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13th September 2010 | Draft

Enabling Governance through the Dynamics of Nature exemplified by cognitive implication of vortices and helicoidal flow

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Introduction

Problems as the key to solutions: water as an example

Vortices of opinion?

Psychosocial vortices as self-referential traps

Being "in the flow" -- learnings from a trout

Governance and the flow of information

Information flow: threads and vortices

Vortex generation and mandalas

Experiential application of vortex insights

Helicoidal integration of dynamics of self-referential initiatives?

Technological innovation as template for cognitive innovation

Vortex management

Overcoming psychosocial fragmentation and buffeting

Navigating psychic space?

Global governance vs. Toroidal governance

Sustainable "global" governance through double helicoidal invagination?

References

Introduction

This follows from the case previously made for exploring "toroidal governance" to compensate for the evident inadequacies of "global governance" (*From global governance to toroidal governance*, 2010). Of particular interest in that respect are the vortex dynamics by which toroidal forms are sustained, as commonly illustrated by the [smoke ring](#). [Vortex rings](#) have been acknowledged by many investigators as one of the most fundamental and fascinating phenomena in fluid dynamics (Feliks Kaplanski, *Dynamics of Vortex Rings*, *SciTopics*, 12 July 2010).

Considerable insight into the functioning of vortices in nature emerged from the work and applications of [Viktor Schauburger](#) (1885-1958). His principal argument was that humanity could benefit considerably by learning from nature -- specifically the dynamics of water -- rather than trying to correct it. His motto was *Comprehend and Copy Nature* -- thereby relating experience to a much wider and more exciting worldview. His concern was to liberate people from dependence on inefficient and polluting centralized energy generation. That concern with water predates the current recognition that freshwater is in increasingly short supply and has been seen as a likely trigger for future world wars.

The following argument is not concerned with water, energy or flow in the conventional sense. The focus here is on the value of insights, as exemplified by those of Schauburger, in enabling a mode of reflection with a higher probability of engendering forms of governance capable of responding to the challenges of the future. Specifically of interest are the insights into psychosocial processes which might be derived from understanding vortices -- as these might relate to enabling "toroidal governance".

The enthusiasm and controversy associated with the innovative approaches to "energy" of Schauburger bear some resemblance to those associated with [Nikola Tesla](#) (1856-1943) or with [R. Buckminster Fuller](#) (1895-1983). The *magnum opus* of the latter on [synergetics](#) claimed to highlight the cognitive implications and informed his social analysis of the human condition (*Synergetics: Explorations in the Geometry of Thinking*, 1975). The inability to derive cognitive benefits from that work, of significance to global governance, was the subject of an earlier argument (*Geometry of Thinking for Sustainable Global Governance: cognitive implication of synergetics*, 2009). Schauburger defined the challenge as one of "thinking an octave higher". It is such a possibility that is of concern here rather than the subtle "energies" with which these innovators were variously preoccupied.

Rather than regretting the controversies and academic antipathy to such innovators, the assumption here is that it is indeed by learning

from nature that a more fruitful approach to such characteristic "psychosocial vortices" may emerge -- of relevance to governance of a complex society. This preoccupation follows from the context for the earlier argument for "toroidal governance" (*Warp and Weft of Future Governance: ninefold interweaving of incommensurable threads of discourse*, 2010). The latter took specific account of the cognitive "strange loops" extensively discussed by Douglas Hofstadter (*Gödel, Escher, Bach: an Eternal Golden Braid*, 1979; *I Am a Strange Loop*, 2007). Schauberger's formulation of the cognitive challenge is consistent with that of Hofstadter:

Humanity has become accustomed to relate everything to itself (anthropocentrism). In this process we have failed to see that real truth is a slippery thing upon which the perpetually reformulating mind passes judgment almost imperceptibly ... Truth resides only in all-knowing Nature (*Our Senseless Toil*, 1934)

Of interest in relation to the dynamics of strange loops is that this "slippery thing" was effectively well-represented by Schauberger's early insight into the capacity of a trout to remain motionless in a fast moving current and to "screw its way" up a waterfall. The argument here is that such insights may well be of relevance to comprehension of the requisite dynamics for sustainability and governance.

Problems as the key to solutions: water as an example

The possibility of an alternative cognitive engagement with a range of problems facing society has been previously discussed (*Degrees of Cognitive Engagement with Interrelated Global Categories*, 2009). The work of Schauberger on water and flow raises the question as to how these might be considered a fundamental source of metaphor offering unexplored clues to governance of the future. The question is whether the very "problems" with which humanity is confronted in relation to water (freshwater supply, pollution, flooding, etc) are the key to approaches to reframing governance from which "solutions" are then more likely to emerge.

The approach may be even of greater relevance to the extent that the learnings to be derived from "problems" are normally rejected in the preoccupation with the "solutions" that need to be urgently imposed upon them -- in the light of mindsets that, in fact, may well be ill-suited to engaging effectively with the "problems". This would be consistent with the much-quoted axiom of Albert Einstein:

We can't solve problems by using the same kind of thinking we used when we created them.

Also relevant is the "law" formulated by Eric Sevareid: *The chief cause of problems is solutions*. For, indeed, it is the application of simplistic, ill-considered solutions which typically engenders even more challenging problems, as argued with respect to current enthusiasm for geo-engineering (*Geo-engineering Oversight Agency for Thermal Stabilization (GOATS)*, 2008). More relevant might be the "law": **Problems are solutions -- misunderstood**. Potentially more challenging is the sense that if advocates of solutions do not understand how they themselves are part of the problem, they will not have the capacity to comprehend the nature of the solution required. This is notably the case with respect to environmental challenges and the tendency to externalize them, as previously argued (*Existential Embodiment of Externalities: radical cognitive engagement with environmental categories and disciplines*, 2009).

It is of course the case that water has been a source of metaphor to many down the centuries -- especially to sailors and poets. Its movements were a lifelong mystery and inspiration to Schauberger. It was through exploring its movement in the minutest detail that he derived much valued technical innovations previously unforeseen by the range of relevant specialists.

Schauberger's basic commitment was to the observation of nature in its details, to deriving patterns from its functioning, and to replicating those patterns in technical designs [see relevant [Schauberger quotes](#) from *Wikiquotes*]. This process could be seen as the technical application of the isomorphism between disparate systems as recognized by [general systems research](#). The process is to be recognized in the recent interest in the potential of [biomimicry](#) or biomimetics, a discipline of which Schauberger has been recognized as an instigator.

As described by [Janine Benyus](#), biomimicry is the examination of nature, its models, systems, processes, and elements to emulate or take inspiration from in order to solve human problems (*Biomimicry: innovation inspired by nature*, 1997). Through the [Biomimicry Institute](#), Benyus has assisted corporations to create sustainable products, processes, and policies based on nature's principles. The approach has been used with respect to water, as described by Alissa Walker (*Biomimicry Challenge: for IBM, Smart Design draws water conservation inspiration from ecosystems*, *FastCompany*, 20 May 2010).

Nature is of course a rich source of metaphor, notably exploited in governance and decision-making -- especially with reference to crises, opportunities and movements of opinion:

- wind: winds of change, hurricane, whirlwind
- water / sea: tsunami, tide, flooding, dam / reservoir, irrigation, channelling
- land: landslide, earthquake, avalanche
- heat / fire: scorched earth, heating, fanning the flames, overheating
- plants: weeds, harvesting
- animals: worms, snakes, tigers, endangered species

However, to the extent that these phenomena offer patterns that are recognized as valuable and credible, the question then is to what degree the patterns can fruitfully be explored further. It is in this spirit that Schauberger's insights into the movement of water merit exploration -- and, more generally, technological innovation in relation to fluid dynamics.

Vortices of opinion?

The assumption here is that the experience of water and its flowing movement can be compared to that of attention and

opinion. Reference is frequently made to "movement of opinion", notably in relation to support or opposition to the challenges of governance. To a lesser degree this is also the case with regard to attention, especially as highly valued by advertising, or as fundamental to disciplines of meditation. Of interest here is the engagement with such flows in the case of information and knowledge management of relevance to governance.

Schauberger is perhaps best known for his insights into the nature of vortices in water and how such patterns could be employed in response to various technical challenges. These included processes to enhance water quality (as with "flowforms") and as a source of energy (as with his "implosion motor").

The term "vortex" is occasionally employed in relation to individual and collective challenges. It may be related to recognition of dysfunctional cycles of violence and how they might be "broken" (*Dysfunctional Cycles and Spirals: web resources on "breaking the cycle"*, 2002). The meaning of a phrase such as being sucked into a "vortex of despair", or a "vortex of depression", can be widely recognized. Recognition of how people can be "drawn into" situations held to be problematic is also readily understandable in terms of a "vortex", as in the case of particular belief systems or movements. Change itself may be described in terms of a vortex (Lawrence Pintak, *Arab News Media: In the Vortex of Change, Transnational Broadcasting Studies*, 2005; N. Shivapriya, *Rural India in the Vortex of Change, The Economic Times*, 6 Sep, 2010; Tansu Çiller, *Turkey and NATO: stability in the vortex of change, NATO Review*, 42, 2, Apr. 1994; Lisa Horner and Josh Wilson, *St. Petersburg: Russia's Vortex of Change*. SRAS, 2010).

The question might even be asked whether the very attraction of particular belief systems or ideologies could be usefully compared with the attraction exerted by a vortex. Should values themselves be considered in that light (*Human Values as Strange Attractors*, 1993)? Again, for outsiders, such a comparison would be meaningful to those proclaiming the dangers of particular value-based systems -- "capitalism" as a vortex, "socialism" as a vortex, "fundamentalism" as a vortex, etc?

Given the familiarity of the cyclones and anti-cyclones on world weather maps, as presented daily by the media, there is even a case for recognizing the possibility of developing analogous maps for movements of opinion -- perhaps to be understood as "whether maps". As with the role of the cyclones and anti-cyclones, such vortices can be readily understood as associated with the depressions and enthusiasms influencing the experience of daily life -- perhaps over longer periods of time.

The distinction between cyclone and anti-cyclone helpfully points metaphorically to the capacity to "rise" or "fall" with the movement of a vortex. It is of course birds, pilots of gliders (and paragliders) who are familiar with the benefit to be derived by this means from "thermals". Possible implications for governance have been specifically explored in the case of ballooning as a metaphor (*Globallooning -- Strategic Inflation of Expectations and Inconsequential Drift*, 2009).

Psychosocial vortices as self-referential traps

As noted above, this exploration derives from earlier discussion of "strange loops" and the self-referential paradoxes they pose. With respect to being trapped in any vortex, it is then especially appropriate to note the adage of policy scientist [Geoffrey Vickers](#) (*Freedom in a rocking boat: changing values in an unstable society*, 1972; *Human Systems Are Different*, 1984), namely:

A trap is a function of the nature of the trapped

In exploring Schauberger's insights in relation to water, and those inspired by his work, there is therefore a case for being especially attentive to the nature of the vortices their own engendered dynamics constitute. With respect to the challenges of governance, Schauberger (as with many innovators) was exposed throughout his life to the problematic dynamics of his relationships with "techno-academics" -- the experts who deprecated his insights and approach, despite his demonstrated competence. He held them primarily to blame for the dangerous state of the world.

The controversies his work engendered through an exceptionally difficult period of European history -- itself a "mega-vortex" -- offer insights into the nature of the trap in which he found himself. As with many other innovators, he does not seem to have applied his insights to reframe that psychosocial vortex. In a phrase, symptomatic of the experience of many such innovators, Schauberger declared just prior to his death (as noted by Alick Bartholomew, *Hidden Nature: the startling insights of Viktor Schauberger*, 2005):

I no longer own my own mind. I don't own even my own thoughts. After all I've done, finally there is nothing left. I am a man with no future.

Schauberger's work has inspired a relatively little known movement amongst environmentalists and those seeking alternatives to the conventional technological mindset. Whilst their commitment is to be admired -- as with Schauberger's -- in terms of the argument here regarding governance, it too calls for recognition in terms of vortex dynamics. The question is how to derive insights from such dynamics in the light of Schauberger's work using insights into water and flow as metaphors. **The argument here is therefore not about water *per se* but more generally about the patterns of which it may be considered the manifestation most readily accessible to human comprehension.**

The argument here must necessarily recognize the work of psychologist [Clare Graves](#) (*Human Nature Prepares for a Momentous Leap, The Futurist*, April 1974). This formed the basis of a much publicized human development programme -- [spiral dynamics](#) -- articulated by [Don Beck](#) and [Christopher Cowan](#) (*Spiral Dynamics: mastering values, leadership, and change*, 1996). This has had a significant influence on the [Integral Movement](#) through the work of [Ken Wilber](#) (*A Theory of Everything: an integral vision for business, politics, science and spirituality*, 2000). These insights have been further developed by [Steve McIntosh](#) (*Integral Consciousness and the Future of Evolution*, 2007). A summary of their relationship is provided by Alex Burns (*About Spiral Dynamics*, 2004).

As with many human development initiatives strongly governed by issues of intellectual copyright (together with problematic

relationships amongst those involved in various ways), it remains to be determined in what ways their insights are self-referentially applied to those same dynamics. The theory as elaborated by Clare Graves, for example, makes no reference to Schauberger -- suggesting that a quite different use of the spiral form is intended. The argument here is that the challenging dynamics amongst psychosocial movements merit consideration in the light of the insights of Schauberger. Whilst the latter's original work on vortices may indeed be mentioned now in the same context as "spiral dynamics", it remains to be seen whether his insights have been embodied in that approach as might emerge from the following argument.

Being "in the flow" -- learnings from a trout

As noted above, Schauberger derived the original inspiration for his insights from observing the ability of a trout to remain motionless in the strongest current -- and its unusual capacity to move upstream if alarmed, rather than be carried down with the flow. This led to his detailed observation of the role of water temperature in enabling such dynamics. As summarized by Alick Bartholomew (*Hidden Nature: the startling insights of Viktor Schauberger*, 2005):

The trout normally swims in the middle of the central current, where the water is densest and coldest. Its body displaces and compresses the individual water filaments causing them to accelerate. As their critical velocities are exceeded, vortices or countercurrents are formed along the rear part of the trout's body, providing a counterthrust to the current, allowing the trout to remain stationary in the fast flowing water. If it needs to accelerate, it flaps its gills, creating a further vortex train along its flanks, increasing the countercurrent upstream. (p. 27).

As noted by Bartholomew, in learning how to generate energy using the methods of nature, Schauberger worked out from such observations "how a trout is able to screw its way up a waterfall by hitching a ride on strong levitative currents". Using this principle, the first generator he developed was the "trout turbine". This has been summarized by Denise Turner (*Water Ways of Life: Viktor Schauberger, Lightnet*). A subsequent development of this turbine is now known as the "vortex generator" (although many others now exist with that name).

The key to such insights, as articulated in a seminal paper by Schauberger (*Temperature and the Movement of Water*), was:

... the influence of minute differences in temperature, which are presently wholly ignored by modern hydraulics and hydrology. Natural, living, water, which is conventionally regarded as a homogeneous substance, he showed to be composed of many strata or layers with subtle variations in temperature and electric charge which influence the water's motion, its form of flow and its physical properties. (p. 31)

Schauberger relied to a degree on his commitment to a shift of focus to identify with the perspective of the trout in the flow. Returning to the metaphor, the question is the cognitive significance to be associated with being "in the flow" in psychosocial situations and the possibility that the "trout-perspective" has merit as a focus of attention and perspective on information flows -- especially as these might relate to governance.

As proposed by Mihaly Csikszentmihalyi, "flow" is the mental state of operation in which a person in an activity is fully immersed in a feeling of energized focus, full involvement, and success in the process of the activity (*Flow: the psychology of optimal experience*, 1990). Its significance has notably been explored in relation to [education](#), [music](#), [sport](#), [religion and spirituality](#), [gaming](#), and [work](#). Csikszentmihalyi has suggested approaches to [group flow](#) -- ways in which people can work together so that each individual member achieves flow. He has collaborated with [Howard Gardner](#) and [William Damon](#) to explore the relationship of flow to corporate activity (*Good Business: Leadership, Flow, and the Making of Meaning*, 2002). A link to governance is indicated by Philip A. Woods (*Building on Weber to Understand Governance: exploring the links between identity, democracy and 'inner distance'*, *Sociology*, 2003). Potentially of relevance to the argument developed here are the concerns of [The Center for Contemplative Mind in Society](#) of which Csikszentmihalyi is one advisor.

The concept of flow has been related to the notion of the "flow of ideas", notably with respect to creativity (Paul Murty, *The Ebb and Flow of Creative Design*, 2009).

Also of relevance here is the sense in which individuals are able to experience themselves to be in the "flow of events", in the "flow of information", or "in the loop". Given the examples of the skills of the trout and the insights of Csikszentmihalyi, the question is whether there are poorly recognized ways in which the individual experience of flow (and the associated skills) can be understood as corresponding in some way to the behavioural skills of the trout.

It is appropriate to note that a corresponding metaphor gave rise to a widely recognized strategic management text on the merit of emulating the skills of a dolphin ([Dudley Lynch](#) and Paul L. Kordis, *Strategy of the Dolphin: scoring a win in a chaotic world*, 1988). Such recommendations (and Schauberger's own ability) are reminiscent of the manner in which individuals amongst traditional tribal peoples may develop a relationship to a totemic animal and the capacity to "see through" the framework offered by that species' relationship to its environment. Development of such thinking is part of the word-of-mouth learning purportedly associated with secret rites of passage and the skills of shapeshifting as separately discussed (*En-minding the Extended Body Enactive: engagement in conceptual shapeshifting and deep ecology*, 2003).

Governance and the flow of information

Institutions of any kind necessarily experience themselves as exposed to a flow of information. For "intelligence agencies" and "security

services" this may be understood as a "flow of intelligence". As recently highlighted in an investigative series of reports by the *Washington Post*, the very quantity of this "intelligence" (managed by some 1,200 bodies in the United States), poses fundamental questions regarding the capacity to process it and derive intelligent insight from it (Dana Priest and William M. Arkin, *Top Secret America*, *Washington Post*, 2010). The attention span of those for whom it is intended is necessarily severely challenged. Corresponding challenges obtain at the community level and for individuals. How is any entity to "govern" its behaviour in the face of such flows?

Various distinctions may be made in considering how insights might be derived from the skills of the "trout":

- the capacity to remain stationary in the flow ("motionless") calls for a distinction between:
 - inaction of the kind of which institutions, especially governments, are frequently accused
 - controlled response to disruptive influences, exemplified by the capacity of birds and helicopters to hover
- the capacity of non-responsiveness to flow:
 - response avoidance, again of the kind of which institutions, especially governments, are frequently accused
 - non-reactive response, namely avoidance of responses of the kind caricatured as "knee-jerk"
- selective response to flow:
 - spasmodic (reactive) response to new information, exemplified by short-term policy-making in response to media reports (caricatured as "fire-fighting")
 - sensitivity to information of longer-term significance, namely the longer-term significance of new information

Aspects of these distinctions are evident both at the level of government and at the individual level:

- the dignified momentum associated with the metaphor "the ship of state" (with the reservations to be derived from the mindset associated disastrously with the *RMS Titanic*)
- the adage: *Don't push the river, rather guide the canoe*

Of greater relevance to the argument here are the senses in which:

- the capacity of a great leader has been traditionally characterized as the capacity "to do nothing", exemplified by qualities traditionally valued in Chinese imperial governance (in that nothing needed to be done)
- the capacity of "calm abiding" or *Vipassana* as valued by some spiritual disciplines (Geshe Gedün Lodrö, *Calm Abiding and Special Insight*, 1998; Raj Arumugam, *Calm Abiding*, 2010; Mantagamo Bhikkhu, *Vipassana or Calm Abiding*, 2009).

However, whilst these point to possibilities as a desirable focus of aspiration and practice, the insights to be derived from the trout in the light of the work of Schauberger would appear to offer behavioural clues relevant to those immersed in any "flow of information". The technical bridge calling for exploration lies in his insights into vortices and helicoidal movement -- and their possible implication for "toroidal governance". Of particular interest is the extent to which they may be adapted to electronic information-handling protocols through which knowledge is processed.

Information flow: threads and vortices

Seemingly related only incidentally (if at all) to the insights of Schauberger, the discipline of [fluid dynamics](#) has long been the arena of extensive research into flow in fluids and gases. Despite frequent use of flow-related metaphors (as indicated above), it is unclear that these explorations have enhanced the capacity to handle flows of information, intelligence, knowledge or insight. Fluid dynamics makes distinctions between flows of the following types, all of which are a potential source of metaphor: [compressible vs incompressible flow](#), [viscous vs inviscid flow](#), [steady vs unsteady flow](#) and [laminar vs turbulent flow](#). In the latter case:

- [turbulent flow](#): is characterized by recirculation, eddies, and apparent randomness. Whilst it has been described as "the most important unsolved problem of classical physics", an equivalent statement might be made with respect to the turbulent flow of information -- as a characteristic condition by which many are confronted. Frequent use of "turbulence" is made in referring to the challenges of governance -- now and in relation to "crisis of crises" by which it is expected the future will be characterized.
- [laminar flow](#): is characterized by the absence of turbulence, although the presence of eddies or recirculation alone does not necessarily indicate turbulent flow. Also known as streamline flow, it occurs when a fluid flows in parallel layers, with no disruption between the layers.

Of interest in what follows is the recognition of a form of [secondary flow](#), known as [helicoidal flow](#) (distinct from the primary, or mainstream flow) and exemplified by the cork-screw-like flow of water in a meandering river.

The concern here is with the "translation" of insights into water flow into insights meaningful with respect to information flow. The "trout" is then to be considered as a vehicle of responsive awareness -- capable to a degree of "calm abiding". With a degree of accord with current insights into laminar flow, Schauberger indicates (as mentioned above):

- water, rather than being a homogeneous substance, is composed of many strata or layers with subtle variations in temperature and electric charge which influence the water's motion, its form of flow and its physical properties.
- the trout's body "displaces and compresses the individual water filaments" causing them to accelerate.

Use of "filaments" is reminiscent of the widespread use of "threads" with reference to discussion on the web, as in ["threaded discussions"](#) and conversation threading -- as previously explored (*Interweaving Thematic Threads and Learning Pathways*, 2010; *Warp and Weft of Future Governance: ninefold interweaving of incommensurable threads of discourse*, 2010). Hourly exposure of web users to multiple thematic threads then reinforces the focus on the skills of the trout -- given the widely acknowledged challenge of "information overload and information underuse" (an early preoccupation of the United Nations University). And, whatever its skills in laminar flow, what unusual adaptations does the trout have to the turbulent flow possibly characteristic of the waterfalls up which it is

able to "screw" according to the observations of Schauberger?

The key to the trout's capacity lies seemingly in what might be termed "vortex management". As noted above:

...vortices or countercurrents are formed along the rear part of the trout's body, providing a counterthrust to the current, allowing the trout to remain stationary in the fast flowing water. If it needs to accelerate, it flaps its gills, creating a further vortex train along its flanks, increasing the countercurrent upstream.

In contrast to increasingly questionable efforts at "knowledge management", how might "vortex management" enhance the individual and collective capacity to engage effectively with flows of information and insight? This would seem to be the key to the case previously made for "toroidal governance".

Vortex generation and mandalas

The earlier exploration of threaded discussion considered ways in which the constraints of its seeming linearity could be transcended by "weaving" threads into forms of greater dimensionality -- including "magic carpets" (*Magic Carpets as Psychoactive Systems Diagrams*, 2010). Essential to Schauberger's insights are his representations of vortex formation in stream flows, necessarily understood as three dimensional along the length of the stream. It was this representation which enabled him to design his first "trout turbine" (as mentioned above), and from which various types of "vortex generator" have since been developed.

If the "trout" is understood to be navigating a tunnel of information, down which vortices are variously formed, it is interesting to note that any cross-section of that tunnel -- cutting through the vortices at that point -- bears a degree of resemblance to types of [mandala](#), as particular integrative configurations of information or insight in the moment. Displacing the cross-section down the tunnel then offers transformations of that mandala -- reminiscent of the visualization of a succession of [brain scan](#) "slices" or of manipulation of a kaleidoscope. Such visualizations recall the [Chladni patterns](#) of [cymatics](#) (Hans Jenny, *Cymatics: a study of wave phenomena and vibration*, 2001).

Irrespective of any effort to weave them together, typically missing from the linear sense of "threads" is the manner in which they shift in relation to one another over time -- perhaps as shifting priorities of attention. The common metaphor of "spin" can then be considered relevant -- even in one's own appreciation (or manipulation) of those threads -- as the emergence of variants of a theme (or "story"). It is in this sense that intuitive appreciation of "threads", "spin" and "vortex" are consistent. Understood only in static terms, they are also consistent with the increasingly prevalent psychosocial phenomenon of [cocooning](#). The information metaphor of "web" reinforces such understandings. Some websites may well be understood as functioning as a form of cocoon -- even well "spun". For many, navigating the "web" might be compared experientially to the challenges posed -- to all but [spiders](#) -- by a cobweb and its cocooned inhabitants.

To the extent that there is psychosocial identification with a pattern of threads, any (possibly cyclic) dynamic relating the threads over time can then itself be understood as the basis of a sense of identity (*Emergence of Cyclical Psycho-social Identity: sustainability as "psychically" defined*, 2007). This may include patterns of identity considered dysfunctional -- as characteristic of cycles of substance abuse and violence. Such considerations may inform the sense of identity over a lifetime, relating to occasional expressions of the insight that life itself may be experienced as a flow.

Introducing a dynamic, longer-term understanding of identity in this way suggests the possibility of associating individuals and other psychosocial entities with vortices of information, insight or belief. This offers a way of framing apprehension of charismatic individuals and of the personality cults which may form around them -- and the "spin" with which they may be experienced as being associated. This also suggests that movements of opinion and belief systems might be fruitfully understood in this way (*Dynamically Gated Conceptual Communities*, 2004). This would be consistent with any sense, from one framework, that another is "twisted" -- possibly in quite complex ways (*Engaging with Questions of Higher Order: cognitive vigilance required for higher degrees of twistedness*, 2004). Are disciplines, ideologies and belief systems to be understood as "twisted" in relation to one another -- undermining transdisciplinary and interfaith initiatives, for example?

Does the dynamic of a vortex offer a richer means of comprehending enthusiasm, depression, confidence and loss of self-esteem -- whether as experienced or for those exposed to others experiencing those conditions? Perhaps of even greater relevance, how might such insights enable better understanding of the dynamics associated with the enthusiasms of change agents, the resistance of conventional belief systems to alternatives, and the problematic dynamics arising from the appreciation of each for the other? Such phenomena, as noted above, were part of Schauberger's own experience and are evident in that of those now inspired by his insights.

The concern here is whether Schauberger's insights into vortices -- and the extensive subsequent commentary on them (see references below) might enhance understanding and engagement with these processes of knowledge and cognition.

Experiential application of vortex insights

As a result of his investigations, Schauberger developed a number of applications, some of which were patented. His approach was appreciated, to a degree and controversially, during the Nazi war effort. It was subsequently a focus of interest of US investigators -- who imprisoned him for a period to debrief him (as with many scientists). Much of his work was seized or destroyed by Russian forces. It is variously alleged that some of his applications and insights have been further developed for military purposes.

Applications he instigated which have been of notable interest in recent decades include:

- water conduction and flow regulation in streams, pipes and channels.

- purification and aeration of water by swirling it through a vortex -- particular vortical patterns formed by the streamlines of natural water flow, resulted in a water quality that was pure and health promoting -- subsequently ensured by [Theodor Schwenk](#) with the use of [flowforms](#) (A. John Wilkes, *Flowforms: the rhythmic power of water*, 2003; Andreas Wilkens, et al. *Understanding Water: developments from the work of Theodor Schwenk*, 2005).
- production of hydroelectric power through a jet or vortex turbine (*Strahl turbine*) by innovative use of increased water velocity rather than simply by water pressure. This was achieved through creation of a vortex motion by spiral ribbings on the inside of the jet. In pipes constructed with a vortical cross section, not only was excess energy delivered to the system (a process termed "implosion"), but the water flowed in the pipe with negative resistance (through formation of a so-called longitudinal vortex). As summarized by Josef Hassberger (*Dynamic Hydropower: the "suction turbine" or "jet turbine" of Viktor Schaubberger*, 1993):
 - this vortex pattern itself has a tendency, quite separate from the jet-effect, to increase the velocity of the water, to decrease its temperature and to augment the water's density.
 - by use of a turbine wheel of conical shape, very high speeds of rotation were achieved, at the same time avoiding the usual difficulties of cavitation found in normal high speed turbine designs. The 'ribs' spiral down the surface of the cone in a corkscrew pattern. The corkscrew turbine wheel parts the flow of water, takes up the water's dynamic energy and lets the flow continue without major disruption. This contrasts with turbines of current design which "hack" the water into thousands of destructive counter flows and cross vortices, thus wasting much of the available energy and causing cavitation.

The energy inherent in the free and unhindered flow of water is then potentially much greater than that obtainable from the exclusive use of pressure resulting from altitude differential.

Common to these (and related) applications is the role of centripetal movement in contrast to the centrifugal movement on which many current technologies are based. The distinction is described by Frank Germano (*Implosion Technology: an alternative, sustainable new basis for modern technology*) summarizing an earlier articulation by Callum Coats (*Living Energies: Viktor Schaubberger's brilliant work with natural energy explained*, 2002):

- centrifugal technology: based on explosion expansive movement, notably achieved by combustion, heat, friction and pressure. Exploiting natural resources, this has an efficiency not greater than 35%, and is responsible for extensive degradation of the environment.
- implosion technology: combining two types of motion, namely [centrifugal](#) (giving pressure, friction, temperature rise and biological deterioration) and [centripetal](#) (giving suction, temperature drop and biological improvement) -- although the literature on Schaubberger uses the neologisms centrifuge and centripence (see [Centre for Implosion Research](#)). The role of polarity and balance is considered critical. This implosion is achieved through the geometric coiling action of a double cycloid spiral curve (as in a vortex) which concentrates, contracts and compacts the water -- thereby cooling it and creating a vacuum augmenting suction. The whole process generates a diamagnetic force. This technology emulates processes in nature (shells, galaxies, antelope horns, sunflowers, pine cones, tree branches, tornados, cyclones, hurricanes). It consequently yields positive and sustainable results in excess. Hence recognition of some of Schaubberger's inventions as free or excess energy devices (Riley Hansard Crabb and Thomas Maxwell Thompson, *Implosion: The Path of Natural Energy -- Victor Schaubberger*, 1985). This implosion technology is variously reported to have been the basis for the development of a flying disk (known as a [Repulsine](#)), now the focus of efforts to reconstitute it ([Alfred Evert, Schaubberger - Repulsine - Redesign](#), 2008).

Schaubberger argued that the focus on centrifugal movement, rather than centripetal, was a case of looking at things the "wrong way around" -- and hence the disastrous consequences for the environment.

It is interesting to look at the possibility of applying this distinction to the manner in which information is handled -- especially information held to be controversial, as is typical of the often highly problematic dialogue between faiths, disciplines and ideologies, perhaps usefully to be described as "turbulent". As suggested above, it might well be applied to the interface between "mainstream" and "alternative" approaches in many domains, including that relating to "energy", as illustrated by Schaubberger's work.

For example, it is worth exploring a distinction of the following kind:

- "centrifugal information": understood in terms of achieving a forceful impact on a "target" audience, as in much marketing, propaganda, proselytizing, indoctrination, dissemination and the like. Associated use of military metaphors is common, as previously argued (*Enhancing Sustainable Development Strategies through Avoidance of Military Metaphors*, 1998). As implied by "centrifugal", information is forced out from a centre to transform understanding at a periphery, however problematic this may be experienced there.
- "implosion technology": understood as an appropriate combination of a "centrifugal" process and a "centripetal" process. But what might be understood by "the geometric coiling action of a double cycloid spiral curve (as in a vortex) which concentrates, contracts and compacts" -- thereby "cooling" and "creating a vacuum augmenting suction"? Presumably clues are to be found from insights into the manipulative operation of cults and other group processes engendering a "vortex" of "energy" -- although this might be considered characteristic of any "movement". including science itself. Such a notion of energy has been separately explored (*Reframing Sustainable Sources of Energy for the Future: the vital role of psychosocial variants*, 2006; *Psychosocial Energy from Polarization: within a cyclic pattern of enantiodromia*, 2007). The sense of being "sucked in" is frequently mentioned. The use of "spin" in the battle for "hearts and minds" is well recognized, if only in marketing.

But, as with the design of any "vortex generator", the issue is both how to improve the design (to reduce inefficiencies in knowledge processing) and how to recognize the dangers of inappropriate exposure to a powerful "implosion" process. The possibility of an

information process based on "the geometric coiling action of a double cycloid spiral curve" is intriguingly represented to a degree by the [Fibonacci spiral](#), as previously argued (*Potential significance of a Fibonacci spiral formation*, 2010; *Tao of Engagement -- Weaponised Violence and Beyond: Fibonacci's magic carpet of games to be played for sustainable global governance*, 2010). Some such "implosion" process is also suggested by the toroidal design required for nuclear fusion, again as previously explored (*Enactivating a Cognitive Fusion Reactor: Imaginal Transformation of Energy Resourcing (ITER-8)*, 2006).

The other water technologies developed from Schauburger's work, suggestive of corresponding information technologies, are:

- purification processes: appropriate centripetal vortex generation has been used for water purification, as illustrated by the work of Gudmund Rapp (*Experiments with a Centripete water vortex generator*). An intriguing challenge is the corresponding design of a dialogue process capable of separating out problematic argumentation inhibiting inter-sectoral intercourse -- in the spirit of [critical thinking](#) and efforts at [argument mapping](#) (*Web resources: Critical thinking vs. Specious arguments*, 2001). The problematic discourse associated with climate change over recent years is an indication of the need, as with any discourse between "mainstream" and "alternative" perspectives. Any use of "purification" in a cognitive context is immediately reminiscent of the extensive preoccupation of many spiritual disciplines with "purifying the mind". In the case of yoga and tantra, for example, the process of [awakening kundalini](#) (represented by a spiral caduceus) recognizes "vortices of energy" in the body and the need for a form of spin in meditation. It is then also of interest how ritual chanting, as commonly deprecated, may effectively elicit valuable cognitive vortices.
- "enlivening water", exemplified by the above-mentioned use of flowforms. This relates to the possibility of "enlivening" or "animating" any psychosocial space, whether at the "global" level, the community level, for a family, or for an individual. In the light of understanding of what "flows", what vortex-like movement might be given to "enliven" it (*Circulation of the Light: essential metaphor of global sustainability?* 2010)? In the case of water, reference is made to how bodies of water are effectively "dead" -- leading to use of fountains and other aeration processes. A fountain is indeed a valuable metaphor for the elusive process of introducing "life" into a community -- otherwise readily termed "dead". What might be the "flowforms" or "fountains" appropriate to enlivening the psychic space of an individual?

Helicoidal integration of dynamics of self-referential initiatives?

The above argument can be fruitfully related to that regarding the role of self-reference in future organization (*Consciously Self-reflexive Global Initiatives: Renaissance zones, complex adaptive systems, and third order organizations*, 2007). This can be further informed by the argument for consideration of the cognitive processes associated with [strange loops](#) as previously developed (*Warp and Weft of Future Governance: ninefold interweaving of incommensurable threads of discourse*, 2010; *Sustaining a Community of Strange Loops: comprehension and engagement through aesthetic ring transformation*, 2010).

The correspondence to be explored is the possibility that information threads, perhaps exemplified on a larger scale by the discourse of disparate disciplines, faiths or modes of knowing, lend themselves to integration in the light of helicoidal flow -- in terms of their dynamics over time. This understanding may be related to the possibilities of "braided discourse" (*Braided discussion threads*, 2010). To the extent that the flow of insight over time may be compared metaphorically to a river, as is occasionally done, this suggests ways of exploring the meandering of that river and its effects. A similar case might be made for the disparate preoccupations of a community or an individual. Of specific interest is the manner in which helicoidal dynamics -- as cognitively experienced -- holds self-referential insight and mirrorings between threads.

In that spirit of self-reference with a cognitive emphasis, and given the characteristically problematic dynamics amongst those variously preoccupied by water and flow, the threads that might weave together in this way in relation to "mainstream" understanding of psychodynamics could include:

- water and healing (thalassotherapy, etc)
- implications of images of water, as widely publicized by [Masaru Emoto](#) (*Message from Water and the Universe*, 2010; *The Secret Life of Water*, 2005)
- association of water with "free energy" alternative technology, notably in relation to "implosion technology"
- implications for rethinking classical field physics (Donald Reed. *Beltrami Flow as Archetypal Field Structure: a Schauburger-Beltrami connection?*, 2001)
- water purification through flowforms (A. John Wilkes, *Flowforms: the rhythmic power of water*, 2003)
- relevance of "enlivened" water to [biodynamic agriculture](#) (Andreas Wilkens, et al. *Understanding Water: developments from the work of Theodor Schwenk*, 2005)
- symbolic and spiritual significance attributed to water in various cultures
- explicit reference to helicoidal and vortex patterns in meditation techniques, such as those relating to kundalini
- widespread description of ego dynamics in terms of "vortex" (for example: the ego as a vortex of consciousness, which separates itself from the ocean of awareness by its own centripetal force)
- recognition of the flow of *qi* (often translated as "energy flow"), whether in martial arts (notably [Chinese](#) and [Japanese](#)) or as *feng shui* (translated as "wind-water") (cf *Metaphorical patterns through which to engage with memetic challenges*, 2010)

Of particular interest is the manner in which the characteristic mutual deprecation, disparagement and accusation of hidden agendas might be embodied into the helicoidal dynamics. Hence the importance of deriving insights from river meandering and secondary flow in understanding the relation of helicoidal movement to the mainstream. Of particular interest is how eddies -- eddy currents -- are suggestive of the processes of minority interests and movements of opinion. With respect to mainstream risk-aversion, many could appropriately aspire to the iconic status of [Eddy the Eagle](#)! Innovators like Schauburger could well be considered in that light (cf *Don*

Justo's Self-Built Cathedral: metaphoric learnings for contemporary alternative initiatives, 2003). How does helicoidal flow embody the "eddies"? Should governance endeavour to eliminate them -- as exemplifying extremism?

Repression of anti-heroes as counter-currents -- an exemplification of "laminated governance" ?

The memorable manifestation of [anti-heroes](#) in particular sports at the Olympic Games, and subsequent regulation to prevent their emergence, can be considered as an effort to "lamine" governance through ensuring conformity to norms. A useful commentary on the phenomenon is provided by Jørn Møller (*From Eddy the Eagle to Grandma Luge, Play the Game*, 2002). Much publicized examples include ["Eric the Eel"](#), ["Paula the Pool"](#), as well as ["Eddy the Eagle"](#), ["Grandma Luge"](#), and the [Jamaican bobsled team](#). Of relevance to governance, Møller notes these characters are of course interesting through the media as singular stories of human interest beyond their eccentricity and bravery -- since the story about any conventional winner is quite often a predictable stereotype of little relevance to other aspects of life and culture.

Reversed losers, in their deviance from perfection, sometimes become more spectacular and better topics for the press than the winning heroes, who tend to become uniform in their perfection of style and attitude and to yield no friction for reflection and second thoughts whatsoever.... If it is one of the laws of fascination that perfection leaves no hold for interest, imperfection on the other hand might offer a road to public attention, and give way for new media strategies.... Like the clowns and the anti-heroes in the Shakespearian drama, who yield us a temporary relief from the fatal weight of destiny, sport also requires its anti-heroes.

Authorities of the "mainstream" sporting disciplines endeavour to suppress unpredictable behaviour because of risk-aversion, fear of ridicule and the distraction of public appreciation away from that expected by mainstream heroes (and their sponsors). This phenomenon is evident in refusal to allow paraplegics to compete against the unhandicapped -- especially when prosthetic devices might offer an advantage (*Disabled athlete denied entry to Olympics, Walking is Overrated*, 18 January 2008). Related phenomena are evident in refusal to allow women to compete against men (or vice versa), or the contrast between the careful distinctions made between weight categories (where weight offers an advantage, as in combat sports) and the absence of such distinctions where height offers an advantage (as in basketball).

These phenomena may be understood as highlighting the manner in which innovation is not recognized within "laminated governance" processes -- and is necessarily held up to ridicule, irrespective of how it is otherwise welcomed. Ironically the "eddies" are thus typically handled through engendering "spin".

Again these processes, widely experienced and often arrogantly enacted, are ignored despite their essential implication for any understanding of collective psychodynamics. Any exploration of them could fruitfully extend to the insights and dynamics of conspiracy theorists and the controversies regarding problematic complicity. Schauberger provides an interesting case study given his acknowledged associations with the Nazi regime and his post-war interactions with the CIA, exacerbated by his controversial secretive involvement in flying disk technology -- readily challenged from mainstream perspectives as associated with UFO speculation. An even more extreme example is associated with the use of "vortex" to characterize some CIA initiatives (Drew Hempel, *Deep Disharmony: secrets of the CIA's psi-plasma vortex*, Lulu, 2010).

Technological innovation as template for cognitive innovation

The above argument can be further developed by considering how innovators engage cognitively with their environment through technology. Much is made of the role of individual creativity in technological innovation. The objects and applications resulting from this creativity are a focus of technological development and commerce. It is these which subsequently become the focus of attention, especially when they enable welcome behaviour modification. The most obvious examples are mobile phones, iPhones, iPods and the iPad.

It is accepted that such objects, and the manner in which they are used, modify attitudes to technology and behaviour in relation to technology. Again the most obvious examples are offered by web technology, as studied by [Sherry Turkle](#) (*Life on the Screen: identity in the Age of the Internet*, 1997; *The Second Self: computers and the human spirit*, 2005; *Evocative Objects: things we think with*, 2007; *Falling for Science: objects in mind*, 2008). Much has been made of [virtual worlds](#), such as [Second Life](#), and more recently of social networking sites and internet addiction.

Such implications have been recently explored by Nicholas Carr (*The Shallows: what the Internet is doing to our brains*, 2010):

Building on the insights of thinkers from Plato to McLuhan, Carr makes a convincing case that every information technology carries an intellectual ethic -- a set of assumptions about the nature of knowledge and intelligence. He explains how the printed book served to focus our attention, promoting deep and creative thought. In stark contrast, the Internet encourages the rapid, distracted sampling of small bits of information from many sources. Its ethic is the ethic of the industrialist, an ethic of speed and efficiency, of optimized production and consumption -- and now the Net is remaking us in its own image. We are becoming ever more adept at scanning and skimming, but what we are losing is our capacity for concentration, contemplation, and reflection.

The concern here -- with respect to learnings from nature -- is somewhat different. The question is how technologies embody a structure that may suggest, and catalyze, a transformation in the way people reframe their own identity and behaviour in relation to nature. This potential is indeed implicit in many technologies, perhaps most obviously the automobile. Schauberger offers a number of

examples in relation to water flow -- understood more generally as fluid flow. More intriguing is the possibility that many technologies have this cognitive consequence to a degree that is not fully recognized. Nature might itself be considered to be a "technology" with such implications -- many offering sophisticated insights in danger of being lost through alienation from nature..

This exploration follows from an argument developed in relation to personal computers (*Computer Use as Philosophy in Operation: metaphors of the inner game*, 2003). An approach more closely related to a fan focused on the wind turbine (*Moving Symbols: radical change in psycho-social energy possibilities?* 2008). Both make reference to the work of Robert D. Romanyshyn (*Technology as Symptom and Dream*, 1989). Also of interest is the work of Erik Davis (*TechGnosis: myth, magic and mysticism in the Age of Information*, 2005). There is the further possibility that society effectively engenders the creative ingenuity for such innovation in response to the complex of cognitive challenges that people face.

Vortex management

Whilst Schauburger's innovations regarding the control of flow are not widely known, another example involving fluid dynamics and the management of vortices is the recently marketed [Dyson Air Multiplier](#) -- a bladeless fan. This, together with other inventions, arises from the much-publicized work of [James Dyson](#).

Blade metaphor of identity: Many cognitive frameworks are based on quadrants, whether for purpose of distinguishing modes of organizational change or as offering styles of personality and cognitive engagement. One of the more obvious and comprehensive is the [AQAL framework](#) of [Ken Wilber](#), developed as part of integral theory. This follows in a long tradition of fourfold frames, notably highlighted by [Carl Jung](#) with respect to the design of mandalas of Eastern cultures (and their Western equivalents) and their correspondence to his four primary [psychological types](#) (sensation, intuition, thinking, feeling).

Of relevance to the argument here is the extent to which such quadrant systems are static, especially in their representations. There is indeed an implied shift in focus between them but this is not explicit in the representation. It is a dynamic which the observer is expected to internalize. A major issue in psychotherapy is dysfunction in that movement with the possibility that an individual is "stuck" in one function and that others are to different degrees repressed.



The situation is similar with respect to the application of quadrant frameworks to organizations by strategic and human relations consultants. In that sense the quadrant pattern may be understood as corresponding somewhat to a static fan, or windmill -- one in which the blades are not understood as turning or being able to turn.

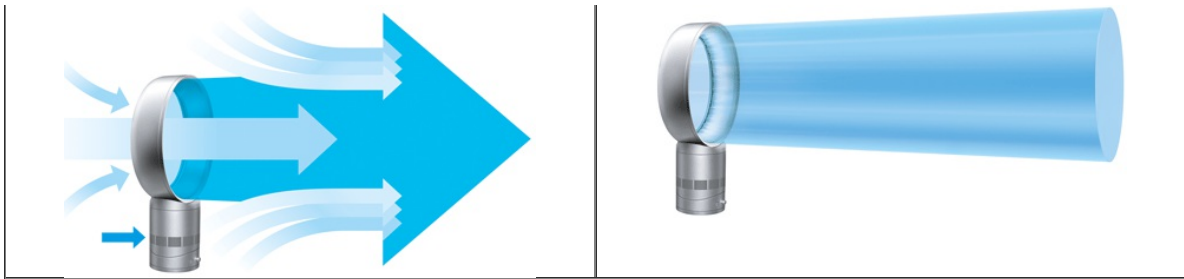
Rotating blades as exemplifying a working identity: Clearly as a metaphor it is fruitful to consider the implications of a rotating pattern of quadrants with which identity is variously associated. Although the cognitive implications are seldom considered, it is clear that this metaphor -- fan or windmill -- is occasionally used in describing the activities of individuals or organizations. In such cases the cognitive distinction made between individual "blades" is essentially forgotten and the focus shifts to the "wind" created by the rotation of the fan as a whole.

Rotating fans are one of the most common technologies, widely used around the world. The concern here is whether the mode of cognition implied by their operation is inadequate to the challenges faced by society. The argument may of course be applied to any conventional quadrant based system, rotating or not. Can it be said that such systems are enabling social change at a rate appropriate to the emerging crises and dysfunctionalities?

Is it possible that inherent in the mode of cognition from which "blades" emerged are deficiencies which merit attention? The question is not specifically focused on "4-blade" patterns. It applies equally to "2-blade", "3-blade" and "n-blade" patterns -- whether static or rotating. A previous speculative comment discussed the implications of an apparent switch from a static 4-fold symbol to a rotating symbol (*Moving Symbols: radical change in psycho-social energy possibilities?* 2008).

One approach to considering potential deficiencies is the creative case for a "multi-blade" approach as made by [Edward de Bono](#) (*Six Thinking Hats*, 1985; *Six Action Shoes*, 1991). This specifically envisaged a form of "rotation" between six categories. He has recently developed the argument for doing so (*Six Frames For Thinking About Information*, 2008). However his emphasis is on the ability to move between the modalities, effectively de-emphasizing any notion of "rotation". The same might be said for any provisions in an organization for a rotating chairperson.

Contrast between bladed and bladeless air fan (Illustrations reproduced with the courtesy of Dyson)	
Conventional air fan with blades rotating blades cause buffeting	Dyson Air Multiplier a bladeless fan
	



Of interest in relation to the argument here is the possibility that future models of the Dyson fan might allow users to switch optionally between the current laminar flow, a helicoidal variant, and vortical (smoke ring) air movement, through orientation of the circumferential air outlets.

Overcoming psychosocial fragmentation and buffetting

The Dyson fan offers a way of framing the question as to whether such technology offers a coherent reframing of personal identity.

There is much comment about the fragmented nature of human initiatives as it manifests through collectivities. It is deplored at a time when the need for a higher degree of coherence is widely recognized. There are few clues to viable forms of coherence -- especially when the "blades" are effectively static, as is typically evident from the organization charts of complex institutional systems. Is each division or department headed by a vice-president then to be understood as a "blade" with the institution achieving its objectives through some form of "rotation" around a common objective represented by the president?

In the light of the rotating category "blades" through which an initiative is manifested, it could be argued that significant deficiencies arise from the manner in which the blades variously "chop the air" -- fragmenting it as a means of achieving work. It can indeed be said to "work". The argument here is that it does so at a cost which may be undermining effective cognitive response to the challenges of a turbulent environment.

One of the consequences of the mode of operation is that the various conceptual blades ensure a form of "buffetting" of those exposed to the initiative. Each blade -- effectively a particular modality -- pushes those exposed to it in a particular direction, compensated by other blades pushing in other directions. The resultant direction is that sought as a consequence of such pummelling.

Whilst the case is made in terms of fan operation, it is the cognitive implications which are of interest here. Using Jung's typology, people are variously buffeted by sensation, intuition, thinking, and feeling -- as are collectivities. It is for this reason that it is appropriate to explore the cognitive implications that are effectively implicit in the Dyson fan -- or in the applications developed by Schauberger.

Navigating psychic space?

The work of Schauberger, and of others inspired by the flow of water, offers a way of reframing reflection about how psychic space is experienced and how the knowledge universe is "navigated". Such navigation may be variously explored (*Noonautics: four modes of travelling and navigating the knowledge universe?* 2006; *Navigating Alternative Conceptual Realities: clues to the dynamics of enacting new paradigms through movement*, 2002).

Such possibilities can be contrasted with the characteristic mainstream ("hearts and minds") bombardment of alternatives (*Missiles, Missives, Missions and Memetic Warfare: navigation of strategic interfaces in multidimensional knowledge space*, 2001). Irrespective of the reality or viability of Schauberger's "flying disk", the thinking it embodies with regard to flow merits consideration.

Of particular interest in relation to such navigation, in the light of insights into air flow, is the cognitive transition of [Arthur M. Young](#). He was the designer of [Bell Helicopter's](#) first helicopter, the Model 30, and inventor of the stabilizer bar used on many of Bell's early helicopter designs. He subsequently founded the "Institute for the Study of Consciousness" and advocated a process approach to [integral theory](#) with a particular understanding of learning-action cycles (*The Geometry of Meaning*, 1976). But of relevance to the argument in relation to navigation is the inspiration that helicopter design offered him in his quest for the development of a psychopter -- the helicopter as the "winged self", a metaphor for the human spirit. As he [stated](#): *I am interested now in the Psychopter -- because it won't work. What is the Psychopter? It is the winged self. It is that which the helicopter usurped -- and what the helicopter was finally revealed not to be.* In subsequent work he focused extensively on the torus and toroidal space-time (*The Reflexive Universe: evolution of consciousness*, 1976; see video [The Sphere and The Torus](#), 2007).

Navigation typically orients reflection to the challenge of movement in space, even understood metaphorically. The argument above with respect to flow, and helicoidal movement within that flow, reframes the challenge in terms of time. References to the river-like flow of time are frequent (Igor D. Novikov, *The River of Time*, 2001; William Prem, *Charting the River of Time*, 2007).

With respect to the earlier arguments for "toroidal governance" in contrast to "global governance", this suggests a new relation to time (*Strategic Embodiment of Time: configuring questions fundamental to change*, 2010; *The Isdom of the Wisdom Society: embodying time as the heartland of humanity*, 2003; *Where There is No Time and Nothing Matters: cognitive challenges at the Edge of the World*, 2008).

The imagination can then be creatively stretched by reflection on the cognitive implications of "timeship" design (*Timeship: Conception, Technology, Design, Embodiment and Operation*, 2003; *Embodying a Timeship vs. Empowering a Spaceship*, 2003).

With respect to the use of metaphor in facilitating "navigation", the point was made in the first of these documents that:

An imaginative stimulus for such investigation is provided by a science fiction scenario explored by a number of writers. It focuses on the challenge of comprehending high degrees of complexity calling for decision-making under operational conditions (as is the case in global management). The problem is that of piloting or navigating a spacecraft through "hyperspace" or "sub-space", as imagined in the light of recent advances in theoretical physics and mathematics.

Because of the inherent complexity of such environments, writers have explored the possibility that pilots and navigators might choose appropriate metaphors through which to perceive and order their task in relation to qualitative features of that complexity - for example, flying like a bird, windsurfing, swimming like a fish, tunneling like a mole, etc. The mass of data input derived from various arrays of sensors, and otherwise completely unmanageable, is then channelled to the pilot in the form of appropriate sensory inputs to the nerve synapses corresponding to his "wings" or his "fins".

Perception through the chosen metaphor is assisted by artificial intelligence software and appropriate graphic displays. The pilot switches between metaphors according to the nature of the hyperspace terrain. Such speculations do at least stimulate imagination concerning a possible marriage between metaphor and artificial intelligence in relation to governance.

The possibility of making such navigational choices is again reminiscent of "shapeshifting" as mentioned above (*En-minding the Extended Body Enactive engagement in conceptual shapeshifting and deep ecology*, 2003). It also recalls the fundamental issues of *apophysis* and unsaying (*Being What You Want: problematic kataphatic identity vs. potential of apophatic identity?* 2008).

Any such focus on "navigation" can be reframed in terms of a longer time frame, namely the evolution of human consciousness, as helpfully summarized by *Jennifer Gidley* (*A Macrohistorical Planetary Tapestry: the fascinating integral narratives of Steiner, Gebser and Wilber*, 2007) as part of her exploration of *The Evolution of Consciousness as a Planetary Imperative* (2007). Of particular interest is then the association on a longer time scale of the integral approach of Ken Wilber with spiral dynamics (as noted above). How might that emphasis be related to the case for consideration of helicoidal flow (as presented above)? In the evolution of human consciousness, from a self-referential perspective, such movement would need to take account of the problematic dynamics between those of different "colour", as coded within the spiral dynamics scheme.

Global governance vs. Toroidal governance

This exploration is effectively the last of a "triptych" starting with the *Warp and Weft of Future Governance: ninefold interweaving of incommensurable threads of discourse* (2010), followed by the more speculative *Sustaining a Community of Strange Loops: comprehension and engagement through aesthetic ring transformation* (2010). All three can be considered as *Metaphorical Geometry in Quest of Globality* (2010).

The three parts progressively challenge the adequacy of "global" geometry for governance -- as typically associated with the sphere and the **static** form of the planet. A case is made for considering the torus as representative of the **dynamic** which the planet traces out in its annual cycle -- and hence the the question raised regarding "toroidal governance" of sustainability in contrast with conventional preoccupations with possibilities of "global governance". That both representations obscure a less evident spiral motion is reflected in the above discussion of helicoidal flow and vortices -- closely associated with the geometry of the torus.

Biological development and biomimicry: In the first paper reference was made to the transition from sphere to torus in the developmental transformation of embryos at their earliest stage through *invagination* (Harald Jockusch and Andreas Dress, *From Sphere to Torus: a topological view of the metazoan body plan*, *Bulletin of Mathematical Biology*, 2003), the latter document forming part of the more general argument by Stuart Pivar (*On the Origin of Form: evolution by self-organization*, 2009). Especially interesting are the implications of their points for a possible "**psychosocial invagination**" of society or civilization. As a topological process, in the initial step of *gastrulation*, this is a massive reorganization of the embryo from a simple spherical ball of cells, the *blastula*, into a multi-layered organism, with differentiated germ layers: endoderm, mesoderm, and ectoderm.

Might "global civilization", as currently understood, then be considered as systemically analogous to an early biological form -- effectively "embryonic" with respect to the potential future development of human civilization?

Cognitive invagination: The question to be asked from a general systems perspective is whether there are constraints on the development of society, understood as some form of globality, which correspond in cybernetic and resource terms to the constraints on the spherical blastula and the development of its cells. Is some form of psychosocial or **cognitive invagination** the key to sustainable governance and navigation of the adaptive cycle? Relevant considerations might include:

- information overload (and information underuse)
- inadequate "busyness" models to handle the increasing rate and pace of psychosocial processes
- erosion of central (hierarchical) control systems as implicitly associated with control of the "globalization" process

A critical transition may be vital for civilizational survival. This suggests a transformation beyond the constraining inadequacies implied by phrases currently embodied in the language of governance, such as "sphere of influence" as it might be superseded by a "torus of influence" -- or "sphere of competence" as superseded by a "torus of competence". In the light of the biological model, toroidal re-organization, through invagination, could then enable psychosocial entities to ingest and digest information more fruitfully. The invagination process might be fruitfully associated with forms of "unknowing" and abstention from closure -- already prefigured by "open source" initiatives.

In the humanities "invagination" has been widely used in a self-referential semantic context to explain a special kind of *meta narrative*

(Jacques Derrida, *The Law of Genre*, *Glyph*, 7, 1980). With respect to development, Derrida's argument that anything which can be completed implies that whatever is so supplemented is therefore effectively not truly "complete in itself". If it were complete without such a developmental supplement, it shouldn't need (or long-for) that development. The fact that a psychosocial entity can be added-to to make it even more "present", "whole" or "integrated" means that there is a "hole" (or "internal pocket") which the supplement can fill. It is the metaphorical opening of this "hole" which Derrida called invagination (even a double invagination). The "internal pocket" is then larger than the whole.

The relation between biological development and the meaning conveyed by a page of text is addressed by David Metzger (*The Lost Cause of Rhetoric: the relation of rhetoric and geometry in Aristotle and Lacan*, 1995):

It is, after all, difficult even to imagine an "internal pocket larger than the whole," which is two-dimensional. Biologists, however, have tried to present "invagination," as such: for them, invagination is the term for the movement of a blastula to a late gastula, in two dimensions. For this reason, Derrida's proponents have argued that his interest in invagination pushes us from the security of the page to the "bewildering wilds" of a multidimensional model (a model than can account for the creation of the body)... Derrida has written that the model of genre produced by invagination is the **chiasmus**, and it is only when mapped onto a page that a multidimensional mode of invagination appears as a chiasmus: such is the graphic lesson catastrophe theorists teach (Rene Thom, *Mathematical Models of Morphogenesis*, 1984). (p. 17)

For Steen Christiansen (*Dissemination and Contamination*, *New Mappings*, 2005):

I will argue that invagination is the same process as grafting, since what we find is that another discourse imposes upon a text and inseminates it with meaning. The confluence of the sexual metaphors here are not to be mistaken for it is clear that meaning is given birth by this process of insemination and invagination.

The term "cognitive invagination" has notably been employed in a critical appreciation of the work of John Cage by Steve McCaffery (*Prior to Meaning: the protosemantic and poetics*, 2001, p. 221). The toroidal implications, with regard to the relationship between form and medium as fundamental to advanced theories of communication, have been argued by Michael Schiltz (*Form and Medium: a mathematical reconstruction*, *Image [&] Narrative*, 6, 2003), as previously summarized (*Beyond the Plane: form and medium in terms of the calculus of indications*, 2006).

Given the extent to which globality is implicitly associated with assumptions regarding global comprehension that have proven to be inadequate, might the geometry of the torus be supportive of less presumptuous integrative assumptions? Of interest are the explorations of cognitive capacity to comprehend complexity, notably the much cited paper by George Miller (*The Magical Number Seven, Plus or Minus Two: some limits on our capacity for processing information*, 1956) as previously discussed (*Representation, Comprehension and Communication of Sets: the role of number*, 1979).

How might such constraints relate to the theorem regarding **contiguous colour mappings** -- of the torus vs the sphere, for example? The question is whether this is indicative of the capacity to distinguish, map or comprehend diversity in relation to plane, cylinder or sphere -- for all of which no more than **four colours** are required (according to the classic **four colour theorem**) to colour the regions of the map so that no two adjacent regions (sharing a common boundary) have the same colour -- the **chromatic number**. In **colouring a torus**, if the surface of a torus is divided into regions, no more than **seven colours** are required so that neighboring regions have different colours -- suggesting a greater mapping/distinction capacity. Do the spherical implications of "global" enable the requisite number of distinctions to be appropriately made? What follows from the exceptions to the general rule (the **Heawood conjecture**) that any set of regions on a **Klein bottle** can be coloured using **six colours** only, as with the Möbius strip? (cf E. R. Swart, *The philosophical implications of the four-color problem*, *American Mathematical Monthly*, 1980; Renato R. Gonzalez, *A unified metric of software complexity*, *Journal of Systems and Software*, 1995).

Is the current understanding of "global civilization" to be compared to the blastula from which a "multi-layered organism" has yet to emerge -- following "massive reorganization" and "rewiring" of its category relationships and associated communication pathways, most notably within institutions and in the organization of "threads" on the web? It might be assumed, in the light of the arguments of Derrida and others, that there is a strong case for exploring "cultural invagination". A Google search reveals only two references to that topic, one being to a seemingly prescient UNESCO document (*Meeting of Experts to Examine the First Results of Research carried out on the Conditions pertaining to the Transfer of Knowledge: the exchange of knowledge and innovation*, 1978, SS.78/CONF.632/5; SS.78/CONF.632/COL.1) referring to "cultural and inequality" with the phrase:

There is therefore no hope of an equalitarian social restructuring without reconsidering the inequality in the distribution of knowledge or in other terms without a cultural restructuring through an exercise in cultural imagination. (p. 25)

Fortuitously the digitization of the original document resulted in the last phrase being imaginatively indexed as "cultural invagination" -- most appropriately in the light of the argument here.

Geometry and symbolism: From a purely geometrical perspective sphere, torus and spiral are related in complex ways, whereas (as a representation) each is readily comprehended on its own. The question might be asked how that relationship might be more usefully understood and the relevance of doing so in order to integrate together disparate insights into the whole which is the responsibility of governance.

Symbolically the torus might fruitfully be considered a kind of context for a sphere -- contained within the ring (as modelled by Saturn)

or implied by it as a subtler, virtual form. Curiously helicoidal motion is often depicted as a flame, suggesting that the three elements might be configured together as the kind of symbolic torch carried on the occasion of the Olympic Games [see notably: [fractal flame visualization](#) via the [Apophysis](#) fractal flame editor and the related collaborative [abstract artwork project](#) known as [Electric Sheep](#)].

Another image is the simple toy of past centuries offering the challenge of catching a sphere in a ring -- now transmogrified into the collective games of netball and basketball through which points are scored. These could all exemplify some of the cognitive challenges of "global" governance.

Of more direct and conventional relevance to governance over the centuries is the association of objects of a particular geometry with [regalia](#) -- the insignia characteristic of a governor, traditionally a sovereign. These notably include the [sceptre](#) and the [orb](#), with the latter possibly embodied into a [crown](#) (or its variants, the [diadem](#) and [tiara](#)). In other cases this symbolism may be embodied into a [chain of office](#) (or mayoral collar) or into a ring. Their geometry may be related to indications of various degrees of cognitive engagement with globality (*Engaging with Globality: through cognitive lines, circlets, crowns or holes*, 2009; *Geometry of Thinking for Sustainable Global Governance*, 2009).

With respect to the argument for the exploration of the torus, it is the geometry of symbols transcending those associated with conventional governance that is of interest. Any symbolic "orb" may be understood as tracing out a torus through an "orbit", although a significant cognitive "hole" of higher dimensionality is evident in the process of donning symbolic circlets, rings and crowns (*Engaging with Globality through Knowing Thyself*, 2009). This holds the paradoxes of reflexivity and self-reference characteristic of the Mobius strip and the Klein bottle. In traditional symbolism this may be represented by the [halo](#), the [Ouroboros](#), the jade [bi disk](#) of China, or the [Eye of Horus](#) (in relation to [Aten](#)) of pharaonic Egypt -- all variously associated with faith and wisdom, and more fundamental insight. Arguably the latter is associated with the [Ba Gua](#) pattern and use of the hexagram by various cultures -- the [Star of David](#) and the Islamic [Seal of Solomon](#) -- especially when represented dynamically (*Animation of Classical BaGua Arrangements*, 2008; *Dynamic Exploration of Value Configurations: interrelating traditional cultural symbols through animation*, 2008). The [bi disk](#), for example, appeared as the design on the reverse side of medals awarded in the 2008 Summer Olympics in Beijing. Hexagram representations are also of interest in the light of the Klein bottle as the six colour exception to the Heawood conjecture (mentioned above).

Curiously the sphere and the orb are closely associated with the geocentric understanding of [celestial spheres](#). Their current use might be considered characteristic of a correspondingly problematic framing of "geocentric globalization". Any "[music of the spheres](#)" (*musica universalis*) lies necessarily beyond such understanding -- however relevant it may be to governance in the shorter term.

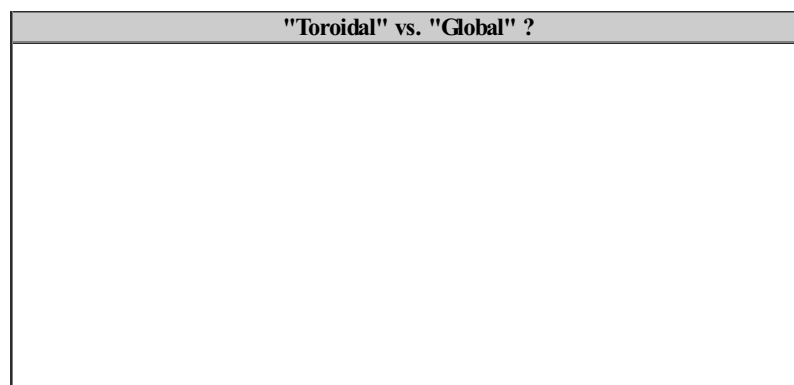
Integrative subtlety: The general point is that, whilst the understanding of globality represented by the sphere has its relevance, this may be of a subtler nature than is conventionally implied -- especially to the extent that it represents an integrative whole. The same may be true to a lesser degree of the torus -- even when it is indicative of a ring of associations or associates.

The spiral and associated helicoidal motion may be more representative of psychosocial dynamics as directly experienced. But of course the sphere may be meaningful in the "rounded" experience in the moment as the sphere of awareness -- the "trout" potentially capable of being motionless in the flow of information. The implication of "globality" then merits careful consideration (*Future Generation through Global Conversation: in quest of collective well-being through conversation in the present moment*, 1997). The assumption, notably in discussion of a [global brain](#), that "global" refers to physical distribution in relation to the planetary sphere is already brought into question by current designs for an [Interplanetary Internet](#) and by preliminary consideration by the [Internet Society](#) of an [Intergalactic Computer Network](#) (aka Galactic Network). Such possibilities helpfully point to the value of shifting from "geocentric globalization" to "heliocentric globalization", if not beyond.

Provocatively it might be said that the globality optimistically implied by a "global brain" may effectively require a "hole in the head" in order to transcend the constraints associated with spherical organization.

"Shape" of integrative wholes: Going further, there are considerations by cosmologists relating to the [shape of the universe](#), including a 4D toroidal model -- widely discussed as the "doughnut model". The capacity of humanity to engage cognitively with its environment in this way suggest their possible relevance for the organization of human knowledge by a culture as a whole (*Towards an Astrophysics of the Knowledge Universe: from astronautics to noonautics?* 2006).

With respect to such cognitive organization within the individual brain, of interest are toroidal mappings associated with the [cognitive implications of music](#). Of related interest are theorems with regard to contiguous colour mappings of the torus vs the sphere -- seven being the maximum for a torus. Such considerations suggest the possibility of a fundamental inadequacy in the structure and comprehension of legal formulations of "universal" -- as with the [Universal Declaration of Human Rights](#) and discussed separately (*Structuring Mnemonic Encoding of Development Plans and Ethical Charters using Musical Leitmotifs*, 2001).




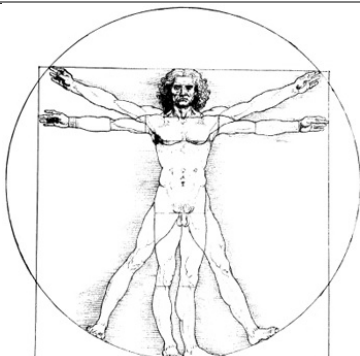


Sustainable "global" governance -- through double helicoidal invagination?

The above argument suggests that nature offers two fundamental metaphors through which sustainable governance can be reframed. Together these might be expressed as:

Sustainable "global" governance
through engendering invagination of "globalization" *through embodying helicoidal strategies*

The capacity of Schauberger's trout offers insights into both through its elegant ability to manage vortices and "eddies". As noted above, the possibility of an information process based on "the geometric coiling action of a double cycloid spiral curve" is intriguingly represented to a degree by the [Fibonacci spiral](#), as previously argued (*Potential significance of a Fibonacci spiral formation*, 2010; *Tao of Engagement -- Weaponised Violence and Beyond: Fibonacci's magic carpet of games to be played for sustainable global governance*, 2010). Also of relevance is the management of plasma vortices through the toroidal design required for nuclear fusion, again as previously explored (*Enactivating a Cognitive Fusion Reactor: Imaginal Transformation of Energy Resourcing (ITER-8)*, 2006). [See also discussion and images relating to [Universal Vortical Singularity](#)].

Perspective of the "trout" within the flow of information, knowledge and insight?	
Nataraja -- Shiva as Lord of the Dance	Vitruvian Man
	

In considering the above implications of flow -- and experience within it as a "trout" -- the metaphor can perhaps be exploited further to highlight a challenge. It is the case that fishing for trout -- fly fishing -- is considered a sport appropriate for governors. What are the attractors by which the awareness of people -- as trout -- is caught? What of the condition of rivers in which trout can no longer thrive -- that have been "fished out"?

This paper and its predecessor (*Sustaining a Community of Strange Loops: comprehension and engagement through aesthetic ring transformation*, 2010) arose from a journey through the wilds of Tasmania with whose iconic centre, [Cradle Mountain](#), is associated the cognitive challenge "where there is no time and nothing matters". The latter gave rise to earlier papers consistent with the above theme (*Where There is No Time and Nothing Matters: cognitive challenges at the Edge of the World*, 2008; *Import of Nothingness and Emptiness through Happening and Mattering*, 2008).

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