The example of Jerusalem gives concreteness to the model. Currently a locus of competing territorial claims based on nativity and religion, the fact that Jerusalem can belong wholly to no single group becomes in Agamben's view an opening to a solution, in which the conflictual site becomes "simultaneously and without any territorial partition... the capital of two different states"... The figure Agamben implies in this passage is the same as that of Lacan's pseudo-Venn diagram. Each of two entities -- say Israel and Palestine -- has added to it something extraneous from the other, the "Jerusalem" that is not its own capital. The external "Jerusalem" both coincides with the internal "Jerusalem" and exceeds it.

This figure of a double negation or reciprocal exclusion results in the Möbius condition, where inside and outside become "in-determinate": *This space would coincide neither with any of the homogeneous national territories nor with their topographical sum, but would rather act on them by articulating and perforating topologically as in the Klein bottle or in the Möbius strip, where exterior and interior in-determine each other... What is useful for us here is Agamben's description of the solution in topological terms....* (p. 51-52)

Agamben's argument with respect to "reciprocal extraterritoriality" is also the subject of comment by Philip Armstrong (*Reticulations: Jean-Luc Nancy and the networks of the political*, 2009, pp. 88-89).

**Diasporas:** A useful summary of Agamben's views is offered by Adam Lebovitz (*The Gospel According to Giorgio Agamben: Reflections on Homo Sacer and the Rights of Man*, 2006), notably:

... Agamben writes rapturously in *Beyond Human Rights* of dissolving the Westphalian "trinity of state-nation-territory," replacing the outmoded nation-state with a diffuse diaspora of "political communities based on the notion of collective displacement," its borders perforated like a Klein Bottle.

Following on Agamben's initiative, it is especially interesting to note that the Klein bottle figures in current exploration of the challenge of diasporas in the global system, as extensively summarized by Francisco Ragazzi (*Governing Diasporas, International Political Sociology*, 2009).

**Global security:** Seemingly independently, reference is made to the Möbius strip (and in preference to the Klein bottle) in relation to future issues of global security by Didier Bigo (*The Möbius Ribbon of Internal and External Security(ies)*, In: Mathias Albert, et al. (Eds.), *Identities, Borders, Orders: rethinking international relations theory*, 2001, pp.91-116):

The transnationalization, globalization of the contemporary world calls into question... models of understanding the practices and the manifestations of security. The norms of security are no longer directional. Notwithstanding the "truth program" of security, it is no longer possible to maintain the closed format. Sovereignty no longer defines borders. The agencies of security... have expanded into a space that no longer respects sovereign borders. Topology of security in democracies is no longer the elegant cylinder but a complicated form, the Klein bottle....Once freedom of movement of persons has been accepted, the construct of the sovereign cylinder is no longer adequate....Identity fences replace territorial fences. While people are allowed to move, their identities must be constructed and controlled. To achieve this Klein bottle process, people need to be reduced to the status of a herd that has only the right to bread and circuses....

Contrary to the Klein bottle process, the Möbius ribbon process can accommodate social practices and flows of people, the practices of the diasporas that open the sovereign cylinder and bind internal freedom with the freedom of movement and residence.

In introducing Bigo's argument, one of the editors, [Yosef Lapid](#), comments:

Didier Bigo also situates himself at the identities/borders (IB) nexus to address the remarkable merging of internal and external security functions. Traditionally, the functions and modes of operation of security-providing institutions (such as the police and the army) were clearly differentiated along the Westphalian, inside/outside, divide. Bigo concludes that, with respect to security, the Westphalian age is coming to an end. "The frontiers between 'inside and outside' are under discussion," he says, "because we are at the limits of our political imagination." To overcome these limits, Bigo situates the IBO triad "at the heart of the discussion concerning security." More than other contributors to this volume, he also articulates his own version of a processual/relational approach and devotes considerable effort to suggesting a metaphor (the "Möbius ribbon") equal to the task. More generally, however, Bigo defines his larger project as an effort to constitute a new international political sociology (*Rethinking the "International": IBO Clues for Post-Westphalian Mazes*. In: *Identities, Borders, Orders: rethinking international relations theory*, 2001).

**Comment:** The acceptance accorded the Klein bottle within the "socio-political" sciences, in the light of these examples, can be fruitfully contrasted with the argument above by Steven M. Rosen from a psychological and phenomenological perspective. Additionally it might be said with respect to those examples:

- the Klein bottle is seemingly proposed only as a means of ordering and describing a socio-political phenomenon which involves "articulating and perforating topologically". The cognitive implications are minimized, if mentioned.
- whilst the Klein bottle is contrasted with conventional forms, as noted with respect to the "cylinder", there is little recognition of the rich set of forms explored by topology and their potential relevance -- other than commentary on the contrast between the Klein bottle and the Möbius strip. In effect there is virtually no use made of the insights of topology and the questions which might be raised by the potential relevance of the other forms to which it is formally related.
- little attention is given to the implication for those offering such a "Klein bottle description", who seemingly uphold their traditional status of detached, external observers. It is in response to this that Rosen makes a case for proprioceptive dialogue, implying a degree of self-reflexivity characteristically absent from conventional socio-political commentary
- in recognition of wider social phenomena "articulating and perforating topologically", notably in relation to "diasporas", it is curious to note the absence of the sense in which the disciplines understand themselves as characterized by a degree of "diasporisation" -- mutually "perforated" with a degree of "reciprocal extraterritoriality". This might enable the challenges of interdisciplinarity and transdisciplinarity to be fruitfully articulated through a form such as the Klein bottle.

The recognition of "topological perforation" in the social sciences by the above-mentioned authors follows from a particular French tradition, notably arousing controversy through its application in the case of the psychiatry of [Jacques Lacan](#). Lacan's use of terms from mathematical fields such as [topology](#), resulted in him being accused of "superficial erudition" and of abusing scientific concepts that he did not understand, notably by [Alan D. Sokal](#) and [Jean Bricmont](#) (*Fashionable Nonsense: postmodern intellectuals' abuse of science*, 1999).

Ironically such critics might well be considered exemplars of the incapacity of physics to offer insights regarding the current challenge of the social system in which it is embedded, and presumably is incapable of understanding by its own criteria -- and by whose tax payers it is generously funded. This contrasts with the efforts of David Bohm, as noted below. However, it has not restrained efforts to reframe Freud, with respect to topological questions (including the Klein bottle) and other recent innovations (Jerry Aline Fliieger, *Is Oedipus online?: siting Freud after Freud*, 2005).

In the light of such controversial criticism, it might be asked how the above authors avoid similar criticism when their arguments are not better informed by (seemingly reluctant) mathematicians. The potential implications of such postmodern deconstructive perspectives for new understanding of globalization have been separately explored (*Engendering Invagination and Gastrulation of Globalization: reconstructive insights from the sciences and the humanities*, 2010; *Complexification of Globalization and Toroidal Transformation: topological implications of invagination and gastrulation in embryogenesis*, 2010)

## Formalization of constraints on "new thinking"

In envisaging explorations (and simulations) of such a form, the intractability of the issues identified above, calls for formalization (in mathematical terms) of particular understandings of, and desires for:

- boundary distinctions between "self" and "other", "us" and "them", given their consequences in practice (*Us and Them: Relating to Challenging Others*, 2009; *Human Intercourse: Intercourse with Nature and Intercourse with the Other*, 2007)
- closure and self-reflexivity, as these follow from the need for boundedness
- identity, as this follows from identification with a closed boundary of some kind
- property, as this follows the sense of possession evoked by the relationship between identity and boundedness

The question is the scope for some new form of agreement in relation to existing confusion regarding boundary distinctions, notably forms of encroachment, as separately noted (*Errorism vs Terrorism? Encroachment, Complicity, Denial and Terratism*, 2004).

The issue is especially striking in relation to the spherical form of the planetary globe and understandings of globalization. Whilst matters

are somewhat clearer in the case of a "flat earth" -- effectively bounded by "horizon effects" -- a globe is curiously "unbounded". More curious is that a globe does not automatically invite agreement as to how it is to be divided up and variously possessed. The motivation for "flattening" of the globe merits attention (*Irresponsible Dependence on a Flat Earth Mentality -- in response to global governance challenges*, 2008).

It might be said that the "global" focus, with its contradictions, is powerfully illustrated in practice by the range of ball sports, typically played with enthusiasm over a bounded flat surface. This suggests the coexistence of two distinct "cognitive regimes", that of the flat surface and that of a form somehow symbolic of a higher form of integrity and integration, whose "possession" is highly valued for that reason. Hence the competition for its possession between "sides" identified with extremes of the bounded "flat earth". This theme has been separately explored (*Understanding Sustainable Dialogue: the secret within Bucky's Ball*, 1996).

Especially intriguing, as a consequence, is the framing of "targets" and assumptions regarding their passivity. It is widely acknowledged the extent to which strategic initiatives are framed with the support of metaphors derived directly from ball sports. These impact on those of military strategy, themselves used to reinforce the articulation of non-military strategies, as previously discussed (*Enhancing Sustainable Development Strategies through Avoidance of Military Metaphors*, 1998).

The nature and role of humour offers a further lead, given its widely recognized integrative function in embodying and bridging across paradox (*Humour and Play-Fullness: essential integrative processes in governance, religion and transdisciplinarity*, 2005). Of interest in this respect is the initiative of Matthew M. Hurley, Daniel C. Dennett and Reginald B. Adams, Jr. (*Inside Jokes: using humor to reverse-engineer the mind*, 2011). Although offering an account of the cognitive and emotional experience providing the humour experience, including reference to phenomenology, they make no attempt to introduce any topological framing which could have fruitfully related their detailed discussion to the possibilities discussed above.

A fruitful challenge to conventional thinking is offered by the range of cultural biases and the various efforts to present them schematically (*Systems of Categories Distinguishing Cultural Biases*, 1993), most notably that of Kinhide Mushakoji (*Global Issues and Interparadigmatic Dialogue*, 1988) who distinguishes four modalities through which the human mind grasps reality:

- Affirmation: Leading to affirmative action in the form of support, commitment, initiative, proposition, cooperation, consensus formation, empowering, 'opening'.
- Negation: Leading to negative action in the form of sanction, withdrawal (of support), denial, disassociation, delimitation, criticism, opposition, promotion of dissent, disempowering, 'closing'.
- Affirmation and negation: Leading to ambiguous action, non-violent resistance, 'dumb insolence', 'giving with one hand and taking with the other', 'double dealing', 'stick and carrot tactics', the 'yes but no' response of the frustrated cross-examinee.
- Non-affirmation and Non-negation: Leading to action in the form of indifference, indecision, non-action (in the oriental sense), 'neither confirm nor deny', 'opening and closing'.

These distinctions are reminiscent of those made by Rosen with respect to the schema for the Klein bottle of Paul Ryan (*Cybernetics of the Sacred*, 1974; *Video Mind: Earth Mind*, 1993).

## Nature of the requisite self-reflexive skill

The conventional strategic skills, widely upheld and promoted as the key to effective strategy, have been made evident in the case of the intervention in Afghanistan over a decade. Little is said regarding the reasons for their inadequacy, or the lessons so painfully learned, as reviewed by Jonathan Steele (*Ghosts of Afghanistan: hard truths and foreign myths*, 2011). These skills might be fruitfully contrasted with subtler skills potentially appropriate to engagement with such cultures (*Poetic Engagement with Afghanistan, Caucasus and Iran: an unexplored strategic opportunity?* 2009; *Transforming the Unsustainable Cost of General Education: strategic insights from Afghanistan*, 2009). Such a conclusion follows from the assessment of the opposing strategies deployed in the Vietnam War, highlighting the successful *wei chi'i* mindset underlying the Chinese game of go (Scott Boorman, *The Protracted Game: a wei chi'i approach to Mao's revolutionary strategy*, 1971).

**Reflexivity:** Such possibilities follow from a recognition, articulated by Gregory Bateson for a conference on the effects of conscious purpose on human adaptation, that "we are our own metaphor" (Mary Catherine Bateson. *Our Own Metaphor*, 1972, pp. 288-289). The necessity has been articulated by various authors in terms of **reflexivity** (Hilary Lawson, *Reflexivity: the post-modern predicament*, 1986), notably by Douglas Hofstadter (*Gödel, Escher, Bach: an Eternal Golden Braid*, 1979), who has developed his argument in terms of the Möbius strip (*I Am a Strange Loop*, 2007; *What Is It Like to Be a Strange Loop*, 2006). The latter was in a collection by Uriah Kriegel and Kenneth Williford (*Self-Representational Approaches to Consciousness*, 2006). Some implications have been explored separately (*Sustaining a Community of Strange Loops: comprehension and engagement through aesthetic ring transformation*, 2010; *Consciously Self-reflexive Global Initiatives: Renaissance zones, complex adaptive systems, and third order organizations*, 2007).

**Embodiment:** The preoccupation has also been articulated in terms of "embodiment of the mind" (George Lakoff and Mark Johnson, *Philosophy in the Flesh: the embodied mind and its challenge to Western thought*, 1999; Francisco Varela, Evan Thompson and Eleanor Roach, *The Embodied Mind: cognitive science and human expression*, 1991). The argument has been further developed by Mark Johnson (*The Meaning of the Body: aesthetics of human understanding*, 2007)

The implication for mathematical reflection has been highlighted by George Lakoff and Rafael Nunez (*Where Mathematics Comes From: how the embodied mind brings mathematics into being*, 2001).

**Proprioception:** Understood as proprioception, Steven M. Rosen clarifies with great insight the nature of the cognitive skill appropriate to the potential implied by the Klein bottle -- in several studies, fruitfully to be read as complementary. These follow from his exploration of the approach to **Bohman dialogue** articulated by the physicist, David Bohm (*Wholeness and the Implicate Order*, 1980; *Changing*

*Consciousness: exploring the hidden source of the social, political and environmental crises facing our world*, 1991; *On Dialogue*, 1996).

For Rosen (*emphasis added*):

- *Topologies of the Flesh: a multidimensional exploration of the lifeworld* (2006 p. 47-48): What I propose here is that proprioception -- broadly understood as a mode of "self-taking" inclusive of cognition -- is the appropriate way to work with the Klein bottle, and that such a meditation is what the self-containing Klein bottle requires and invites. In thinking this Kleinian text, we must think proprioceptively, think our own thinking.

Note that, when I speak of "meditation", I am surely not referring to the *classical* kind. Whereas classical meditation generally aims at transcending the body, the self-reversal of thinking I have in mind would seek to move back into it. ***The goal would be re-embodiment, reconnection with the lifeworld.*** But would this not require a *disengagement* from thought and a return to the bodily senses?

What we learn from Merleau-Ponty is that thinking in fact does not entail sheer abstraction but possesses its on bodily grounding. For Merleau-Ponty, the dimension of language and thought operates as a "second flesh", a second order of embodiment: *It is as though the visibility that animates the sensible world were to emigrate, not outside of every body, but into another less heavy, more transparent body, as though it were to change flesh, abandoning the flesh of the [sensible] body for that of language.* (1968, p. 153)

- *The Self-evolving Cosmos: a phenomenological approach to nature's unity-in-diversity* (2008, p. 246): Proceeding in the manner of [Trigant Burrow](#), I, the psychological analyst, aim to enter my body through my head to obtain a bodily sense of the head that is directing this analysis. Since the proprioception thereby enacted is no act of "pure meditation" that leaves thinking and language behind, it seems the process must include the appropriate mode of signification if the maximum effect is to be achieved. ***In the semiosis required, neither words nor conventional mathematical symbols will suffice.***

***What is needed is that unique topological signifier that refers concretely to the "fourth dimension"*** -- the dimension of depth incorporating my subjectivity -- by referring to *itself*. I am speaking, of course, of the Klein bottle. Assuming the Klein bottle is not just taken as a signified topological object or as an arbitrarily devised, conventionally agreed upon signifier (as are most mathematical symbols), it is this body of paradox that constitutes the semiotic content of the proprioceived brain.

In the proprioception of the brain that is at once a phenomenological mediation upon the Klein bottle, the analyst surpasses the brain of the particular individual to gain a glimpse of the dimensional organism's "generic brain", the "braneworld" in which the thinking function is centered. The brain thus proprioceived is no mere object of scientific scrutiny but is the sub-objectively *lived* brain ([Drew Leder](#), *The Absent Body*, 1990, p. 113); it is the brain as a concrete universal, as the "flesh of the world" (Merleau-Ponty, 1968, p. 139).

- *Dimensions of Apeiron: a topological phenomenology of space, time, and individuation* (2004, p. 207): In making the (w)holeness of Being a concrete reality, we are to read this text Proprioceptively; read our own reading; read these words about passing beyond themselves (into their prereflective roots) in such a way that the passage actually takes place. ***Such a reading is mediated by fleshing out this text via the dimensional amplification provided by the Klein bottle.***

Now the body of our text does not consist merely of lifeless, empty symbols, intrinsically meaningless signifiers that can only point outside themselves to disembodied meaning: our text is the Klein bottle. It is in cotentively reading the (w)hole in this self-containing three-dimensional text (the "blind spot" in the field of vision) that we should pass unbrokenly into its subtext. The Klein bottle's incompleteness when read ontically is at once an incompleteness in our reflecting upon it....

Can we read the hole in the Klein bottle in such a way that we relax the compulsion to regard it as *merely* a hole, a gap in an ordinary object simply contained in space? ***Can we read the hole in the Klein bottle as an opening to "another dimension"*** and read that dimension as the prereflective source of our very own reading? Can we *enter* that dimension through Proprioception?

It is a matter of proceeding medi(t)atively, from "both sides at once" -- from the mediative side of the conceptual, and from the side of experiential immediacy known in meditation. The Kleinian concept brings us to the limit of the conceptual... ***It is here that we can realize the intimate harmony of outside and inside, of object and subject, of the bounded and boundless.*** That is to say: the harmony of *apeiron* can be realized in full by the Goddess herself.

**Meditation:** Despite Rosen's reservations regarding "classical" meditation, echoes of the cognitive skill are arguably to be found in deep breathing meditation exercises -- as widely practiced according to different traditions, and described in their extensive literature. The cognitive processes that are suggestively related to inspiration and expiration might well be understood -- in their more developed modes -- as isomorphic with the form of a Klein bottle, especially given its coherence in a fourth time dimension. Related references to "raising energy" up the spine as a consequence of this cyclic process are then potentially consistent with understanding of [Kundalini](#) as involving a topological "perforation" or "insertion".

**Liminality:** Another "echo" of the cognitive skill, perhaps stronger for those frequently exposed to it, is that of [liminality](#) -- as mentioned above. This can be described as the cognitive modality necessary in order to survive, if not thrive, "between worlds" ([Living as an Imaginal Bridge between Worlds: global implications of "betwixt and between" and liminality](#), 2011).

Other clues to the cognitive skill are offered by the practices of various traditions and belief systems (*Navigating Alternative Conceptual Realities: clues to the dynamics of enacting new paradigms through movement*, 2002). It is appropriate to recall the speculations regarding a "psychopter" -- the helicopter as the "winged self", a metaphor for the human spirit -- by the developer of the Bell helicopter, [Arthur M. Young](#) (*The Bell Notes: a journey from physics to metaphysics*, 1979).

The cognitive challenge of Young's "psychopter" might be illustrated by the contrast between the widely known challenge of learning to ride a ("binary") bicycle and the acknowledged challenges of learning to pilot a helicopter.

## Engaging with time-bound paradox

It is to be expected that the paradoxical cognition implied by this approach would be especially elusive -- or else it would be more widely recognized. The challenge is enhanced by the role of time implied by the four-dimensional nature of the Klein bottle. The point is well made by the ease with which the Klein bottle is commonly depicted, with only a footnote to the effect that its coherence could only be understood in "four dimensions" -- however that is assumed to be understood.

**Spiral staircase:** The challenge of verbal description, without imagery, is indicated in the case of a simple spiral staircase. It is difficult to comprehend from a verbal description alone -- especially if it has never been seen before. An example of the implication of time into a spiral staircase might be offered by the construction of such a staircase within a circular tunnel -- oriented vertically -- and of sufficient diameter such that the curvature of the tunnel was not apparent to anyone climbing up within (what then appears as) one side. The illusion would be completed by allowing the tunnel to rotate as the person climbed, so that the climb always seemed as vertical as might be expected.

This recalls the illusion famously depicted by [M. C. Escher](#)'s unending staircases -- without the perspective that such images offer..

**Mirror test:** The tunnel staircase only suggests part of the difficulty however. Another suggestive image is that of a special "mirror" devised so that looking into it one only saw oneself from behind. The illusion could be augmented by arranging the installation such that the "mirror" was framed by a tunnel entrance into which one could step -- with the image of one's back moving along the tunnel in advance of one's own movement. The illusion could be presented otherwise by introducing a spacetime delay -- a "temporal echo" -- perhaps displaying the image of walking seconds or minutes earlier, out of phase with one's current movement. (This recalls the extent to which views in the present of stellar objects are actually those from the past -- whether seconds or millions of years past -- but not those of the present.)

Just as looking into an ordinary mirror, one may be momentarily challenged to recognize oneself, the tunnel installation can be modified further -- as suggested by the so-called [mirror test](#) of [self-awareness](#). The image from behind may be modified to represent oneself dressed otherwise, perhaps on some previous occasion. Such modifications and delays could then be increased such as to increase the probability that doubt regarding the identity of the person seen from behind increased -- to the point that one's subjective identification with it could no longer be "re-membered", and its identity as an "other" could be asserted more definitively, however erroneously.

**Otherness:** The experiment is thus an exploration of the sense of otherness and its emergence, and of the transformation of an image into an "object" -- through objectification. It recalls the many tales regarding ghostly doubles -- a [doppelgänger](#) or [vardøger](#) -- the sensation of having glimpsed oneself in peripheral vision, in a position where it is believed that there is no chance that it could have been a reflection.

**Enactivism:** The experiment evokes reflection on one's own sense of identity in walking the tunnel -- effectively a ghostly awareness -- in the absence of any obvious self-image. A normal mirror would enable one form of self-awareness. But in this experiment one is effectively encountering from behind what one has engendered in the past -- potentially to be recognized only as an "other". This recalls the [enactivist](#) argument of [Francisco Varela](#) (*Laying Down a Path in Walking*, 1987) favoured by Buddhism.

It also recalls the Arthurian legend of the elusive [Questing Beast](#), tracked by its [fewmets](#) (excreta), by which its hunter monitors its condition and state of health. The legend frames the question as to whether one's identity is primarily associated with the hunter, the beast, or its tangible products.

**Artefacts as mirrors:** Individually or collectively, the products of activity can thus be understood as a form of projection and concretization of identity through creativity (*Embodiment of Identity in Conscious Creativity*, 2011). As understood by archaeologists, for example, artefacts serve as a mirror of the cultures which produced them. For U. G. Williams: Art is the codified mirror of a culture in which you can see your identity and ... yourself.

For Elisabeth Siddiqui ([Islamic Art](#)):

Art is the mirror of a culture and its world view. There is no case to which this statement more directly applies than to the art of the Islamic world. Not only does its art reflect its cultural values, but even more importantly, the way in which its adherents, the Muslims, view the spiritual realm, the universe, life, and the relationship of the parts to the whole.

As noted in the [Wikipedia](#) entry on [ethnochoreology](#):

Dance is not just a static representation of history, not just a repository of meaning, but a producer of meaning each time it is produced -- not just a living mirror of a culture, but a shaping part of culture, a power within the culture.

**Technology as mirror:** Of current relevance, especially given the reference above to E. F. Schumacher in scoping out the potential of

"intermediate technology", is the nature of technology as a major product of the times. With respect to this argument, it is the recognition of its role as a form of cognitive mirror.

Aspects of the argument are offered by Robert D. Romanyshyn (*Technology as Symptom and Dream*, 1989). Greater focus is given to the argument in the various works of Edwin T. Layton, Jr., notably as reviewed by Eda Kranakis (*Looking Into the Mirror of Time: reflections on the life and work of Edwin T. Layton Jr., 1928-2009, Technology and Culture*, 2010). For example, Layton argues:

The denial of a thought component to technology is thus the consequence of adopting a theory of the relationships of science and technology. This theory holds that scientists generate new knowledge which technologists then apply. Two assumptions are critical here. The first is that technological knowledge is essentially identical with natural philosophy. The second is that this knowledge has been produced by scientists since 1800. Logical deduction from these premises leads to an absurdity: that prior to 1800 technology involved no knowledge at all... If the treatment of technology as thought is an important tendency in contemporary historiography, then where is it leading? (*Technology as Knowledge, Technology and Culture*, 15, 1, 1974)

The strategic implication of the mirror metaphor are discussed separately in relation to scenarios as a form of "speculation" (*Stepping into, or through, the Mirror: embodying alternative scenario patterns*, 2008). The argument was applied to reflection on the previous UNCED Earth Summit (*My Reflecting Mirror World: making my World Summit on Sustainable Development (Johannesburg, 2002) worthwhile*, 2002). It is however appropriate to note arguments against approaches comparing the mind to a mirror that reflects reality, as articulated by Richard Rorty (*Philosophy and the Mirror of Nature*, 1979).

## Cognitive products as property subject to possession

Discussion of the products of cognitive activity typically ignores a dimension which is fundamental to the territorial challenge which is a theme of this argument. The Klein bottle indeed suggests a means of engaging with nonduality. Nonduality was central to the interest of Gregory Bateson (*Mind and Nature: a necessary unity*, 1979) as previously discussed (*Transcending duality: epistemological panic of nonduality?* 2010).

**Scientific responsibility:** The challenge implicit in the above argument has been partly addressed by Gregory Bateson (*Angels Fear: towards an epistemology of the sacred*, 1987, compiled posthumously, with commentary, by Mary Catherine Bateson). Bateson saw the challenge of the future as one of transcending the dualism that has bedevilled explanation in the past. But he offers the following warning of relevance to the arguments above concerning the nature and responsibilities of science:

The title of the present book is intended to convey a warning. It seems that every important scientific advance provides tools which look to be just what the applied scientists and engineers had hoped for, and usually these gentry jump in without more ado. Their well-intentioned (but slightly greedy and slightly anxious) efforts usually do as much harm as good, serving at best to make conspicuous the next layer of problems, which must be understood before the applied scientists can be trusted not to do gross damage. Behind every scientific advance there is always a matrix, a mother lode of unknowns out of which the new partial answers have been chiseled. But the hungry, overpopulated, sick, ambitious, and competitive world will not wait, we are told, till more is known, but must rush in where angels fear to tread.

He makes a "politically incorrect" point, relevant to this argument as another recognition of "hidden" dynamics, but with a conclusion that merits careful attention in the light of any assumption that nonduality can be understood as "business as usual":

I have very little sympathy for these arguments from the world's "need." I notice that those who pander to its needs are often well paid. I distrust the applied scientists' claim that what they do is useful and necessary. I suspect that their impatient enthusiasm for action, their rarin'-to-go, is not just a symptom of impatience, nor is it pure buccaneering ambition. I suspect that it covers deep epistemological panic.

The point is of great relevance to the current technocratic enthusiasm for geoengineering as a response to global warming (*Geo-engineering Oversight Agency for Thermal Stabilization (GOATS)*, 2008).

**Intellectual property:** Further comment on Bateson's argument was framed under the heading of [intellectual property](#), illustrated by a seeming contradiction as follows:

But even more insight may be derived from the duality he seeks to transcend -- Pleroma-Creatura -- in the context in which his views are made known. The introductory chapters of the book have been reproduced with appreciative acknowledgement on a website, accompanied by the remark "**protected by copyright and may not be reproduced in whole or in part without permission**" a form of Creatura, that is cognitively "invisible" within those realms -- a point previously mentioned with regard to any paper published by physicists in a peer-reviewed journal to ensure its "existence" in the body of knowledge. Bateson himself discusses at some length the challenge of names in a chapter on *The World of Mental Process* (1987) -- but without mentioning this issue.

As mentioned in that [comment](#):

The implication is that any future *Theory of Everything* will be "subject to" [intellectual property](#) rights -- as with the existing

proposal for a *Theory of Nothing* (2006). Mathematicians exploring the ultimate forms of symmetry accept the appropriateness of the proof of the so-called "**enormous theorem**" -- of biblical proportions at some 15,000 copyrighted pages in length -- far beyond the capacity of any single individual, however specialized, but in which all are called to believe. The term is curious in that it incorporates points, usually ignored, that Bateson makes with respect to naming in *Creatura* and any mapping there of *Pleroma*. However "intellectual property" might then be "re-cognized" as implying that anything derived from the cognitive process -- anything intellectual -- necessarily has a property (if not properties). It is in that sense conditioned, notably by the conventional perspective from which it is framed. This recalls the argument mentioned earlier (*Einstein's Implicit Theory of Relativity -- of Cognitive Property? Unexamined influence of patenting procedures*, 2007).

This seemingly abstract and sterile argument has extremely concrete implications -- well-recognized by the indigenous peoples of the world with their unique relationships to the land, as documented by **Darrell A. Posey** (*Cultural and Spiritual Values of Biodiversity*, 1999). As is most evident in the case of the Aborigines of Australia, whose "unconventional" relationship to the land is not in terms of "property" but through the **Dreaming** -- a sleep-related metaphor. This gave rise to the controversial, "conventional", legal assumption of *Terra Nullius* -- territory which has never been subject to the sovereignty of any state, or over which any prior sovereign has expressly or implicitly relinquished sovereignty.

Bateson's arguments, as presented -- as with the *Theory of Nothing* -- are then best understood as a form of *Terra Meus* -- not even *Terra Nostra*. But, rather than that frozen "rock logic", reference might be better made to the dynamics of *Cosa Nostra* and its dark waters of *Omertà* (*Dynamically Gated Conceptual Communities*, 2004).

Curiously, it might then be said that any Theory of Everything is effectively to be understood as subsumed by provisions for intellectual property rights -- for which the Theory of Everything makes no provision.

**Inappropriate possessiveness:** Such concerns are of course relevant in the agonizing territorial disputes associated with Jerusalem -- *Terra Nostra, par excellence?* -- and the desperate quest for a "two-state" solution. Is the associated possessiveness a phenomenon as ubiquitous and mysterious as gravity is to astrophysicists -- calling for an equivalent degree of research? Do the gravitational relationships between (orbiting) celestial bodies offer a suggestive model of the constraint of cognitive possessiveness?

How is it that there would appear to be no exploration of Agamben's "reciprocal extraterritoriality" at this crucial time with respect to the Palestine-Israel situation?

The possessiveness evoked by cognitive products could be considered to be remarkable in a global civilization threatened by ever greater turbulence -- and even collapse. There is an acceptance of the probability that use of any remedy of major significance would be subject to intellectual copyright negotiations -- with civilization being held to ransom by the party claiming such ownership, as separately discussed (*Future Coping Strategies: Beyond the constraints of proprietary metaphors*, 1992). Cynically it might be inferred that even reproduction of the insightful words of the messiah -- invoked by the current US presidential candidate, Rick Perry, to deal with the current global crisis -- would be subject to copyright agreements.

## Identity otherwise informed

Much is made of the cultivation of identity, whether through image management via the media, or through fashion, or as the fruit of experience in "maturity".

**Geometric metaphor:** Identity may also be associated, or attributed, through geometric metaphors, as discussed separately (*Geometry, Topology and Dynamics of Identity*, 2009). In the light of the study by George Lakoff and Mark Johnson (*Metaphors We Live By*, 1980), it is appropriate to recognize the extent to which people may be described as "square", "well-rounded", "straight", or "bent", for example. They may be associated with, and defined by, a "circle" -- of friends or acquaintances. Use may be made of "tree structures" to define identity within a kinship network. Geometric metaphors may be used to define a career path. The identity of people may be reduced to a "point" in statistical data for administrative, marketing or scientific purposes.

Less evident is the extent to which people themselves associate and describe their identity, and its coherence, through geometric metaphors (*Dynamic Reframing of "Union": Implications for the coherence of knowledge, social organization and personal identity*, 2007).

\*\*\* Laing knots

**Dynamic metaphors:** Also of relevance is the extent to which identity may be understood dynamically (*Emergence of Cyclical Psycho-social Identity: sustainability as "psychically" defined*, 2007; *Union of Intelligible Associations: remembering the dynamic identity of a dodecameral mind*, 2007). In this respect, the dynamics may be intimately related to creativity (*Embodiment of Identity in Conscious Creativity*, 2011). Potentially more fundamental, the very nature of identity may be experienced as beyond being described as associated with a particular form, whether or not it is associated with alternation between a set of forms (*Being What You Want: problematic kataphatic identity vs. potential of apophatic identity?* 2008).

**Forms for the future:** In a world in which the increasing extent of psychoses and alienation is widely recognized, onto what "forms" can people fruitfully "hang" their identity to give themselves a sense of coherence -- and even a "container" for fulfillment? Should people be discouraged from exploring "extraordinary" forms with which to associate their identity?

In this respect it is appropriate to recall the extent to which individual and collective identity continues to be curiously associated with complex forms, including animals -- as in heraldic devices and flags, notably in the case of political parties and sports teams, and most evidently in the logos of organizations. It is questionable whether these have psychoactive cognitive significance comparable to the role


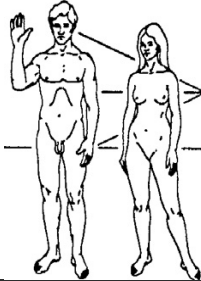

of totemic symbols in many indigenous societies.

**"Extraterrestrial identity":** A fruitful speculation is the nature of the forms with which hypothetical extraterrestrials might associate their identity. With what kinds of geometry or topology might their identity be associated, whether individually or collectively -- and quite possibly dynamically? Would they understand the maturation process to be associated with transition to more complex forms? How is communication between them, and with them, to be conceived under such circumstances -- given the forms with which humans tend to identify (*Communicating with Aliens: the psychological dimension of dialogue*, 2000)?

Rather than "extraterrestrial aliens", given the extent to which many individuals in modern society are experienced as "alien" -- if not "feral" or "terrestrial extras" -- might it be fruitfully assumed, if only implicitly, that they identify with other forms of which they may not be aware? The role of knots has been significant in this respect in the work of R. D. Laing and Jacques Lacan in dealing with the mentally disturbed.

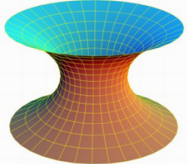

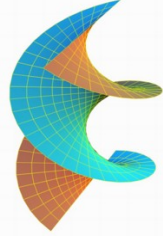
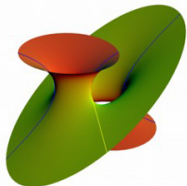
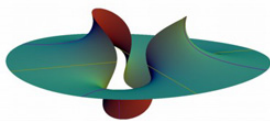
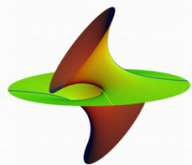
**Depicting identity:** In relation to this argument, it is of particular interest how human identity is typically depicted and reinforced. Examples of interest include:

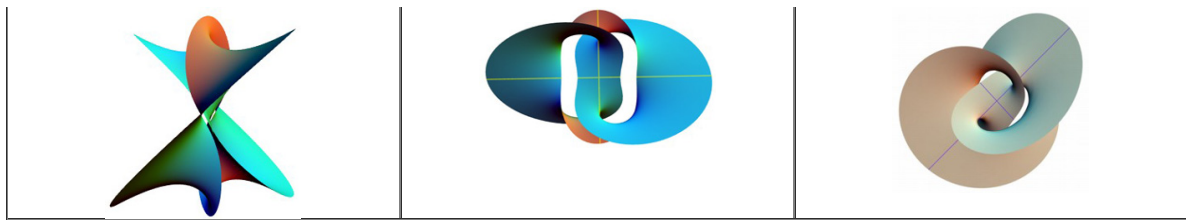
- **stick figures:** a very simple type of drawing made of lines and dots. In a stick figure, the head is represented by a circle, sometimes embellished with details. The arms, legs and torso are all represented by straight lines. Such figures have been known since the Stone Age.
- **cartoon characters:** especially relevant are those partly designed for educational purposes (*Muppets* of *Sesame Street*, *Simpsons*, etc) as well as their adaptation for political purposes in depicting leadership and opponents
- **iconic personalities and models** (as used in advertising), celebrities/stars, and deities, all intended to evoke and reinforce identification and emulation

Contrasting self-depictions of humans currently disseminated across the galaxy		
Mr Blobby	Extract from NASA Pioneer plaque	Muppet from Sesame Street
		

Beyond the geometry associated with stick figures, it is useful to speculate on the nature of other forms with which individuals (and collectivities) might identify. Complex examples are offered by *mandalas* and *yantras*. In the case of organizations, these could be contrasted with geometrically innovative representations of *organization "charts"* at one extreme and *organization logos* at another.

Future possibilities can however be innovatively reframed by considering the possibility that hypothetical extraterrestrials might identify with one or more of the many forms noted by mathematics. There is a very extensive array of such forms -- of which some of the simplest are presented below. These "minimal surfaces" are the most economical connections between loops or lines in three-dimensional space.

Minimal Surfaces in Three Dimensions		
The images below are reproduced from an excellent selection by Miquel.com at <i>An Introduction to the fascinating patterns of Visual Math</i> . They are primarily derived from a larger selection maintained at the <i>Minimal Surface Archive</i> by Matthias Weber at Indiana University (see notably <i>Illustrated Notes on Minimal Surfaces</i> )		
		
		



**Dynamics and musical harmony:** The web sites noted above, from which these images were reproduced, naturally include more complex forms and indications of transformation between them. Of particular relevance to this argument are the dynamic forms presented there as animations -- given the argument here that identity may be more meaningfully and realistically supported in this way rather than statically.

Exploration of such dynamics is further justified by current research into cognitive engagement with the harmonies of music and the topological forms by which it can be represented -- notably understood through toroidal forms and orbifolds (Dmitri Tymoczko, *The Geometry of Musical Chords*, *Science*, 2006; *A Geometry of Music*, 2011). (cf. Zoltan Kadar, *The torus and the Klein bottle amplitude of permutation orbifolds*, 2000). Such possibilities are especially relevant to the extent that many individuals and groups associate their identity and its reinforcement through music.

**Clues from nature:** The relevance to the above argument is further reinforced by exploration in music theory by the construction of a generalized Klein-bottle *Tonnetz* -- departing from the toroidal *Tonnetz* of neo-Riemannian theory (Robert W. Peck, *Klein-Bottle Tonnetz*, *Music Theory Online*, 9, 3, August 2003). Such work could suggest that the cognitive engagement enabled by the form of the Klein bottle might in fact be enabled by music -- notably in the case of Jerusalem (*A Singable Earth Charter, EU Constitution or Global Ethic?* 2006).

The argument with respect to form and identity can be developed otherwise by recognizing the extent to which nature offers a vast array of forms. In the case of crystals, some have long been associated with human values and identity -- suggesting fruitful psychosocial implications (*Patterning Archetypal Templates of Emergent Order implications of diamond faceting for enlightening dialogue*, 2002). The emergence of order in nature has been extensively documented by Christopher Alexander (*The Nature of Order*, 2002-2004) as a basis for his geometrical work (*Harmony-Seeking Computations: a science of non-classical dynamics based on the progressive evolution of the larger whole*, *International Journal for Unconventional Computing (IJUC)*, 5, 2009) discussed separately (*Harmony-Comprehension and Wholeness-Engendering: eliciting psychosocial transformational principles from design*, 2010).

In the light of such a perspective, it is then possible to ask whether the experiments in order by many species in the environment effectively offer clues -- from a systems perspective -- to new possibilities of order in governance. The vast array of *radiolaria* offer but one set of examples.

**Totems revisited?:** Such a perspective is a reminder of the manner in which *totemism* (notably in relation to *totem animals*) has long been used by indigenous populations as a means of ordering their identities and relationships. Claude Lévi-Strauss (*Totemism Today*) argued that human cognition, which is based on analogical thought, is independent of social context. For him, totems are chosen arbitrarily for the sole purpose of making the physical world a comprehensive and coherent classificatory system which he recognizes as a more efficient way to cope with this particular mode of life in which abstractions are rare, and in which the physical environment is in direct friction with the society.

Given the extent to which groups (notably political parties and even military regiments) associate their identity with figures of animals (or live "mascots"), these could be readily understood as performing the valuable function of totems. This is discussed [separately](#) in the light of the arguments of James Cowan (*Mysteries of the Dream-Time: the spiritual life of the Australian Aborigines*, 1989).

## Conclusion

Given its reputation as the discipline most skilled at the exploration and comprehension of relationships of the subtlest kind, where is the analysis of the branches and levels of mathematics that have endeavoured to explore intractable conflicts? What possibilities have emerged for agreements of a higher order regarding the so-called "two-state" solution and for Jerusalem, for example?

To what extent have these possibilities been informed by the creative insights regarding the *two-state quantum system* -- associated, ironically, with the so-called *Rabi cycle*? If the discoveries of *moonshine mathematics*, identifying the *Monster symmetry group*, are upheld by mathematicians as the key to everything -- including topology -- then what are their relevance to intractable conflicts? (*Potential Psychosocial Significance of Monstrous Moonshine: an exceptional form of symmetry as a Rosetta stone for cognitive frameworks*, 2007).

Given the proposal by the *Middle East Quartet* for renewed negotiations, in immediate response to the Palestinian request to the UN for membership, what new mathematical insights have been identified to reframe previously discussed options? (*Mahmoud Abbas cool on Mid-East Quartet talks blueprint*, *BBC News*, 24 September 2011)?

At a time when it is widely argued that "every possible avenue has been explored", why is mathematics not seen as offering such a possibility? How has such mathematical analysis been inhibited or deprecated -- in comparison to its application to the exploration of complex codes and esoteric possibilities?

What calls for proposals and prizes have been announced to motivate creativity? With respect to faith-based conflicts, is it not the case that the parties involved are in principle amenable to solutions of higher dimensionality consonant with mathematical theology (cf Philip J. Davis, *A Brief Look at Mathematics and Theology*, *The Humanistic Mathematics Network Journal Online*, 27, 2004)? Physics gives

credibility to the manner in which a Newtonian framework in physics is subsumed by an Einsteinian framework (with the latter subsumed in turn by string theory as an emergent Theory of Everything). Given that conventional "two-state" solutions are defined within a Newtonian framework, what might be the "Einsteinian framework" within which "Newtonian inconsistencies" could be resolved -- as a prelude to a Theory of Everything?

Where are there institutes of advanced studies in mathematical theology? What are their programs of research ("*Tank-thoughts from Think-tanks: metaphors constraining development of global governance*, 2003)? With regard to the "presumptions" and "assumptions" undermining effective discourse on intractable conflicts, where is the research on the fruitful implications of "subsumption" and "transumption" (*New Paradigms via a Renewed Set of Prefixes? Dependence of international policy-making on an array of operational terms*, 2003; *Exploration of Prefixes of Global Discourse: implications for sustainable confidelity*, 2011).

Given the remarkable work of Christopher Alexander on a pattern language and the *The Nature of Order* (2002-2004), as a basis for his quest for geometry-based harmony, where are the analogous initiatives with respect to global governance? Should these extend to the "dynamics of order" and the manner in which they enable more meaningful forms of identity (*A Singable Earth Charter, EU Constitution or Global Ethic?* 2006).

Given the challenge of engaging more fruitfully with a rapidly degrading global environment, what possibilities do the above arguments suggest for patterning that engagement otherwise -- if only as a means of mediating against increasing evidence of lifestyle diseases? Are dimensions of the response to be found in complementary arguments articulated separately (*En-joying the World through En-joying Oneself: eliciting the potential of globalization through cognitive radicalization*, 2011; *Embodying the Paradoxes and Contradictions of the Pursuit of Happiness*, 2011; *Psychology of Sustainability: embodying cyclic environmental processes*, 2002).

Following the points made by Rosen in the light of insights articulated as Bohmian dialogue, reflection is required on the implications of the need to move cognitively beyond thought alone. The strategic challenges of governance, as with the enabling interface of the Klein bottle, cannot be adequately "envisaged" through reliance on the conventional "vision" metaphor. There is a need for them to be "enfelt" in ways which call for exploration. Characteristics of this are to be found in the experience of liminality -- suggesting that the Klein bottle is a form of bridge between worlds variously imagined, experienced and chosen (*Cultivating Global Strategic Fantasies of Choice*, 2010; *Living as an Imaginal Bridge between Worlds: global implications of "betwixt and between" and liminality*, 2011).

Governance is bedevilled by the seemingly incommensurable nature of the alternatives characteristic of strategic dilemmas (*Configuring Strategic Dilemmas in Intersectoral Dialogue: summary of analysis on the occasion of Earth Summit*, 1992). Does understanding of the Klein bottle, as outlined above, merit exploration as offering a potential bridge transcending binary disassociation?

Posing strategic dilemmas in their own right, might interdisciplinary, intercultural and interfaith discourse be enabled in unforeseen ways by this approach -- most symbolically in the case of Jerusalem (*Reframing Relationships as a Mathematical Challenge: Jerusalem -- a parody of current inter-faith dialogue*, 1997)?

Such considerations have implications for possible responses to intractable dynamics currently expressed geometrically, such as "reciprocal extraterritoriality" and "condominium" -- beyond oversimplistic proposals for a "two-state" solution. The issue is how to enable imaginative engagement with them, even assisted by mythopoeic modalities more characteristic of faith-based discourse than the proposals for new "metrics" (*Relevance of Mythopoeic Insights to Global Challenges*, 2009).

Given the development of the topological argument, is there a case for combining it dynamically with the coherence offered by spherically symmetrical polyhedra -- in the quest for more powerful ways of informing values (*Topology of Valuing: psychodynamics of collective engagement with polyhedral value configurations*, 2008)?

As a challenge to creative speculation, is it worth considering the possibility that hypothetical extraterrestrials may apply their own form of the conventional mirror test in order to assess the "self-awareness" of humans? Might this imply a radical degree of cognitive engagement with the global environment (*Self-reflective Embodiment of Transdisciplinary Integration (SETI): the universal criterion of species maturity?* 2008).

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