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Engendering a Psychopter through Biomimicry and Technomimicry Insights from the Process of Helicopter Development

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Introduction

The possibility explored here follows from the questions raised at the time of writing by the unprecedented [street protests in Wall Street](#), subsequent to the widespread revolutionary protests of the so-called [Arab Spring](#) (Sarah Jaffe, *This Is Only Getting Bigger: 20,000 Rally in New York to Support Occupy Wall Street*, *AlterNet*, 5 October 2011). The central organizational and strategic question is how viable new patterns of self-organization can evolve out of such collective action and the associated engagement in social networking. It is a theme of critical commentators and an aspect of a special report by *The Economist* (8-14 October 2011).

As explored previously, the question can be discussed from various perspectives (*Consciously Self-reflexive Global Initiatives: Renaissance zones, complex adaptive systems, and third order organizations*, 2007; *Dynamically Gated Conceptual Communities: emergent patterns of isolation within knowledge society*, 2004).

As explored here, the focus is on the implications of [biomimicry](#), or biomimetics, as the examination of nature, its models, systems, processes, and elements to emulate or take inspiration from in order to solve human problems. It was first developed as an academic field in 1950 through the University of Reading, subsequently promoted through the study by [Janine Benyus](#) (*Biomimicry: innovation inspired by nature*, 1997), and was formalized in 2002 as the research network [BIONIS: The Biomimetics Network for Industrial Sustainability](#) and in 2005 as the [Biomimicry Institute](#). Biomimicry is intimately related to the field of [bionics](#), named in 1958 by [Jack E. Steele](#), for which [R. Buckminster Fuller](#) was an early inspiration. An early description is that of [Jill E. Steele](#) (*Bionics and Engineering: the relevance of biology to engineering*, 1983).

One report estimated that biomimicry would have a \$300 billion annual impact on the US economy, plus add an additional \$50 billion in environmental remediation (*Biomimicry: An Economic Game Changer*, 2007). In the light of the [Occupy Wall Street](#) protest movement, this approach was reviewed with respect to the relationship between dinosaurs and multinational corporations (*Systemic Biomimicry of Dinosaurs by Multinational Corporations: clearing the ground for future psychosocial evolution*, 2011).

The scope of that argument is broadened here to include "technomimicry", potentially to be defined as the examination of technology, its models, systems, processes, and elements -- as an inspiration for new modes of organization. The focus is on the learning processes associated with the development of the helicopter, as the means whereby humans were able to control their movement through the air in three dimensions. Of particular interest in relation to such navigation 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. The approach is inspired by his subsequent aspiration, through generalizing from those technical challenges, to envisage the design of a "psychopter" (*The Bell Notes: A Journey from Metaphysics to Physics*, 1979).

Also cited in the work of [Viktor Schauberger](#) (*Nature As Teacher: how I discovered new principles in the working of nature*, 1998) who framed 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 may have been variously preoccupied.

Such possibilities are all the more pertinent given the sophisticated information technology enabling current protests and the challenges nevertheless experienced in applying collective intelligence to recent emergencies (*Enabling Collective Intelligence in Response to Emergencies*, 2010). What is the next phase in collective psychosocial evolution -- "beyond the dinosaurs" as emulated by multinational corporations?

General systems research and the VSM

In the previous case, comparing dinosaurs with multinational corporations from a purely systemic perspective, the key issue was the minimum number of parameters required to describe an animal as a viable system in contrast with the number required to describe a corporation. As noted there, the recent literature on biomimicry is indicative of many fruitful possibilities for innovation now considered worthy of exploration -- previously considered improbable or far-fetched. The argument here takes its point of departure from the systemic organization of animals -- especially in information and energy terms -- and not from the more evident external forms which more readily inspire mimicry research.

One point of inspiration is the research on "general systems", originated by [Ludwig von Bertalanffy](#) (*General System Theory: foundations, development, applications*, 1976). General systems theory is an interdisciplinary practice that describes systems with interacting components, applicable to biology, cybernetics, and other fields. Originally given focus by the [Society for General Systems Research](#), the latter has been absorbed into the [International Society for the Systems Sciences](#).

Of relevance to this argument is the subsequent work of management cybernetician [Stafford Beer](#) (*The Heart of Enterprise*, 1988; *Brain of the Firm*, 1981). His work resulted in the ongoing development of the [Viable System Model](#) (VSM) as a model of the organizational structure of any viable or [autonomous system](#). Of particular relevance to the evolutionary question raised in this argument is that a viable system is any system organised in such a way as to meet the demands of surviving in the changing environment. One of the prime features of systems that survive is that they are adaptable. The VSM is an abstracted cybernetic description that is applicable to any organization that is a viable system and capable of autonomy.

Biomimicry as a methodology implies a conscious effort at learning from nature, the case explored here may depend on mimicry inspired by the collective unconscious -- some form of deep biocultural memory ([John Ralston Saul](#), *The Unconscious Civilization*, 1995). It may additionally be engendered by an associated form of conditioning and determinism in response to environmental opportunities understood systemically. Whilst this may apply in the case of dinosaur biomimicry by multinational corporations, the question of interest here is the possibility of a more conscious, even self-reflexive, approach to the possibility -- notably when assisted by the sophisticated simulation technologies previously discussed (*Simulation and representation*, 2011; *Identification of systemic correspondences*, 2011).

Exoskeletons and immersion simulation

A major development in simulation (discussed with respect to [dinosaurs and multinationals](#)) has been beyond the use of simulations as a "model", typically "run" through a number of cycles to test selected parameters. By analogy with the [exoskeletons](#) of some animals, a [powered exoskeleton](#) can be donned by an individual to enhance capacities in extreme environments. Immersion simulations now allow individuals to operate within a construct in relation to a [virtual environment](#), possibly within a [virtual world](#). Variants have long been evident in training simulators, most notably to develop skills in managing automobiles, aircraft, ships and complex equipment.

Of considerable significance is the sense of reality associated with immersion -- a matter of continuing research interest. In the case of engagement within a virtual environment, it is the sense of identification with the "vehicle" which is of primary importance -- notably expected to offer well-recognized market opportunities for virtual sexual encounters (as with the [minitel](#) precursor of the internet). This technical preoccupation is clearly of major relevance to the rapidly developing technology of [drones](#) -- primarily for surveillance and destructive purposes in warfare and the suppression of popular unrest.

There is every probability that simulation technology will soon enable individuals to immerse themselves within a simulated animal -- of any chosen species. There is the more distant possibility that this will extend to real animals rather than virtual variants. With respect to the more probable case, it is interesting to note the argument of a science fiction tale, as separately described (*Metaphoric Entrapment*, 2002):

One situation explored by a number of writers is however of relevance to comprehending the complexity of multiple realities. That is the problem 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, several writers have explored the possibility that pilots and navigators might choose appropriate metaphors through which to perceive and order their task in relation to that complexity - for example, flying like a bird, windsurfing, swimming like a fish, tunnelling like a mole, etc (see discussion below on animal movement).

The mass of data input, 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". The perceptions through the chosen metaphor are assisted by artificial intelligence software. The pilot switches between metaphors according to the nature of the hyperspace terrain.

It may prove to be the case that insights into the variety and combinations of such complex 'terrains' have been richly mapped by the Chinese classic, the *I Ching* [[more](#)]. Such speculations do at least stimulate imagination concerning a possible marriage between metaphor and artificial intelligence in relation to governance.

Forms which lends themselves to systemic analysis and simulation -- as intermediaries between the dinosaur and the corporation -- are

the galleys used so significantly by early Mediterranean civilizations in the growth and maintenance of their empires. These evolved from the [penteconter](#) (30 oars), through the [bireme](#) (120 oars), the [trireme](#) (170 oars), the [quadriremes](#), the [quinqueremes](#), the [hexareme](#), the [septireme](#), the [octeres](#) (1600 rowers), the [enneres](#), to the [deceres](#) -- distinguished by the number of banks of oars on each side of the ship. Each oar was manned by one or more people -- suitably reminiscent of the manning of sections within a corporation (with the "99%" being commanded by the "1%").

The prospect of such developments points to the possibility of immersion in a "corporation" framed to use information inputs and behaviours corresponding to a relevant dinosaur species. The attributes of a real-world corporation could even be used to select the most appropriate dinosaur to pattern that behaviour for those in the simulation "situation room".

Irrespective of simulation as described above, there is some merit in recognizing how the culture of a multinational corporation may condition the lives of those operating within it -- effectively living a kind of "simulated" existence (as simulacra?). The following might then be fruitfully confronted:

- **"multinational man"**: *Corporation Man* (1972) by [Antony Jay](#), reviewed by Dwight E. Robinson (*The Evolutionary Heritage of Corporation Man: Introducing the Organizational Theory of Antony Jay*, *The Academy of Management Journal*, . 15, 3, 1972, pp. 345-353)
- **"dinosaur man"**: *The Dinosaur Man: tales of madness and enchantment from the back ward* (1992) by [Susan Baur](#) -- exploring the imaginations and behaviour of deeply disturbed people and their extraordinary delusional worlds.

Popular recognition is now variously accorded to "getting in touch with your inner" self, whether animal, dog, caveman, neanderthal, serial killer, Godzilla, and the like. There is clearly a case for getting in touch with one's "inner dinosaur" -- and indeed this metaphor has been explored by on a number of web sites.

Psychosocial evolution: "beyond the dinosaur" and "globalization"

Framed in this way, how might it be appropriate to seek inspiration from nature with regard to evolution "beyond the dinosaur" -- subsequent to any "extinction event" of which equivalents are variously envisaged for the current global civilization?

One approach is clearly the attentive study of the evolution of species in the light of the principles of biomimicry. The question, understood in systems terms, is what mode of organization became viable after that event. How can this be defined cybernetically in terms of the implication for the design and operation of new styles of organization? The work of Maurice Yolles would be particularly relevant (*Knowledge Cybernetics: a metaphor for post-normal science*, 2010; *Organisations as Complex Systems: an introduction to knowledge cybernetics*, 2006).

Another approach, potentially closely related, would be to explore the new modalities which became evident subsequent to the extinction of the dinosaurs. As noted above, a curious historical coincidence is the strategic implication of the incredible rapidity of the current development and application of drones -- in ironic support of forms of governance reflecting a seemingly obsolete mindset. Are these, together with surveillance satellites, to be understood as a "last gasp" effort of "dinosaurs" to "get off the ground" and obtain a fruitful sense of perspective -- like the [pterosaurs](#)?

There is considerable irony to the official name for drones -- "[unmanned aerial vehicles](#)" -- in that their essentially questionable nature is exemplified by the implication that they might well be piloted by "eunuchs" or, far more controversially by "women". That their use requires not an iota of human courage, compunction or compassion implies that they might as well have been named "unmanly aerial vehicles". In the quest for the principles of operation of a "psychopter" however, this suggests the possibility that such a vehicle may well need to be "engendered" through insights into sexuality.

Corporations learning to "dance" may not be enough ([Rosabeth Moss Kanter](#), *When Giants Learn To Dance*, 1990), nor may other [non-confrontational strategies](#) such as thinking "like a dolphin" ([Dudley Lynch](#) and [Paul L. Kordis](#), *The Strategy of the Dolphin: scoring a win in a chaotic world*, 1989). Curiously the latter has inspired many imitations ("mimicry?") reflective of the old mindset: thinking like a CEO, thinking like a manager, thinking like a millionaire, etc.

It is a relief to note the popularity of the science fiction tale of [James Patrick Kelly](#) (*Think Like a Dinosaur*, *Asimov's Science Fiction*, June 1995). An instructional pack for teachers has been designed to enable learning about the world of dinosaurs through dance, drama and music -- including how their world came to an end ([Jayne Bolsover](#), *Dancing with Dinosaurs*, 2001).

The dance metaphor has been variously explored in song by [Steven Curtis Chapman](#) (*Dancing With the Dinosaur*) and in relation to religion by [William Easum](#) (*Dancing with Dinosaurs: Ministry in a Hostile and Hurting World*, 1993) and by [Mark Patrick Hederman](#) (*Dancing with Dinosaurs: a spirituality for the 21st Century*, 2011). Hederman extends the metaphors a metaphysical conceit for our relationship with God in an effort to clarify the landscape between this world and the next.

The metaphor is used very perceptively by [Chris Hedges](#) (*Dancing with Dinosaurs*, *The New Humanist*, 122, 2, March/April 2007). He relates the disastrous effects of increasing globalization to the displays at the [Creation Museum](#) in the USA -- where dinosaurs are portrayed as coexisting with early humans. The tendency to "dance" in relation to current environmental policies, most notably in relation to climate change, has been challenged by [Neal Peirce](#) (*Stop dancing with dinosaurs*, *The Seattle Times*, 19 June 2008).

The archetypal dolphin metaphor may suggest that the alternative approach is intimately related to the systemic significance of "flying" -- most readily understood in ecosystemic terms as a means of ensuring cross-fertilization. This is currently used as a metaphor in describing the capacity of projects to "get off the ground" -- typically whether a design concept "flies".

The consequent nature and significance of such three-dimensional movement is evident both in discussion of [flocking behaviour](#) and "[swarm intelligence](#)" (notably by the military) and of the [collective intelligence](#) potentially emergent from social networking. Enabling

fruitful collective behaviour might then be seen as a specific challenge for the current [Occupy Wall Street](#) initiative.

A Designer's Insight from a Duck Flying

reproduced with permission from [John Chris Jones](#), *a duck flying, technology changes*, princelet editions, 1984, pp. 17-18

Yesterday, walking on the Heath, I got enthralled by rapid movements of the wings of a duck flying away from me. So fast, so fast. About five wing-beats a second I should think. And, within each beat, too fast to see or even to think about, each wing changing its shape progressively, passing through many 'aerofoil sections' as we crudely call them, many configurations akin to but much more quick and subtle than those astonishing motions of flap and slot, airbrake, spoiler, etc., that one sees appearing out of the wingsurfaces when a jetplane transforms itself into a kind of lumbering biplane/triplane so that it can fly slowly enough to land. Marvellous as that is, in itself. But in the case of the duck how much more so? Not only must something like all that be happening many times a second as each wing bends from downward curve to upward, the wingtips almost meeting above and below, but, on the upward stroke, as when one swims, the shape of the whole structure must be entirely reshaped from that of controlled thruster to streamlined shape that can return to the top without pushing the air with it and thus defeating the effort to support and propel the duck's quite heavy body.

But that's not all. What got me thinking all this, in that flash with which the brain lets one realise such things, was the thought that, inside all this incredibly complex and rapid motion of the wing as a whole is another process, an order of magnitude faster and more complicated: the separate motions of each feather, no doubt anticipating the wing-motions I've tried to guess at, so that each successive wing-shape is smoothly arrived at...

...Which leads me to a favourite thought, to the entity or process which I like most: the nervous system.

Having attempted to think and describe motions and sub-motions of the duck's wing ... one can think, with ever-growing respect, of the seemingly unbounded capacity of the system of nerves-and-gaps-between-nerves (the synapses), firing intermittently, and operating as much decentrally as centrally, by which all this beautiful complexity is able to appear in time and space in each and every creature. Plants too, though with somewhat different systems of awareness and control and letting-be. The same system, in the main, in every living thing.

There, in this process, in its varieties, its adaptability, its speed, faster than the action it regulates, and in its invisibility, its unconsciousness, is the model, or metaphor at least, for what we seek to do, but fail to do, so far, in our ways of organising human life, beyond the given, the natural. How stiff, in comparison, are our rules, our laws, our plans, our designs, our modes of management-in-the-large, of government, of organising radio and tv, and even our methods of programming computers. All such processes, as we do them now, seem to me to be tied to notions of simplicity, conscious control, centralism, cheapness, and total disrespect for what we are, for what the duck is too, and thus to have no chance of working right. None at all....

Technomimicry as analogous to biomimicry

Biomimicry (variously defined to include biomimetics and bionics) is understood as learning from nature, notably applying the insights to development of technology. The artefacts so developed may be recognized generically as analogous to the species recognized in nature -- emerging as a result of mutation in a knowledge-based society. This point has been made by [Kenneth Boulding](#) (*Ecodynamics: a new theory of societal evolution*, 1978).

Expressed differently, societal learning can be inspired and catalyzed by technological innovation. The process might be described as "technomimicry" -- a neologism whose interpretation and scope are currently under discussion. Use is already made of "technomimetics" in molecular nanotechnology to refer to molecular systems that can be made to mimic man-made devices as the essential components of molecular machines. **The issue here is whether cognitive systems can be usefully devised to mimic -- in systemic terms -- the structures and processes of certain technologies.** This would follow from the principles of isomorphism associated with general systems research (M. Joseph Sirgy, *Strategies for developing general systems theories*, *Systems Research and Behavioral Science*, 33, 1988, 1, pp. 25-37).

A useful example is provided by [Elizabeth Finkel](#) (*The Genome Generation*, 2012). In explaining radical rethinking regarding the previous inadequacies of understanding of the process of genetic inheritance, she explores how this may now be framed by the new familiarity with information technology:

Scientists have always understood biology in terms of the technology of the day. The brain, for instance, was considered by the Ancient Greeks and Romans to be an aqueduct for pumping blood; inhabitants of the 19th century likened it to a telephone exchange; those of the 20th century likened it a personal computer. Now scientists compare the brain to chaos and distributed functions of the Internet.

It is appropriate to note the implications of biomimicry and technomimicry, as understood here, for "memetics". This is a theory of mental content based on an analogy with [Darwinian evolution](#) -- an approach to evolutionary models of cultural [information transfer](#). A [meme](#), analogous to a gene, is essentially a "unit of culture"-an idea, belief, pattern of behaviour, etc. which is "hosted" in one or more individual minds, and which can reproduce itself from mind to mind. Reference is already made to "biomemetics" when "biomimetics" may have been intended. The same could be said of "technomemetics" (*The Techno-Memetic Evolution of the Biosphere*, 2006; *The Evolution of the Techno-meme*, 2009).

As might be expected, there are already traces of a related recognition of [mnemonics](#), as memory aids, in the form of "biomnemetics" and "technomnemetics" -- aids to remembering. The terms mimetics, memetics and mnemonics are then natural complements with respect to the following argument. The issue here, however, is **can a pattern of organization, recognized in existing technology, be**

applied to psychosocial organization in some way, just as organization in nature is applied to the development of a product ?

The question goes to the root of the debate regarding the influence of technology on cognitive processes -- as currently explored from a range of perspectives (Nicholas Carr, *The Shallows: what the Internet is doing to our brains*, 2010; William Powers, *Hamlet's BlackBerry: building a good life in the Digital Age*, 2011; Erik Davis, *Technognosis: myth, magic and mysticism in the age of information*, 1998; Robert D. Romanyshyn, *Technology as Symptom and Dream*, 1989; R. Kanai, et al. *Online social network size is reflected in human brain structure*, *Proceedings of the Royal Society*, October 2011). Especially noteworthy is the work of Sherry Turkle (*Life on the Screen: identity in the Age of the Internet*, 1997; *Evocative Objects: things we think with*, 2007; *Falling for Science: objects in mind*, 2008).

A striking example is provided by the study of the unsuspected formative influences on the development of the frame of reference of Ludwig Wittgenstein, as explored by Susan G. Sterrett (*Wittgenstein Flies a Kite: a story of models of wings and models of the world*, 2005). The argument has been speculatively applied to the frames of reference of Albert Einstein (*Einstein's Implicit Theory of Relativity -- of Cognitive Property? Unexamined influence of patenting procedures*, 2007).

Unexpected relevance to the potential implications of technomimicry, but yet to be fully explored, follows from the elaboration of quantum theory. As recently noted in a lead article by Mark Buchanan (*Quantum Minds: why we think like quarks*, *New Scientist*, 5 September 2011, pp. 34-37):

It may sound preposterous to imagine that the mathematics of quantum theory has something to say about the nature of human thinking. This is not to say that there is anything quantum going on in the brain, only that "quantum" mathematics really isn't owned by physics at all, and turns out to be better than classical mathematics in capturing the fuzzy and flexible ways that humans use ideas, than the one dictated by classical logic... It's a finding that has kicked off a burgeoning field known as "quantum interaction", which explores how quantum theory can be useful in areas having nothing to do with physics, ranging from human language and cognition to biology and economics....

Yet one big question remains: why should quantum logic fit human behaviour? ... The reason is to do with our finite brain being overwhelmed by the complexity of the environment yet having to take action long before it can calculate its way to the certainty demanded by classical logic. Quantum logic may be more suitable to making decisions that work well enough, even if they are not logically faultless... much of our thinking operates on a largely unconscious level, where thought follows a less restrictive logic and forms loose associations between concepts.... This is not to say that the human brain or consciousness have anything to do with quantum physics, only that the mathematical language of quantum theory happens to match the description of human decision-making.

The essentially constructivist nature of the belief in the "existence" of th entities to which quantum logic applies, increases the relevance of the argument from the perspective of cognitive psychology (George Lakoff and Rafael Núñez, *Where Mathematics Comes From: how the embodied mind brings mathematics into being*, 2000). With respect to "quantum interaction", Diederik Aerts, Marek Czachor and Sandro Sozzo (*Quantum Interaction Approach in Cognition, Artificial Intelligence and Robotics*, April 2011) indicate:

We point out that these results provide interesting insights toward the development of a unified theory for meaning and knowledge formalization and representation.

Just as it has been recognized that considerable benefits can be derived from biomimicry (as noted above), there is every reason that analogous benefits could be derived from technomimicry -- especially given the very heavy investment in the learning and innovation process associated with any given development.

The issue is how can that learning be applied in other domains. A preliminary scoping of possibilities is presented separately (*Principles of Re-reading and Application*, 2001). In the focus here on the "psychopter", the domains in question are psychosocial and necessarily **intangible** -- rather than deriving principles of relevance in other **tangible** domains typical of technical research and development.

Process of helicopter development: "getting off the ground"

If the next phase of psychosocial evolution implies "getting off the ground" -- out of the dinosaur mode -- there is a case for exploring biomimicry and technomimicry together as a source of learning. Especially relevant to any such exploration is the history of the development of the helicopter. The point to be made is that **it is not the final operational product which merits as much attention as the process through which it emerged** -- not the solution but the learning process.

The well-documented history of helicopter **development** is striking because it was absolutely unclear what needed to be learned and understood (see *Helicopter History Site*; *History of the Helicopter: Igor Sikorsky and other early pioneers*). Especially valuable is the study by Frank Ross (*The History of Helicopters*, extracted from his *Flying Windmills: the story of the helicopter*, 1953).

Whilst the primitive nature of the early experiments with airplane development over a century ago are reasonably familiar through photographs, those relating to the helicopter are less well-recognized -- especially since some of the histories omit critical phases in the process. However, **what is less clear from these histories is not what was learned, as understood and explained after the fact, but how it was learned -- through what inspiration**. What were the special insights involved in understanding how to take off vertically and then move horizontally to a new location?

As noted and illustrated by J. Gordon Leishman (*A History of Helicopter Flight*, 2000, extracted from his *Principles of Helicopter*

Aerodynamics, 2000), the six fundamental technical problems recognized as limiting early experiments with helicopters were [with comments added here, as indents, relative to possible psychosocial analogues]:

1. **Understanding the basic aerodynamics of vertical flight:** The theoretical power required to produce a fixed amount of lift was an unknown quantity to the earliest experimenters, who were guided more by intuition than by science. While basic theories describing the operation of thrusting rotors had been established by the end of the nineteenth century by William Rankine (1855), W. Froude (1878) and R. E. Froude (1889), the first significant application of aerodynamic theory to helicopter rotors came about in the early 1920s.

What needs to be understood with respect to psychosocial evolution and "escape" from the currently "grounded" condition? How are the questions to be formulated? Where are clues to be found -- as separately explored (*Functional Complementarity of Higher Order Questions: psycho-social sustainability modelled by coordinated movement*, 2004; *Navigating Alternative Conceptual Realities: clues to the dynamics of enacting new paradigms through movement*, 2002)

2. **The lack of a suitable powerplant (engine):** This was a problem that was not to be overcome until the beginning of the twentieth century by the development of internal combustion (gasoline) powered engines. Yet, it was not until the mid-1920s that engines with sufficient power and with the high power to weight ratios suitable for vertical flight became more widely available.

How is the nature of the "engine" to be understood? What enables "lift-off"? How is this to be distinguished from "hot air" ballooning so characteristic of contemporary governance -- as discussed separately (*Globallooning -- Strategic Inflation of Expectations and Inconsequential Drift*, 2009)

3. **Minimizing structural weight and engine weight:** Early power plants were made of cast iron and were relatively heavy. Aluminum, a common material used on modern aircraft, was not available commercially until about 1890, but even then was inordinately expensive. Aluminum was not widely used in aeronautical applications until 1920.

Is the excess "weight" to be usefully understood in terms of inherited "baggage" and habitual patterns which it has proven difficult to discard? Is metaphorical use of "heavy" and "lighten up" helpful in this respect? Is it a question of "bigness" as discussed with respect to dinosaurs and multinationals (*Systemic Biomimicry of Dinosaurs by Multinational Corporations*, 2011)

4. **Counteracting rotor torque reaction:** The idea of a tail rotor to counter torque reaction and provide directional control was not used on most early designs. Most early machines were built with either coaxial or laterally side-by-side rotor configurations. Yet, building and controlling two rotors was even more difficult than for one rotor. Igor Sikorsky was the first to successfully use the tail rotor in the single rotor helicopter configuration we know today.

Could this be usefully understood in terms of reactionary spin or a dysfunctional critical response -- perhaps to be recognized in terms of "twistedness", as separately discussed (*Engaging with Questions of Higher Order: cognitive vigilance required for higher degrees of twistedness*, 2004)

5. **Providing stability and properly controlling the machine:** A primary concern was to devise a means of defeating the unequal lift produced on the blades advancing into and retreating from the relative wind when in forward flight. These were problems that were only to be fully overcome with the use of blade articulation in the form of flapping and lead/lag hinges, ideas that were pioneered by Cierva, Breguet, and others, and with the development of blade cyclic pitch control.

Is stability to be understood in the light of resilient response to potentially disruptive psychosocial cycles, but more especially to the challenge of the longer-term adaptive cycle -- as highlighted by the Resilient Alliance ***

6. **Conquering the problem of high vibrations:** Vibration was a source of many mechanical failures of the rotor and airframe, and reflected an insufficient understanding of the dynamic and aerodynamic behavior of rotating-wings.

Are high "vibrations" to be understood in terms of rapid shifts of (public) opinion associated with excesses of certainty/uncertainty or hope-mongering/doom-mongering? Does this call for a new kind of engagement with time (*Strategic Embodiment of Time: configuring questions fundamental to change*, 2010)

Reptilian inhibition of innovation -- Noble dinosaurs?

Requisite craziness: With respect to the first point, namely understanding the aerodynamics of flight, it is especially noteworthy that the first vehicle capable of taking off vertically and flying horizontally -- other than a balloon -- was developed by Étienne oehmichen (duly rewarded by the Aéro-Club de France for his flight on 4 May 1924). He is known for his very extensive study of flying insects and birds to that end -- studies currently being re-explored with respect to the development of drones. His original preoccupation with that source of inspiration was widely ridiculed at the time -- notably in the form of cartoons and comic strips.

It is the process by which he acquired those insights which is far less clear and merits attention in the light of the remark of Freeman Dyson:

When a great innovation appears, it will almost certainly be in a muddled, incomplete and confusing form. To the discoverer, himself, it will be only half understood; to everyone else, it will be a mystery. For any speculation which does not at first glance look crazy, there is no hope! (Innovation in Physics, *Scientific American*, 199, 3, September 1958)

Unfortunately the significance of the remark is highlighted by the context and by subsequent events. It was made with respect to a much-cited Bohr-Pauli interaction regarding requisite craziness in theoretical physics. [Niels Bohr](#) declared in response to [Wolfgang Pauli](#):

We are all agreed that your theory is crazy. The question which divides us is whether it is crazy enough to have a chance of being correct. My own feeling is that it is not crazy enough.

At the time of writing, with respect to [Daniel Schechtman](#) -- the Nobel laureate in chemistry in 2011 for his work on [quasicrystals](#) -- the Nobel committee noted:

His discovery was extremely controversial. In the course of defending his findings he was asked to leave his research group.

Schechtman experienced several years of hostility toward his non-periodic interpretation -- he recounts that "people just laughed at me". A double Noble laureate in his field asserted that he was "talking nonsense" and "There is no such thing as quasicrystals, only quasi-scientists" -- suggesting further that he go back and re-read the conventional crystallography textbooks. In being asked to leave his research team, it was argued that Schechtman was bringing shame upon their work.

Noble dinosaurs: In a spirit of both technomimicry and biomimicry, given the acceptance now accorded to quasicrystals as patterns of non-repeating order, are there analogous forms of psychosocial order of significance -- to be fruitfully contrasted with rigid understandings of the "order" of [law and order](#)?

In relation to so-called [scientific revolutions](#), and the much-appreciated emergence of new paradigms, what is the "evolutionary" process whereby a Nobel laureate effectively evolves "retrogressively" into a dinosaur -- a "noble dinosaur", incapable of recognizing what is "crazy enough"? Is there a need to recognize the existence of such dinosaurs in the academic world and leadership of today -- even of the nobility of a *Tyrannosaurus rex*? Where are the case studies of such behaviour? For example:

- [Arthur Eddington](#) is renowned for his public ridicule of astrophysicist [Subrahmanyan Chandrasekhar](#), for the latter's discoveries leading to the currently accepted theory on the later evolutionary stages of massive stars -- for which he was later awarded the Nobel Prize.
- the [Galileo Affair](#) offers an early "case study" of [Galileo Galilei](#) and the retraction forced upon him by the Papal Inquisition in 1633 regarding his evidence for [heliocentrism](#). He is widely alleged then to have murmured *E pur si muove*.
- [Barry Marshall](#) and [Robin Warren](#) discovered the *Helicobacter pylori* for which they were widely ridiculed by the medical community -- only later to be awarded the Nobel Prize

What is to be understood of the learning processes of such as [Dmitri Mendeleev](#) and others in relation to [ether theories](#) -- given the subtlety of current theories -- or of [Isaac Newton](#) in relation to the ether and alchemy. It is recognized that Newton's interest in alchemy cannot be isolated from his renowned contributions to science. Of particular relevance to this argument are the learnings of [Leonardo da Vinci](#) in relation to flight, with his studies of the flight of birds, including his *Codex on the Flight of Birds* (c. 1505), as well as plans for several flying machines, including a light hang glider and a machine resembling a helicopter. Views contrary to current wisdom -- such as the alchemical studies of Newton -- are deprecated much as though those holding them were covert sex offenders.

Reptilian mindset? Whilst being "laughed at" is no guarantee of being awarded a Nobel Prize, not being laughed at would seem to be a stronger guarantee of being a non-recipient -- for not being "crazy enough". There is however no Nobel Prize for governance even though global governance is now widely seen as risible. The laughter of those seen as benefitting most from it might however well be understood as "reptilian" -- consistent with the highly controversial argument of conspiracy theorist [David Icke](#) regarding [reptilian humanoids](#). Of course, given the millions of years during which the dinosaur species existed and able to reflect on the threat to their future evolution, it might be speculated that dinosaurs developed an early form of the [mind uploading](#) technology (envisaged by [Ray Kurzweil](#) and others) to enable their continued existence within species which evolved into *Homo sapiens*.

If there are useful evolutionary reasons to recognize the current existence of "reptilian mindsets" characteristic of dinosaurs (and the "reptilian brain"), there is a case for taking account of their credibility in popular mythology. The award winning movie animation *The Dark Crystal* (1982), with an associated book (*The World of The Dark Crystal*, 1982) offers a graphic set of indicators of current relevance to globalization and its exploiters. Of greater popularity is the mythology of [J. R. R. Tolkien](#) (*The Lord of the Rings*, 1954) and its associated movie versions (*The Lord of the Rings film trilogy*, 2001-2003). Noteworthy is the portrayal of the primary antagonist, [Sauron](#) -- an appropriately saurian name. Separately it is argued that myth offers a key to framing the current dilemmas of governance (*Relevance of Mythopoeic Insights to Global Challenges: cognitive integration implied by the Lord of the Rings*, 2009; *The "Dark Riders" of Social Change: a challenge for any Fellowship of the Ring*, 2002).

Misleadership: In a time of unprecedented crisis in governance of the global economy, is it appropriate to assume that leadership is now effectively provided by "noble dinosaurs" lacking any meaningful accountability? This can be variously described, as discussed separately:

- *Emergence of a Global Misleadership Council: misleading as vital to governance of the future?* 2007
- *The Art of Non-Decision-Making*, 1997

- *Monkeying with Global Governance*, 2011
- *Strategic Inflation of Expectations and Inconsequential Drift*, 2009

The future will no doubt describe the current situation as a vast dramatic display of non-decision-making -- "fiddling while Rome burns". Are the self-selected councils of the wise -- the Bilderberg Group, the Trilateral Commission, the Club of Rome, the World Economic Forum, and the like -- then to be understood as councils of "noble dinosaurs"?

Should their deliberations be understood as elegant exercises in pattern replication -- "rearranging deck chairs for the eminent on the Titanic", perhaps in unconscious anticipation of their own imminent extinction event? As suggested by the Titanic metaphor, in such settings strategies are complacently elaborated by ignoring underlying central problems, as separately discussed (*Lipoproblems: Developing a Strategy Omitting a Key Problem -- the systemic challenge of climate change and resource issues*, 2009).

Is the possibility of "getting off the ground" effectively constrained by a mindset corresponding to the widely-told anecdote regarding the "scientific proof" that the **bumble bee cannot fly** -- in the light of the principles of aerodynamics? Is it the unfortunate essence of "institutionalized science" to think "inside-the-box" in an effort to get phenomena and principles into an explanatory box -- reversing the challenge of Pandora? Is this echoed in the advice to a Nobel laureate to "re-read the crystallography textbooks" or by others to "re-read the scriptures"? Is it echoed metaphorically in policy think "tanks" (*Tank-thoughts from Think-tanks: constraining metaphors on developing global governance*, 2003)?

Lessons for future psychosocial evolution

The question is then, given the challenges of this learning process, what are the kinds of lessons to be learned in the case of psychosocial evolution -- and under what conditions can they be learned? **Why is it so difficult to comprehend what is involved, even by those motivated to do so** -- as illustrated by the case of helicopter development? Might the same be asked of the [World Social Forum](#) and its current incarnation in the Occupy Wall Street Movement?

Also very significant is the learning required to control and pilot such a vehicle. The non-trivial learning challenges of the following may be usefully contrasted: balloon, bicycle, automobile, airplane, helicopter, spacecraft, monocycle -- if only in terms of learning time required. The question could be asked with respect to "sustainability" as to whether the new insights required correspond to the automobile or the airplane -- or involve unusual insight into balance implied by some of the other vehicles, and especially the helicopter. Or are there new "vehicles" to be discovered based on new principles, or on generalization of known principles into new dimensions? What might that mean?

Especially relevant is the extent to which known vehicles are used as metaphors for collective strategies, potentially constituting a form of metaphoric entrapment, in the light of Leishman's "technical problems" above:

Vehicles as metaphors for collective strategies							
	balloon	bicycle	automobile	airplane	helicopter	spacecraft	monocycle
vertical aerodynamics							
powerplant / engine							
minimizing weight							
counteracting torque							
stability and control							
minimizing vibration							

How are these technical problems to be understood -- or reframed -- with respect to the next phase of psychosocial evolution? Are there additional problems to be understood -- technical or otherwise?

How is learning to be ensured in the terms of Donald N. Michael (*On Learning to Plan and Planning to Learn*, 1973; *The Unprepared Society: planning for a precarious future*, 1968)? Especially relevant is the discussion of "the requirement for embracing error" echoed by John O'Brien (*Embracing Ignorance, Error, and Fallibility: competencies for leadership of effective services*, 1987):

More bluntly, future-responsive societal learning makes it necessary for individuals and organizations to embrace error. It is the only way to ensure a shared self-consciousness about limited theory on the nature of social dynamics, about limited data for testing theory, and hence about our limited ability to control our situation well enough to be successful more often than not (*Learning to Plan and Planning to Learn*, 1997)

Imagining the nature of "transcending": sustainable (r)evolution?

Imaginative stimulus: There is a classic science fiction tale regarding an interdisciplinary group of specialists, in a range of technologies, brought together in a top secret installation by an appropriate government agency. They were shown a low quality film of a supposedly top secret laboratory which had apparently achieved a degree of success in developing an antigravity vehicle -- before all involved, and the laboratory (with all its records), were destroyed by an explosion during a testing phase. The challenge to the new group, inspired by the apparently evident partial success of the previous group, was to replicate the work and develop the vehicle. Unknown to the "new" group, the film had however been deliberately faked by the government agency -- simply as a means of motivating a group of otherwise sceptical specialists.

With respect to the operation of a "psychopter", what might "anti-gravity" imply in terms of "getting off the ground"?

"Higher": Importance is variously attached to the individual and collective challenge of getting "higher". For example:

- strategically achieving height in relation to an opponent is seen as a major advantage, notably with respect to early detection of threats, effective use of weaponry, and acquiring a defensible position
- height is valued in relation to status -- encouraging "social climbing" and aspirations to "higher" positions ("high office"), exemplified by "high flyers"
- achieving "height" is implicit in the stages of "higher" education -- or the achievement of a "high degree" in some secret societies -- potentially culminating in wisdom, or becoming highly cultivated
- competitive construction of the "highest" skyscrapers is widely held as vital to national prestige
- in addition to the challenge of flight, that of ensuring "escape velocity" in order to achieve orbit is also considered a mark of national prestige
- collective cultural development may be understood as culminating in a "high" civilization or a civilization at its "height"
- getting "high" is a primary motivation for drug-enhanced experience
- height is implicit in the the ascension envisaged and cultivated in psychospiritual development

"Meta": Implicit in the non-physical indications is some sense of higher dimensionality -- whatever that might be understood to mean. As indicated, intuitions of its nature may be readily and mistakenly projected into physical forms. "Higher" however has a sense of "meta" as implied by Gregory Bateson:

The pattern which connects is a meta-pattern. It is a pattern of patterns. It is that meta-pattern which defines the vast generalization that, indeed, it is patterns which connect. And it is from this perspective that he then warns: "Break the pattern which connects the items of learning and you necessarily destroy all quality". (*Mind and Nature; a necessary unity*, 1979, pp. 8-11).

Any sense of higher dimensionality is then a challenge to understandings of "higher" in relation to achieving "escape velocity" with respect to the geometry of "globalization". Consideration may then have to be given to the implications of a "hypersphere" on which humanity may be cognitively grounded. Through what succession of geometries may ascension then be conceived?

"Meta" of course implies abstraction as a form of "higher" -- presumably implicitly associated with the degrees of abstraction achieved through "higher" education. However, in the sense of a pattern of connectivity, "meta" may be understood otherwise as independent of "higher" and its dysfunctionality, as separately argued (*Higher Education & Meta-education? Transforming cognitive enabling processes increasingly unfit for purpose*, 2011). This may notably imply the capacity to function "in between" incompatible conventional "higher" understandings (*Living as an Imaginal Bridge between Worlds: Global implications of "betwixt and between" and liminality*, 2011).

A related implication is offered by Joël de Rosnay (*The Macroscope*, 1979) as the detection of patterns of larger systems (by analogy with the microscope). Understanding at the micro-level may offer guidance to understanding of systems of a larger scale. This is an instance of technomimicry. This approach was a stimulus to the study of Luc de Brabandère (*Le Latéroscope: systèmes et créativité*, 1989; *The Forgotten Half of Change: achieving greater creativity through changes in perception*, 2005).

Metaphors: Another approach may be through understanding of metaphors as cognitive vehicles in their own right, as separately argued (*Metaphors as Transdisciplinary Vehicles of the Future*, 1991). Of relevance in this respect is the unexplored complement to the ubiquity of "assumption" (and "presumption"), namely "transumption" or *metalepsis* as a figure of speech in which one thing is referred to by something else which is only remotely associated with it.

It is in the light of such possibilities that a wide range of clues to "ascension" has been separately explored (*Navigating Alternative Conceptual Realities: clues to the dynamics of enacting new paradigms through movement*, 2002):

- **Metaphoric Entrapment** (Annex 1)
 - Possibilities of entrapment
 - Detachment from embodiment within traps
- **Clues to Movement and Attitude Control** (Annex 2)
 - Clues from kinetic intelligence and sports psychology
 - Clues from animal locomotion
 - Clues from animal locomotion understood generically
 - Clues from Christian vices and virtues
 - Clues from yogic perspectives on afflictions of the mind
 - Clues from Buddhism
 - Clues from the streetwise and from nonviolence
 - Clues from the martial arts
 - Clues from psychotherapy and game-playing
 - Clues from dialogue
- **Combining Clues to Movement and Attitude Control** (Annex 3)
 - Combining the clues framing any static perspective
 - Clues to integrating movement through kinetic intelligence
 - Clues from catastrophe theory, force dynamics and manoeuvring
 - Clues from navigation of multi-media and virtual reality environments
- **Clues to 'Ascent' and 'Escape'** (Annex 4)
 - Clues to 'ascent' from Christianity
 - Clues to 'escape' from Buddhism

- Clues to 'ascent' and 'escape' from Theosophy
- Combining Clues to 'Ascent' and 'Escape' (Annex 5)
 - Tuning and playing category arrays: methodological challenges
 - Patterns of aesthetic associations

Technomimicry: As noted above, of particular interest in relation to such navigation, in the light of insights into air flow, is the cognitive transition of [Arthur M. Young](#) as 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. 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. He understood this to be 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.

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 (*Geometry of Meaning*, 1976). 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).

Conclusion

As noted above, [Viktor Schauberger](#) (*Nature As Teacher: how I discovered new principles in the working of nature*, 1998) defined the challenge as one of "**thinking an octave higher**".

At the time of writing, the worldwide resonance of the [Occupy Wall Street](#) protest movement, has acquired focus through its slogans relating to the exploitation of the 99% by the 1%. With the narrow focus of the slogans of the 1% on "**growth**" and "**globalization**" -- and their implicit cultivation of "**greed**" as fundamental to "development" -- new thinking is clearly appropriate.

In the light of Young's insights, the argument is developed separately as a form of speculation to identify potentially suggestive "technologies" as ways of engaging with the possibility of "**getting off the ground**" (*Eliciting a 12-fold Pattern of Generic Operational Insights: recognition of memory constraints on collective strategic comprehension*, 2011).

Protestors from around the world on the occasion of the Occupy Wall Street demonstrations



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