En-minding the Extended Body

Enactive engagement in conceptual shapeshifting and deep ecology

Introduction

This is an exploration of the extent to which the phenomena of the perceived environment are effectively conceptual "coat hangers" on which individuals project dynamics that they are unable to encompass conceptually within accepted mindsets -- whether learnt or inculcated. Emphasis here is on various species of animals having been unconsciously "delegated" by humans to function as carriers for such projections. The contention is that, in a sense, the complex dynamics of living to which humans are exposed have, in part, been effectively "outsourced" to animals because of inability to handle many aspects of these dynamics.

Once outsourced in this way, the mind effectively withdraws from full engagement with the environment. With loss of recognition that functions were delegated in this way, humans then deal with the environment in an instrumental manner without recognizing what they are doing to their own humanity -- and to the ecosystem on which they depend for their survival. This process is paralleled by the development of conceptual "models" through which humans then endeavour to describe and articulate strategies of human behaviour, whether individually or collectively. The relation between the anatomy and behaviour of animal species in the environment and the operation of such models is therefore considered here.

The concern of what follows is given useful focus by the introduction to George Monbiot's critique of the prevailing social attitude with respect to the threat to humanity of climate change -- to which there is a collective refusal to respond rationally (With eyes wide shut. Guardian, 12 August 2003):

We live in a dream world. With a small, rational part of the brain, we recognise that our existence is governed by material realities, and that, as those realities change, so will our lives. But underlying this awareness is the deep semi-consciousness that absorbs the moment in which we live, then generalises it, projecting our future lives as repeated instances of the present. This, not the superficial world of our reason, is our true reality. All that separates us from the indigenous people of Australia is that they recognise this and we do not. Our dreaming will, as it has begun to do already, destroy the conditions necessary for human life on Earth.
The concern here is not with the philosophy of deep ecology -- with which it has many sympathies -- but rather with the actual way in which non-human living species carry conceptual modalities that are essential to both human survival and thrival. One consequence of this perspective is that it indicates how the environment is a knowledge carrier -- as some indigenous peoples have emphasized -- which humans destroy at their peril (Darrell A. Posey. Cultural and Spiritual Values of Biodiversity, 1999; David Abram. The Spell of the Sensuous: perception and language in a more-than-human world, 1997). Recovery of this connection is seen as a vital means of giving operational meaning and value to features of the environment that will otherwise continue to be degraded and destroyed in the name of safeguarding the human species.

More particularly, the concern is with how any individual is sustained by "en-minding" the extended body that is their natural environment. This is seen as related to the cognitive concerns of enactivism outlined by Francisco Varela alone (Laying Down a Path in Walking, 1987) and with others (The Embodied Mind: cognitive science and human expression, 1991).

Sets of operational concepts in collective enterprises

Many approaches to organizing human response to the challenges of the real world are now articulated through conceptual "models". These are increasingly copyrighted as intellectual property for the purpose of subsequent marketing and franchising (Future Coping Strategies: Beyond the constraints of proprietary metaphors. 1992). They are a prime feature of the offerings by management consultants to major corporations and to governmental enterprises and public services -- whether nationally or internationally. One challenge is that in a competitive environment the lifecycle of such models is usually measured in years, if not months -- rather the decades or centuries relevant to sustainable development. Their inability to provide operational mastery -- as the panacea's they are often claimed to be -- creates opportunities for the emergence of new models. But it also engenders a sense of disbelief that any such models will respond to the strategic and operational needs of collective enterprises -- or of individuals (cf Simon London. Why are the fads fading? Financial Times, 12 June 2003; Eileen Shapiro. Fad Surfing in the Boardroom; reclaiming the courage to manage in the age of instant answers, 1995).

Typically such models derive their originality from the operational dimensions they are able to encapsulate in a compact and memorable diagram. This tends to take the form of either a tabular/matrix structure (4x4, 5x5, 8x8, etc) or of a centrosymmetric structure divided into segments, often with concentric rings. Some religions also make use of such models, notably in the form of mandalas. Various uses of models have been explored in earlier papers (see New Paradigms via a Renewed Set of Prefixes: Dependence of international policymaking on an array of operational terms, 2003; Varieties of experience of past-present-future complexes, 2001)

To be most useful, the insights and processes associated with the features of any such diagram (identified by the labelled cells in such a table), need to be intimately related to operations through which the enterprise manoeuvres through the environment. The different cells labelled in the model offer insights into the different conditions that may be encountered -- and that need to be skillfully balanced against each other. The task of strategic management is then to coordinate the enterprise through that framework -- through the set of functions identified by the model, which may be reflected in specific divisions on a corporate organization chart. Metaphorically, it might be compared to a combination of gear-shift, steering wheel, brake and accelerator -- with an emphasis on how they each have complementary functions that need to be played off against each other as appropriate.

It is of course the case that models effectively identify meta-functions that have more to do with the subtler skills of driving the enterprise rather than with the tactical skills associated with particular operations. The latter may call for technical manuals focused on particular operations or on much more complex systems models. The challenge of the meta-functions may, by contrast, be embodied in superficially simpler models that are more of a reminder of appropriate sets of insights and modes of operating -- or, as in the case of mandalas, a focus of extended meditation.

Curiously the term "management" is believed to derive from a combination of manus ("hand"), notably as in handiness -- appropriate to the notion of "hands on") and the French term manège -- associated with handling of horses. In its limited sense of management of a horse, "management" in French has been displaced by manigé; in its more general meaning, by "management". The origins of the term are also influenced by the French ménage, in the sense of administration of a household or farm. The latter connection gave rise to ménagerie as housing for domestic animals. This has been extended in English to include any collection of diverse and possibly exotic people or things, including wild animals as in a zoo. It has been further extended to include the collection of animals in a wilderness reservation.

Management literature has cultivated the metaphorical connotations, as with B. S. Raghavan (Managerial menagerie. Financial Daily, 6 September 2000): "Functional and operational diversities apart, even sartorially and grooming-wise, the world of managers is a menagerie". (See also Saif Rahman. The Imaginary Menagerie). Given the argument of this paper, these influences suggest that management could be understood pejoratively as the care of a collection of uncontrolled "animal" needs and behaviours that characterize a human organization -- but more constructively understood as helping them to fulfil their respective potentials as a community.

Sets of animal appendages

The argument here is that it is useful to see the locomotion challenge of animals as involving a need, analogous to that in management, to coordinate the movement of a set of complementary ways of interacting with the environment. To survive an animal has to move its appendages, typically legs, in appropriate relation to one another and in response to challenges of the environment (whether topographical or other species). In effect the set of legs is like the set of complementary operational concepts embodied in any management model.

In the case of an operational concept of management, the interesting difference however is that the animal's legs can be seen as a visible articulation of operational principles that may be interpreted as present within the model if appropriately understood. The operation of its legs by an animal is an exemplification of integrated operational requirements that the strategic model may -- or may not -- render comprehensible in the case of a collective enterprise. The model is an abstraction in the case of the enterprise, which is given dynamic operational form in the case of an animal's use of its appendages for locomotion.
Most intriguing is the rich range of animal species -- each of which survives with a somewhat different "model" of appendage operation. 
Is there something to be learnt from this range that may be of relevance to the ways in which humans are able to respond to the many aspects of their environment?

<table>
<thead>
<tr>
<th>Appendages (wings + legs)</th>
<th>Animal species and range of appendages</th>
</tr>
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<tbody>
<tr>
<td>Pseudo-Ciliates, Urchins, Medusa</td>
<td></td>
</tr>
<tr>
<td>(1) Starfish</td>
<td>Octopus, (Starfish)</td>
</tr>
<tr>
<td>2 Centipedes, Millipedes</td>
<td>Centipedes, Millipedes</td>
</tr>
<tr>
<td>3 Decapods. Crustacea</td>
<td>Decapods. Crustacea</td>
</tr>
<tr>
<td>5 Starfish</td>
<td>Starfish</td>
</tr>
<tr>
<td>6+ Insects</td>
<td>Insects</td>
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<tr>
<td>7 Starfish</td>
<td>Starfish</td>
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<tr>
<td>8 Octopus, (Starfish)</td>
<td>Octopus, (Starfish)</td>
</tr>
<tr>
<td>9+ Ciliates, Urchins, Medusa</td>
<td>Ciliates, Urchins, Medusa</td>
</tr>
<tr>
<td>Many</td>
<td>Many</td>
</tr>
</tbody>
</table>

### Animal movement and conceptual exoskeletons

The question of how animals move has been a focus of multidisciplinary research in recent years that has now been comprehensively reviewed (Michael H. Dickinson, et al. *How Animals Move: An Integrative View*. Science, 7 April 2000). As with the relevance of bird movement to development of airplanes, a major reason for this interest is the relevance to robotics. Science is finding that mimicking living systems to produce robots is about understanding biology, not physics. And, according to Tim Wallace, there are lessons here for the way human corporations are run (*Mind of the company: Boss Financial Review*. July 2003). Similar lessons have been sought by the corporate world through such metaphorical explorations as *Strategy of the Dolphin* (1988) by Dudley Lynch and Paul Kordis which blends the latest findings in psychology, physics, sociology and business strategy to contrast the subtleties of thinking/acting like a dolphin with that of cars (prey) and of sharks (predators).

The concern in the exploration here is however much less with how the complexities of animal movement can be reflected in tangible artefacts -- but much more with how they can be reflected in the dynamics interrelating the cultural artefacts that are human systems of categories in use to frame perceived reality. The question is **what are the cognitive insights to be derived from understanding of how animals handle the dynamic challenges to their movement**.

An aspect of robotics involves the design of more flexible exoskeletons to enhance the human capacity of the "wearer" -- whether the framework is worn physically or virtually (possibly requiring "implants" in the future for more intimate integration with the nervous system, as with cyborgs). The concern here is whether insights into animal movement suggest ways of elaborating "cognitive exoskeletons" that would enable other kinds of ordered movement in knowledge space. This was discussed in an earlier paper (Judge, 2003) as being not only a framework through which the world is observed and "read" (a grille de lecture) but as effectively a conceptual (if not an existential) "exoskeleton" that empowers and enhances capacities to interact with "reality". Such exoskeletal augmentation of human intellect was articulated in a classic text by Douglas Engelbart (*Augmenting Human Intellect: a conceptual framework*, 1962)

Good examples of such exoskeletons are the "models" provided for the corporate environment by Edward de Bono in discussing operacy -- as explored through two books: *Six Thinking Hats* (1987) and *Six Action Shoes* (1991). Operacy is the skill of action, of getting things done and making things happen -- which he equates with literacy and numeracy. These books build on a well-publicized series of his earlier books dealing with creative approaches to problem-solving, notably in corporate policy-making environments. He argues that, to get a well-rounded view, a committee needs to look at issues wearing a succession of colour-coded "hats" (or "shoes"), corresponding to different styles of thought (or action).

This enhanced ability to navigate reality might be usefully discussed as a conceptual analogue to proprioception, itself currently of great interest in the physical fitness industry:

"Understanding how movement affects efficiency can lead to understanding how the body communicates with itself. The strong influence of yoga, martial-arts-based programs and other whole-body programs has swung the door open for more program possibilities. With the new emphasis on creating a connection between mind, body, spirit and emotion, body awareness represents the next frontier of movement education." [more]

Proprioception may be understood as an automatic sensitivity mechanism in the body that sends messages through the central nervous system. Unconscious initially, human beings can "train" for proprioception in the quest for efficient everyday movements. Through conscious appreciation and cognitive processing of the body's position in space, the central nervous system and sensory receptors can be conditioned to be more responsive to length and tension in the muscles and tendons. [more]

The array of concepts in a model may then be understood as a system of operations and operators for defining, processing and consuming reality -- and for farming, mining and exploiting it (as with any animal species). As such it can be "played", like an organ or any other complex musical instrument. This is the skill deployed by experienced negotiators. Some of the implications of this have been
ultimately as persons within a shared environment. Slikkerveer points out that perhaps the best way to think of this traditional cultural perspective in terms of conservation is well summarized in a paper by Darrell Posey (Cultural and Spiritual Values of Biodiversity, 1999) cited above:

The importance of this neglected perspective is well summarized in a paper by I. Jan Slikkerveer (Ethnosience, 'TEK' and its application to conservation) in the collection of papers edited by Darrell Posey (Cultural and Spiritual Values of Biodiversity, 1999) cited above:

The inclusion of other living beings and natural objects into the category of 'persons' requires political and ethical constructs that include these other community members. The best illustration of how native peoples include many other natural objects and living beings as members of their community is found in native clan names and totems. 'There seem to have been a series of covenants between certain human families and specific birds, grazing animals, predatory animals, and reptiles' (Deloria 1990: 17). These animals are connected to families over prolonged periods of time, and offer their assistance and guidance during each generation of humans.

It is frustrating and uncomfortable to constantly hear non-native peoples speaking romantically of the Indians’ ‘closeness to nature’ or ‘love of nature.’ The relationship is more profound than this expression connotes. To be Wildcat, Deer, Bear or even Wasp clan means that you are kin to these other persons -- they are your relations, your relatives. Ecological connectedness is culturally and ceremonially acknowledged through clan names, totems and ceremony. In nearly all native creation stories, animal-persons and plant-persons existed before human persons. These kin exist as our elders, and, much as human elders, function as our teachers and as respected members of our community. Acknowledging non-humans as teachers and elders requires that we pay careful attention to their lives, and recognize that these lives have meaning on their own terms (cf. also Taylor 1992). [p. 195]

Slikkerveer points out that perhaps the best way to think of this traditional knowledge borne of experience is that native people lived their lives as though the lives of other organisms mattered. Natives experienced other creatures in their role as parents, as offspring, and ultimately as persons within a shared community -- as part of what amounts to an “extended family”. But he points to a fundamental mistake in mainstream understanding:

People of European heritage often develop a love of nature because they love a particular cat or dog, or perhaps animals in general. They often imbue these animals with human emotions and thoughts, i.e. anthropomorphize them, which leads them to oppose the taking of other animals through hunting, and in some cases to refuse to eat meat. It is often assumed that such
attitudes are similar to those of native peoples, since it is assumed that opposing hunting, or eating a non-meat diet, brings people closer to ‘harmony with nature’. Such people are often shocked when they realize that native peoples regard hunting, fishing and meat-eating as part of a strong cultural tradition, even when the animal being hunted is endangered or subject to federal regulation, such as bowhead or beluga whales. [p. 195]

This conflict of views results from a failure to realize that native people do not identify with and anthropomorphize animals, but instead recognize that the lives of animals and plants exist on their own terms, and have value independent of any that human beings place on them. By contrast, Europeans often identify with the prey in an extremely anthropocentric and psychological sense, and react as if their loved ones were being taken for food. This leads to an unrealistic hostility towards all predators, leading to a belief that wolves, cougars and bears are creatures of evil, capable of ‘slaughter of helpless prey’.

Darrell Posey's collection of papers goes beyond the point made above regarding relationships with particular species to demonstrate that the environment as a whole is indeed held by many indigenous peoples to be a carrier for their collective identity and awareness. Hence the importance of the title Cultural and Spiritual Values of Biodiversity -- which he introduces with a chapter on Culture and nature: the inextricable link, recalling Gregory Bateson's Mind and Nature: a necessary unity (1979) and his concern with the destruction of the "pattern that connects". Posey makes the point that:

Technical descriptions of biodiversity often give the impression that science and economics are adequate tools with which to characterize the qualities of the intricate web of life. In a world increasingly dominated by mega-modelling, global trading and consumer trends, it is easy to forget that values of plants, animals, mindscapes and ecosystems cannot be adequately measured in statistical or monetary terms -- and certainly cannot be described using the languages of only a few academic disciplines and markets, no matter how politically favoured and powerful they might be.

In discussing the unhelpful assumptions in descriptions of the knowledge systems of Native Americans, Ron Eglash (Computation, Complexity and Coding in Native American Knowledge Systems, 2002) argues that

Such portraits come from good intentions; but they only serve to further the stereotype of indigenous peoples as historically isolated, alive only in a static past...We need to take special efforts to open our eyes to the dynamic histories and technological sophistication of indigenous cultures -- for example, to think about active indigenous ecological knowledge rather than the passive portraits we so often hear, e.g. "Indians lived as part of the ecosystem.". Rather than the illusion of a frozen pre-colonial tradition, we need to see indigenous societies as having always been in a state of change, and to understand more recent features of Native American life as part of that history.

This perspective has been given a powerful articulation by the novelist Ian Watson (The Embedding, 1973), which in describing the cognitive universe of an Amazonian tribe, is notable for being one of the first science-fictional explorations of modern linguistic and anthropological theories [as explained by Pamela Sargent]. Previous science fiction had dealt with the possible problems human beings might have in communicating with aliens. According to Michael Bishop:

One idea exploited in different guises or subtle variations from novel to novel is Watson's strategically held "belief" that consensus reality, or the world of everyday experience, is ripe for transcendence. The means of transcending our human limitations or the prison of the physical universe may differ from one fictional foray to the next, but the fact that there does exist a transcendent mental set or cosmic continuum to which we may or should aspire remains a conspicuous constant. Although Watson usually embeds this idea in a scrupulously rational context (often it is a research project or a scientific mission), a strong element of the primordial or the mystical (from meta-linguistics to Sufism) lends his several restatements of the concept a rich and endlessly ramifying ambiguity

Animal locomotion: example of walking as a cognitive metaphor

An earlier paper explored one form of physical movement in relation to transdisciplinarity (Transdisciplinarity-3 as the Emergence of Patterned Experience: Transcending duality as the conceptual equivalent of learning to walk, 1994)

Polarities as limbs: Following the above arguments, polarities can be used like limbs to support a body of awareness. To understand experientially what is a limb in this context, there may be merit in exploring the evolutionary origin of limbs -- on the understanding that "psychogeny" may replicate ontogeny. And a form of psychogeny may be replicated during daily life. The simpler forms of integrative experience can be considered amoeboid or amorphous. For example, sleepily stretching out an arm from bed in the morning to turn off an alarm clock bears more resemblance to extruding a reabsorbable pseudopod than using a limb. There may well be stages to patterned experience equivalent to the emergence of true opposing limbs, passing though those of an insectoid nature. How many limbs does one need to support one's current body of awareness?

Such conceptual limbs can be used for locomotion through a more paradoxical space. As is already evident, they can be used as weapons in attack and struggle. One pole of any polarity is always a useful weapon to attack another (objectivity vs subjectivity, head vs heart, abstract vs concrete, left vs right, etc). Other kinds of struggle become possible when the use of both limbs can be coordinated.

Polarities as limbs can also be used for mutual support: in a wind, on a cliff, when intoxicated, etc. Other kinds of support may be possible when use of both limbs can be coordinated. There is a need to be attentive to efforts to handicap collective awareness by
effectively cutting off a limb to repress one polar alternative. This leads to conditions analogous to paraplegia, where locomotion is only possible by limping or hopping, if at all. Reluctance to challenge, formulate reservations and use negatives has become a new form of social disease, notably in North America. Our civilization may yet sink under the weight of upbeat reporting and the inability to face up to challenges.

**Polyhedral organization and "limb responsibility":** The above arguments point to the importance of configuring polarities as a way of creating transcendent frameworks (Judge, 1994). In such configurations of categories, there would need to be concern for the health of the extremes -- a form of "limb responsibility", if the configuration of categories is expected to support a new body of awareness. Whether in the case of a conceptual framework or a social group, the process of configuration may variously be compared to the construction of a body, a walking frame or a house. It is a form of conceptual scaffolding. [For further discussion of polarization and polyhedra, see *Evoking Authenticity: through polyhedral global configuration of local paradoxes*, 2003]

The coordinated movement of limbs focuses the strategic challenge of governance endeavouring to reconcile dilemmas articulated through opposing political parties. In practice, there may be a number of such parties that configure in different ways in response to different circumstances. The alternation between parties in governance in moving the country forward points to the value of considering how development relates to alternation between opposing perspectives (see *Policy Alternation for Development*, 1984).

**Shapeshifting**

Curiously the archaic belief in shapeshifting characteristic of Celtic myth [more] is presented as a feature of the education of King Arthur by Merlin in T H White's classic novel *The Once and Future King* (1966). Through its many links to shamanism, cognitive shapeshifting has now become a theme of popular workshops [more] and is also a feature of role playing and other games valuable to imaginal education. Explanations of shapeshifting have also been related to multiple personality disorder [more].

As explored in an earlier paper (Being the Universe, 1999), there is a case for seeing oneself at any one moment as conforming to dynamics of any of a wide spectrum of species, from all levels of the evolutionary diaspora. There is a way in which one can be an amoebic blob, a spider, a snake, a bird, a wolf, etc -- or labelled as such. To what degree are we all behavioural shapeshifters? Should shapeshifting be a part of our education (as Merlin purportedly offered the young Arthur and as in totemic education in many tribes)? How are we constrained in adopting particular behavioural patterns? When is there a case for experiencing reality as an amoeba? A potato? A doormouse? A tiger? What ecosystems do we then require in order to survive and thrive in that shape? How do we relate to others through such patterns?

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 fictional problem is that of piloting or navigating a vessel 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 s/he's "wings" or s/he's "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 serve to stimulate imagination concerning a possible marriage between metaphor and artificial intelligence in relation to governance.

As a provocative follow-up to his study of shapeshifting, John Perkins (*Shapeshifting: Shamanic Techniques for Global and Personal Transformation*) presents a later text under the title: *The Shape of Things To Come: Shapeshifting*.

**Insights into shapeshifting from collective behaviour**

Given the focus on bridging between animal movement and "models" of collective behaviour, it is worth considering the degree to which animal movement is emulated by groups and teams of people. Much has been made of the early skill of human groups to work as a team to attack larger animals -- still to be seen in the hunting skills of animal packs (dogs, wolves, lions, etc). Most striking is the capacity of the team (whether human or animal) to reconfigure in response to the prey. This is an example of collective shapeshifting that is now most evident and valued in human team sports.

At the simplest level, two humans can collaborate as a one "four-footed, four-handed" entity to lift and carry an object. This skill can be flexibly extended in the collaboration of many more to carry a heavy log -- as a "centipede"!

Humans may choose to shift into ordered configurations when moving together -- into a line as in a trekking party, clustered as in a tour group. Other configurations are used for gangs operations and military action. Much attention is given to such configurations and their transmutation in team ball sports (especially rugby and football).

**Conceptual endoskeleton vs Conceptual exoskeleton**

The introduction above of the notion of a conceptual "exoskeleton" is consistent with behaviours in which individuals switch between academic disciplines or computer interfaces. As noted above, Edward de Bono describes the process of shifting between "thinking hats" or "shoes".

On the other hand it might be said that the whole process of conventional education is designed to inculcate a mindset that an individual is not expected to be able to "doff" at will. The "skeleton" is then effectively an "endoskeletal" framework into which the individual is
"locked" -- or around which the individual's sense of identity has been "built" through enculturation processes. The framework is internalized through these processes. Substance abuse -- and heavy beat music -- might be seen as an effort to unlock such a framework when it is sensed to be claustrophobic. Such unlocking is also a preoccupation in "deprogramming" those that have been incorporated into the belief systems of certain cults and sects -- although in contemporary society the distinction between "acceptable" and "unacceptable" cult mindsets remains to be clarified.

The suggestions from shamanism regarding shapeshifting imply a much greater degree of identification with any alternative cognitive pattern -- but in the expectation that the individual will eventually return to the pattern of origin. Clearly the existential discipline here is of a different order than with "donning" a conceptual exoskeleton. The challenge of "doffing" is much more closely associated with the meditative processes of "detachment" from form as widely discussed in Buddhism. It is skills in detachment which enable endoskeletons to be "doffed".

Identity, invariance and enactivism

In contrast to the abstraction implied above in selecting an animal cognitive form to be "donned", a particular concern here is the cognitive challenge of relating to the variety of animal forms encountered at any moment in daily life -- the environment of the moment. Earlier this was introduced in terms of the tendency to "outsource", cognitively, the dynamics of the environment. In this way the mind then effectively withdraws from full engagement with the environment. With loss of recognition that functions were delegated in this way, humans then deal with the environment in an instrumental manner -- without recognizing what they are doing to their own humanity -- and to the ecosystem on which they depend for their survival. Metaphorically the "sap" is withdrawn from the branches of the living tree of knowledge and these are then judged to be "dead" by the individual at their origin. Reified in this way, they can then be cut off with little concern, especially if they can be exploited as a resource.

Any existential bonding with the experienced environment may be most simply described in terms of empathy. Indeed the simplest form of cognitive shapeshifting can be associated with the capacity to identify empathetically with features of the environment. In the case of another person, it may described as being able to "get into their skin" -- to see the world in their terms. Deep ecology extends this empathy -- even to what has been termed (and disparaged) as a mystical level of identification with a whole wilderness.

The concern here however is to look for a form of "marriage" between the overt forms (from which one is normally dissociated) and the implicit, mystical form into which personal identity may be subsumed. How is identity to be understood and experienced in this context -- and by whom? Who indeed is the experimenter? To what extent is there a form of invariant identity underlying cognitive shapeshifting -- accepting that for some, such invariance is a matter of long-standing philosophical debate?

In the discussion of the "tree of knowledge" by Maturana and Varela (The Tree of Knowledge: The Biological Roots of Human Understanding, 1992) an individual's "reality" is constructed from his or her (or its) perceptions. These perceptions are interactive with the environment. The authors use the analogy of a raindrop which falls on a mountainside and, as it courses downward, both affects and is affected by the slope down which it rolls. That raindrop's experience is its incontrovertible truth, though rain falling on an opposite slope finds quite a different path and is differently affected. Thus, our "reality" is interactive. Moreover, our reality is mutually constructed. Our commonly agreed-upon view of reality is in fact a shared set of assumptions/perceptions. Together, humans bring forth the world they experience as objective reality. It becomes dangerous to scorn alternative views, having their own validity -- for without them the larger understanding of "reality" is incomplete.

As noted earlier, this raises the question of how definition of the environment can then be enacted. This is seen as related to the cognitive concerns of enactivism outlined by Francisco Varela alone (Laying Down a Path in Walking, 1987) and with others (The Embodied Mind: cognitive science and human expression, 1991). More particularly, the concern is with how any individual is sustained by "en-minding" the extended body that is their natural environment and the implications for the quality of a community so engaged.

Unconscious models as beasts of the imagination

The term "en-minding" could be understood to imply a sustained endeavour to consciously control the environment -- to the point of effectively "invading" the environment through the mind, whether by academic disciplines, by some mental disciplines focusing on the human body, or by acquisition of skills in controlling human relationships. This invasive en-minding might be usefully compared to the colonial enterprise through which "America" is "discovered", "conquered" and "occupied" by an extension of the "European" mindset. As in this analogy, the fact that "America" had long existed prior to such discovery -- and been long inhabited by peoples with other mindsets and dynamics -- is considered irrelevant. But "en-minding" can be more fruitfully understood through recognition of a degree of mutuality with the environment -- a continent to be explored with attitudes and intentions that were poorly cultivated in the colonial enterprise.

On the other hand, when "America" is not recognized -- in the light of the flat earth perspective of earlier times -- the mindsets active there may be understood as playing out into awareness in various ways:

- **unconscious models**: In everyday life, people rely on cognitive models, maps or schemas of how the world works, to organize their perception of events and determine how to act. These models make up much of the structure of the unconscious mind, on which conscious thinking and decisions are based. Their role in governing behaviour has been extensively documented in the therapeutic disciplines, notably in transactional analysis as first articulated by Eric Berne.
- **stories**: Unconscious models may become explicit in the stories that people choose to tell or by which they are touched, now a focus of narrative studies [more].
- **dreams**: The analysis of dreams (and nightmares) by psychoanalysis offers a means to make conscious the unconscious models that influence personal behaviour. In terms of the archetypes of depth psychology, no direct access to them is possible, since they...
are unconscious, but they may become "constellated" or made manifest at the conscious level in various ways, notably in dreams.

- **deities:** As with stories, the deities to whom significance is attached in particular cultures are indicative of the kinds of unconscious models governing or influencing behaviour within that culture. Such deities may be "peaceful" or "wrathful" -- as with the distinction in Tibetan Buddhism
- **possession:** The phenomenon of possession, that continues to be a focus of attention in both modern and indigenous societies (as with voodoo), is indicative of ways in which unconscious models may take over control of conscious behaviour
- **fiction:** Fiction, especially through film, gives creative form to dark imaginings -- especially in the case of horror movies and science fiction depiction of monsters from "outer space" (cf. Alien) or from another reality (cf. Matrix)

Each of these points to a realm of (un)reality "where the bad things are" which potentially have some ability to control and distort conscious behaviour. It might be argued that in freeing "civilized" humans from the totemic world another problem has been created. The modalities which were "contained" by the conscious relationship to totemic and similar figures in tribal societies have effectively been "unleashed". The above can then be understood as examples of forms through which they can now manifest. This is a fundamental theme in psychoanalysis.

In the light of the theme of the earlier argument, the "beasts" depicted (in fiction and myth) and encountered (in dreams) might be understood as efforts to give coherence to dynamics designed out of contemporary experiential reality -- through the use of animal-like shapes and movements. These beasts may also be given logical form as mental models whose elements are a dramatic, and even threatening, challenge to comprehension.

This perspective points to the merit of considering that such "beasts" roam the unconscious realms of an individual's psyche -- in "spaces" "behind" conscious awareness of the world. They are unconscious precisely because they cannot be integrated into consciousness and therefore are to some extent experienced as having a separate existence. There are numerous accounts of people referring to the "beasts within us" (also the name of a recent movie). For example, Dante's spiritual progress was described as blocked by three evil "beasts within" with which he had close encounters [more]. Typically this is a descriptor used by alcoholics in relation to their temptation to imbibe. This is also the case with other human proclivities, especially when they cause harm to others [more].

There is then value in endeavouring to recognize the fauna in the wilderness within. The argument above points to the possibility that by en-minding the environment and its wildlife this may give forms and niches without to what otherwise lurks within.

There is also a case for recognizing that our conscious collective world may have what can usefully be termed "dark riders" -- namely entities that exploit the realm from which collective consciousness has been withdrawn (in favour of the ubiquitous instrumental approach to reality). This possibility has been explored in a separate paper (The "Dark Riders" of Social Change: a challenge for any Fellowship of the Ring, 2002). It is echoed by the final words of David Kelly (UN weapons inspector who committed suicide in the UK, 18 July 2003): "I'm haunted by many dark actors playing games" (Sunday Telegraph, 20 July 2003, frontpage headline).

These "beasts" might be usefully understood as a kind of perverted reflection of conscious models -- refracted into human imagination through the boundary between unconscious and conscious. They hold the dynamics of what is effectively designed out of conscious models. In both cases the models can be "ridden" -- consciously as exemplified in their imposition from above in corporations, and unconsciously by the "dark riders" discussed in the earlier paper. As intimated in many myths, the structure of the beasts retains the patterning of the conscious models -- a "dark twin from the shadows". At its simplest, perhaps as noted earlier, this is to be seen in the correspondences between sets of virtues and vices.

One formulation of the argument of this paper is that the static set of virtues does little to clarify the requisite dynamic complementarity necessary for them to constitute a viable modality (as intuitively recognized in a "man for all seasons") -- hence the proclivity to sin of their greatest advocates. The unintegrated dimensions are then appropriately held by the necessarily dynamic complementarities of the set of vices -- readily labelled as "animal-like" or "bestial". It is this intuition that points to the appropriateness of articulating understanding of the dynamics through recognition of how they are indeed carried by the locomotion styles and strategies of animals.

This approach also helps to clarify the nature of the realms in which the unconscious beasts are free to roam -- namely the niches where the unconscious models are viable and thrive. Part of the difficulty of the conscious models is that they tend to be viable with respect to the domain of the intellect, or of the emotions, or of the intuition, or of physical action -- but are much challenged where these have to be integrated. Hence the merit of exercises like that of de Bono’s "hats" and "shoes" (see above). Real animals tend to be able to move between air, and water, and heat/cold and land -- of which the former are traditional metaphorical equivalents. It is precisely because of the difficulty of consciously traversing such boundaries, with neatly segmented "Cartesian" models, that the models are then embodied in "magical" beasts that offer lessons through the unconscious as to how it is done.

In effect the beasts are creatures of the interfaces and "cracks" between the media that humans are challenged to integrate. They are all that humans have as bridges between realms that are readily dissociated by rational models.

### Endangering species by rationalizing the environment

The modern civilizing enterprise has been a vast exercise in taming the "wilderness", destroying animals "dangerous to man" (or his self-image), and domesticating any species conceived to be of direct value. This enterprise is now being extended to include the destructive exploitation of ecosystems that are habitats of species that are no danger to humans. Even amongst the domesticated species, care is taken to emasculate or destroy those (such as bulls, stallions, or pack leaders) that might draw them into natural behaviours unwelcome to man. The topographical layout is also modified into a rational gridwork of field and road systems. Rivers are straightened and "tamed". Wilderness areas have been converted into zoos in which animal behaviour is managed according to appropriate rationalized models.

Conceptually the whole civilizational process may be criticized as a dangerous exercise in "throwing the baby out with the bathwater" --
however necessary it was to get rid of the "bathwater". If only the need to recycle it had been understood!

But, curiously, the deliberate or inadvertent reduction in biodiversity through the destruction of species is accompanied by the activation of behaviours within human civilization analogous to those destroyed. Behaviours by which tigers were recognized by humans, are now recognized within human society. There is increasing recognition of "snakes" and "rats" -- and of course "sharks". Women are frequently confronted by "wolves". Delicate social systems are endangered by "elephants". There are whole populations of "hawks" and "doves" -- and "foxy" salesmen have a sharp eye for "pigeons". Some humans are perceived as "rabbits", others as "snails", "slugs" or "worms". The life of society is enhanced by "butterflies" and "peacocks". Hard work is left to "donkeys" and work "horses". Wannabee leaders have a tendency to believe that they can manage others like "cattle" -- and may be remarkably successful in doing so in the short-term, as explored elsewhere (Promoting a Singular Global Threat -- Terrorism: Strategy of choice for world governance, 2002). "Dinosaurs" are now recognized as a prominent feature of modern policy-making environments -- even without any memetic engineering analogue to the theme of Jurassic Park.

The infiltration of such behaviours into "civilization" may be seen in other areas, notably terminology in relation to the epitome of advanced civilization -- namely the web. Through "browsers", billions of people have now been offered behavioural patterns associated with the grazing activities of ruminants. These facilities may be provided by others who manage "spiders". Search engines may also be fed by agents associated with rodents (eg Gopher, Archie, Veronica -- the last two being abbreviations in which the R stands for rodent). Similarly, many advanced weapons systems are given names of predators, and pilots ensure that their planes and bombs are decorated with similar motifs. It would appear that in contrast to naive expectations of "win-win" solutions to humanity's challenges, the speciation of human behaviour is occurring in such a way as to engender and maintain a complex ecosystem -- complete with carnivores, herbivores and omnivores -- in which every species is some other species' lunch. Ironically many of civilizations' highest values continue to be embodied in animals on heraldic devices, notably through the lion, leopard, eagle, dove, and elephant.

Is there no suspicion that such simplistic choices of animals may be seen by the future to exemplify "civilization's" reduction of the dynamics of the environment on which it depends to the menagerie of a kindergarten tale? There is an irony to the fact that the animal dynamics associated with "virus" are now emerging as a major factor with which the information society is now forced to deal -- in contrast with the "mega-fauna" noted above.

Why was it ever assumed that the physical laws of action and reaction did not have their analogue in psycho-social systems -- as intuited in Eastern beliefs in karma? It would seem that the process of naively endangering and destroying species evokes in human behaviour the savage dynamics long associated by humans with such species. The civilizing enterprise, especially in the 20th century, subjected humans to a greater degree of savage slaughter than anything associated with wild animals -- in total contradiction to the declared values of the civilizations engaged in such destruction.

From a psychoanalytical perspective, the destructive instrumental attitude towards the untamed features of the environment might be understood as a form of projection of human feelings, emotions or motivations -- without realizing that this reaction is really more about humans themselves, collectively and individually, than it is about what is disparaged in the environment. For therapists, such reactions are caused by unmet emotional needs, neglect, and other abuses that transpired in childhood. Similarly, with respect to the environment, such projection might be said to derive from the unfulfilled relationship to the complexity of the world -- perhaps even a feature of racial memory -- that causes the pathological dissociation.

Humans thus incarnate behaviorally the animal species that they destroy. Whilst the bodies exhibiting particular dynamics may be destroyed, the behaviours -- as memetic patterns -- migrate most successfully to become associated with other bodies. It might be said that even though no individual and no species is immortal, their behavioural patterns effectively are. The great danger is that behavioural patterns that have been "well-handled" or "well-contained" by a particular animal species may fit extremely poorly when incarnated by humans. It is therefore vital to understand the role played by animals for humans in this respect.

Enthusiasts for nuclear technology have in the past decade been confronted with the real costs of "decommissioning" nuclear power stations. Attention has yet to focus on the real costs of "recommissioning" devastated ecosystems faced with ever increasing demands from humans. The more fundamental challenge is then the cost to any civilization of designing out the natural environment to ensure its own food security for physical survival -- when by doing so it engenders dysfunctional dynamics from an inner wilderness that are necessary for the nourishment of its collective psyche. The challenge is also relevant for any individual.

Memetics as the under-explored analogue to genetics

Much has recently been made of genetics, of genetic engineering, and of decoding the human genome. It was asserted that much of human characteristics and behaviour could be explained by individual genes. The work has resulted in two great surprises. A much higher degree of genetic material is common to all animal species -- including humans (for example 98% shared between humans and chimpanzees) -- and despite their marked differences. The number of genes (30,000) in the human genome is far less than expected (100,000) so that explanations must now shift their focus from the statics of identifiable genes to the dynamics of genetic interaction (known as epistasis) to control a single phenotype. In the desperate search for the program of life, as noted by Richard Strohman (Human Genome Project in Crisis: Where is the program for life?) it has now been acknowledged that "genes can't possibly explain all of what makes us what we are". The human genome project has shown that the one-gene, one-trait concept is false. With epistasis, it is the gene combinations which are important. Thus for example, 2 loci, each with 2 alleles, have 9 different combinations, not 4. With 3 locus interactions, 3 loci each with 2 alleles, there are 27 different combinations, not 9, etc.

A meme has been defined as an information pattern, held in an individual's memory, which is capable of being copied to another individual's memory. Cultural evolution, including the evolution of knowledge, can be modelled through the same basic principles of variation and selection that underlie biological evolution. This implies a shift from genes as units of biological information to a new type
of unit of cultural information: memes [more | more]. Memes only take minutes to replicate, and thus have potentially much higher fecundity.

In terms of this paper, conceptual models may then be understood as explicated memetic patterns or structures. Efforts have been made to identify implicit models (cf Michael L. Best. Models for Interacting Populations of Memes: Competition and Niche Behavior, 1997). As yet there are challenges to defining memes and memetic structures [more]. The possibility raised here is that animal dynamics offer a mnemonic device to "carry", for human comprehension, a large diversity of memetic patterns -- avoiding the trap of the genome mapping initiative by acknowledging epistasis. Paraphrasing an aphorism of the Whole Earth Catalog, it is not necessary to map these behavioural dynamics since they have already been mapped -- in the biodiversity and dynamics of the environment. Thus in relation to animal movement, Liane Gabora (Meme and Variations: A Computational Model of Cultural Evolution, 1995) argues:

There is epistasis; the value of what one limb is doing depends on what its left-right counterpart is doing. Finally, since there is one optimal allele for the head, two optimal alleles for the tail, two optimal forelimb combinations, and two optimal hindlimb combinations, we have a total of eight different optimal memes. This enables us to perform a comparative analysis of diversity under different ratios of creation to imitation. [more]

Susan Blackmore (The Meme Machine, 1999) argues that routines and competencies should be taken as the equivalent of memes. Humans, decisions and strategies are no longer the focus. Those are all simply ways in which routines and competencies make copies of themselves. Paul Marsden (A Strategy for Memetics: Memes as Strategies, 1999) argues that: "A meme conceptualised as a culturally transmitted behavioural strategy has a number of advantages".

Whereas the significant difficulties of physical shapeshifting are recognized as being constrained by modification of genetic structure, the possibility of cognitive shapeshifting in the light of memetics was discussed in an earlier paper (Being Other Wise: Clues to the dynamics of a meaningfully sustainable lifestyle, 1998). What indeed is the epistemological equivalent to the computer technique of morphing with which so many computer users are now familiar? It was noted there that:

How do memes get added or removed from the psychological "genetic structure"? How is its mega-structure then affected -- the patterns which otherwise give rise to characteristic spiral patterns in flower petals or leaves of plants? Is there an equivalent psychic mega-structure? Little is said of "psycho-genetic engineering" as such, although there is a remarkable parallel between modifying genes in biological makeup and modifying memes in psychological makeup. But in fact analogous concerns are to be noted in the response to the activities of certain sects and the need to deprogram their adherents. More acceptable are the activities of advertising campaigns in modifying belief systems -- following a long tradition of religious proselytizing. Psycho-genetic engineering also "cannot be wished away".

As author of the Meme Manual: A Cybernaut's User's Guide to Mind Viruses (1995), Brett Thomas argues that "Memes, mind viruses and media viruses are important and useful concepts. Memetics (the field of the study of memes) provides a foundation for understanding the evolution of society up to now, and provides real tools for change, a technology through which we can engineer the future that we want." However, despite the many useful pointers offered, it is the significance of the latter phrase "what we want" which raises the question of the relationship between memes as explanatory constructs (the cognitive models of this paper) and the dynamics inadvertently designed out of any consciously recognized "want". These then become unconscious memetic patterns effectively carried by beasts of the imagination -- perhaps well-modelled by the notion of vicious mental viruses.

For Carl Jung the "collective unconscious" was a repository of all human ideas. Critics have dismissed Jung's archetypes as unscientific and metaphysical. However, some Jungians, for example Anthony Stevens (On Jung, 1990) have interpreted the idea in a biological sense. Stevens regards the archetypes as inherited patterns of function analogous to instincts in animals. On this view archetypes could be thought of as psychological "instincts" that manifest themselves in behaviour and thought patterns. With respect to archetypes and the realms that they occupy Ron Evans (Memetics: A Systems Metabiology, 1995) argues that:

If such does exist, then metaboliological organisms must live there. Jungian archetypes may manifest themselves as mega-memes in the ideosphere or collective unconscious. Jung said that archetypes have no content. An archetype may therefore function as a sort of memetic skeleton, a meme that itself binds together clusters of memes with informational content, which may include directives of the sort discussed above. Why do some of the metabolbiological phenomena discussed above manifest themselves as separate, self-conscious entities capable of reproduction, while others do not? Part of the answer to this question may lie in the way in which these metaorganisms insinuate themselves into the memetic structure of the individual human. Most often people who carry these metaorganisms become infected by them during a sudden, almost catastrophic "conversion process".

Memetic engineering: a Western discovery?

The 2050 Project for transition to sustainability was a program from 1991-5 on long-term sustainability conducted jointly by World Resources Institute, Brookings Institution, the Santa Fe Institute, and a global network of scholars to explore how the future might unfold in the light of scenarios that might reflect very different mindsets or world views as well as different trajectories into the future [more]. An outgrowth of the project using the simulation technology Sugarscape was Growing Artificial Societies: Social Science From the Bottom Up (1996) by Joshua M. Epstein and Robert Axtell [more]

James Gardner (Memetic Engineering, Wired, 1996, Issue 4.05) reports on the 2050 Project in the following terms:
A meme-focused vision of culture and consciousness acknowledges forthrightly that memes are not mere random effluvia of the human experience but powerful control mechanisms that impose a largely invisible deep structure on a wide range of complex phenomena -- language, scientific thinking, political behavior, productive work, religion, philosophical discourse, even history itself. But consider the matter more closely. What if it were possible to construct a new science of the meme -- memetic engineering -- analogous to the discipline of genetic engineering? Such a science would allow us to manipulate complex patterns of replicating memes and achieve consistent and predictable manifestations in the form of a precisely altered cultural phenotype. Who would then be in charge of the course of cultural evolution, our selves or our selfish memes?

Gardner’s interpretation of possibilities does not seem to have been reflected in follow-up to the 2050 Project -- although in the light of current American approaches to the strategy of global hegemony, this may be because such explorations are now highly classified and enfolded into "PsyOps". Gardner's speculative insights are however usefully expanded in Roger Bishop Jones’ Memetic Future Engineering (2000). A well-articulated thoughtful discussion is provided by Kas Graham (Mmetic Engineering). As speculatively expressed in the Encyclopaedia Galactica memetic engineering is:

The practical application of memes in order to influence behaviour, especially on a mass-scale... Propaganda and Advertising are a crude form of memetic engineering. Some philosophers have observed that memetic engineering raise serious questions in free societies. Mempengineering is rather like advertising and spin-doctoring. First the memengineer learns as much as e can about the target population, and then develop various versions of the meme (likely testing them in simulations and focus groups). Then it is spread through advertising, music, network postings, subliminals, memebots, alifes, neogens, new religions, artificial fads, or other means. Real memetic subversion is done by launching many synergetic memes. 

Memetic engineering is of course of great interest to those designing viral marketing campaigns -- whether political, commercial or religious [more | more]. In this sense, and without being recognized as such, exposure to memetic engineering has already prefigured and far outpaced exposure to genetically modified organisms about which there is so much controversy (cf Paul Marsden. Genetically Modified Food and Memetically Modified Ideas, 1999). Controversy in relation to the former now appears under banners such as cultural imperialism and spiritual pollution. The clash of cultures, civilisations and ideologies is increasingly framed as "memetic warfare" (see Missiles, Missives, Missions and Memetic Warfare: Navigation of strategic interfaces in multidimensional knowledge space. 2001)

A valuable satirical exploration of how memetic engineering is positioned in relation to other global strategic approaches is provided by Andrew Weitzman (Mmetic Engineers). In an earlier article, Michael Wilson (Mmetic Engineering PsyOps and Viruses for the Wetware, 1993) argues:

"If you think about how you think, you will find your mind is made of memories, facts, and that sort of thing; you picked these up through continual reinforcement... Using a computer metaphor, your mind is hardware (the grey matter, providing you with your senses, nerve endings, neurons) and software (combined from that odd core of your being that is doing the reflecting, and the material it is reflecting upon, kind of like a computer program and its data). That isn't the whole story, of course; there is an unidentified extra component, the 'wetware', that gives you free will, volition, self-awareness. We know next to nothing about how this piece works; it appears to be an odd combination of chaotic and stochastic processes, transcending both. About the only thing we know for certain about the human mind is that we haven't even begun to utilize it to its full potential."

**Memetic engineering: an Eastern practice ?**

The references to contemporary thinking about memetics indicate, as some critics point out, that it remains an interesting meme in its own right whose value in practice has yet to be demonstrated -- beyond the manipulative enthusiasms of propagandists and marketeers that have underpinned the behavioural sciences from its origins.

It is therefore interesting to explore the traditional practice of sand painting in relation to memetic engineering. Variants of this practice are central to a number of tribal cultures. Tibetan Buddhists are also noted for their construction of sand mandalas [more]. Curiously, given its dedication to complexity sciences and global systems, the Santa Fe Institute is located in that area of the USA where the Navajo also practice sand painting [more | more]. The SFi logo takes the form of a mandala, presumably derived from the Navajo -- but the relationship between SFi interest in memetics and the process of sand painting does not seem to have been acknowledged.

For the Tibetans, a mandala sand painting is a representation of the universe as known. It contains traditional Buddhist symbolism and is created by lamas whenever they feel there is a need for the healing of the environment and all living beings -- and themselves in the process. The act of constructing it over a period of days is considered a religious practice and a path to enlightenment for those who engage in it. For Carl Jung, the mandala -- of which there are many varieties -- is a universal expression of the human subconscious, a vessel into which humans project their psyche [more | more | more]. For Jung (Mandala Symbolism, 1973), mandalas:

... are all based on the squaring of a circle. Their basic motif is the squaring of a centre of personality, a kind of central point within the psyche, to which everything is related, by which everything is arranged, and which is itself a source of energy. The energy of the central point is manifest in the almost irresistible compulsion and urge to become what one is, just as every organism is driven to assume the form that is characteristic of its nature, no matter what the circumstances. This centre is not felt or thought of as the ego but, if one may so express it, as the self. Although the centre is represented by an innermost point, it is surrounded by a periphery containing everything that belongs to the self -- the paired opposites that make up the total personality. This totality comprises consciousness first of all, then the personal unconscious, and finally an indefinitely large
Mandalas tend to have a variety of levels of meaning:

- outer level represents the world in its divine form;
- the inner level depicts a map pointing toward enlightenment;
- the secret level represents the perfect balance of body and mind.

The purpose of creating a sand painting is to achieve purification and healing on all three levels. Such a mandala is subsequently destroyed as part of the same ritual. Those who participate in its creation and destruction, including observers, are believed to be purified, uplifted, and enlightened by the sacred energies of the spirits, deities, buddhas, and saints that it is designed to evoke.

One basic mandala is that illustrating the cycle of existence and the challenge of ensuring release from its dynamics. Its outer ring then has twelve links -- each dependent functionally on the previous link, and leading to the next link, constituting what is known to the complexity sciences as a feedback loop. The function of these twelve links of dependent origination is to tie the living to continual birth and rebirth, or reincarnation, in the six realms that are depicted in the middle ring. Attainment of nirvana or enlightenment is the only thing that will allow the individual a rest from this endless cycle of life and death among the realms. The inner ring's dark half depicts demons whose function is to push the dead spirits into hell. The light half, in contrast, shows fortunate spirits rising to heaven [more].

These are all features that could usefully symbolize the immense challenge to human societies of handling differences of any kind through inappropriate use of rigid conceptual models. The various concentric nested sets of cognitive subdivisions of a mandala might indeed be understood as a generic template for the various possible sets of appendages of animals -- with the dynamics that implies in each case (see also Representation, Comprehension and Communication of Sets: the role of number, 1978)

Through the processes of the sand painting exercise, the cognitive transitions of participants might be usefully associated with cognitive shapeshifting -- as discussed earlier. The participant reconfigures in ways that are echoed in the limited imagination by the shadowy legendary, fantasies regarding werewolves and the like.

Given its complex use of cultural memes and ritualized interaction with them, it is worth asking the question how the traditional sand painting process is to be considered distinct from the emergent insights into the possibilities of memetic engineering. As noted above, the outer level of significance provides a comprehensive, integrated map of the world as it is abstracted into consciousness in all its fragmented diversity -- a descriptive attitude typical of global modelling. This is the framework within which the process then develops. A second level focuses the subsequent steps of convergence and integration within the process. The final, secret, level is the experiential exemplification of the balance and insight resulting from that integration. The integration is articulated mnemonically in the flexible dynamics through which animals move, according to their nature, between land, water, air and heat/cold in the natural environment. This -- and the "sacred energies" invoked -- would accord with the remark of Heraclitus: "A wonderful harmony arises from joining together the seemingly unconnected".

Given such insights, and the challenges of interfaith dialogue around the world, it is a wonder how and why the four main schools of Tibetan Buddhism emerged and remained distinct: Nyingma ("Red Hats"), Kagyu ("Black Hats"), Sakya ("Grey Earth"), and Gelug ("Yellow Hats"). As with the speciation of other religions through schism, who recognizes their respective roles in the memetic evolution of Tibetan Buddhism as a whole? (on this point, see also Coherent Patterns of Schism Formation, Bifurcation and Disagreement, 2001)

Deriving meaning from descriptions and depictions of such a process for the western mindset is highly dependent on the understanding associated with the "purification", "uplifting" and "enlightenment" of those who participate in it and experience the "sacred energies" [more]. It is however possible to hypothesize the existence of memetic engineering processes, in which people voluntarily engage, that might indeed improve the quality of their sense of self, the world, and their healthy integration (see Enhancing the quality of knowing: through integration of East-West metaphors. 2000). This is to be contrasted with the many manipulative speculations currently associated by behavioural scientists with memetic engineering -- where the focus is on imposing such memetic modification on others, typically without their consent, as with genetic engineering.

**Neurobiological clarification**

In response to the above argument, philosopher Antonio de Nicolas (Neurobiology and Yoga: From the gods of the amygdala to the God of the Heart; The Biocultural Paradigm: The Neural Connection Between Science And Mysticism) has clarified the Buddhist epistemological perspective in the light of contemporary neurobiology:

1. The Western self is located in the left side of the neocortex. As such it can only receive its information from the images of the right side of the neocortex, not nature or the world, or any god. It reads these images according to its own interests and logics. Hence dominion, taming, "overriding" of all the other brains by way of conceptual manipulation. But this is a totally gratuitous act of its own since the left brain, what we call reason in the West, is born out of a delay mechanism in the brain itself between the global perception of the right side of the neocortex and the translation of this perception into concepts. The Classics called this self the shadow. It is a shadow self that appears only in reflection, not in experience. In this way you see that the, dominion, taming, pruning, imperialism we ourselves inflict in our own brains is reflected in the abuse of nature we cry about. We are our own mirror, as self and as nature.

2. What in Buddhism is called "ignorance" of the twelve preconditions, is a package we carry with ourselves from the moment of conception to the moment of birth. These twelve preconditions take place in utero of the mother, the face we had before we were born, or simply before we developed our own memory and could access it, which happens only after a couple of years of
our own life with the birth in each one of us of the hippocampus. The hippocampus does not have access to the memories of the amygdala, the place where all memories in utero and the first two years and some months of our individual lives are stored for each one of us. In this sense we ignore the real face of Nature, animal and otherwise, and we are able to see only the conscious faces we have created by our own conscious power of reason. From this point of view the Buddhist twelve preconditions make much more sense.

Buddhism knew that the visual images used in ritual and the "forms" of the culture were conditioning activities and not conducive to nirvana-moksha, at the hands of the priests. The visual neocortex rules the visual world as opposed to the reptilian and limbic brains that are just vibrations as the "language of rituals" as the priests present them -- not realizing the dependence of this language on the other two. Rituals are forms, visual forms and therefore conditioned and conditioning. This is the reason St. John of the Cross wrote: "And on the top of the mountain, nothing, nothing, nothing," referring to the images of meditation and how to get rid of them once they have done their job.

The priests did not realize that all life is conditioned, including their rituals, since images are an activity of the visual neocortex, that is, a holographic summary of the previous vibrational languages of the reptilian and limbic brains. Furthermore Buddhism realized that the greatest conditioning begins even before we can identify ourselves in and through memory, that is, before the hippocampus is developed in us. Therefore, Buddhism focuses all its attention to overcome conditioning in the life we have before we become conscious of ourselves, that is, our life in the amygdala.

Of the twelve preconditions, or dependent origination, samsara, eight of them deal with life in the womb: vijnana, the birth of individual life, nama-rupa, name and form as differentiated by the khandas, perception as discreet; sad-avatana, formation of six sense organs; sparca, concomitant sense of individuation in sense experience; vedana, individuated sensations; trishna, the birth of desire; upadana, individual life in the womb; and bhava, life as an individual feat. Then comes rebirth and life, decay, death: the wheel of samsara grounded on the ignorance, avidya, of how our conditioned lives work.

For de Nicolas, with the overriding power of the left brain (rational, conceptual brain), humans not only imprint their image of nature on nature and its creatures, but it is this same image of ourselves that conditions us in return -- as suggested by the earlier arguments of this paper. As de Nicolas expresses it an epilogue to a new edition of his Meditations through the Rig Veda: Four-Dimensional Man (2003):

Revelation, individual experience, is an affair of the right side of the brains. The left hemisphere can only interpret, translate what the right hemisphere presents as sensation. Thus, while we have five different brains (not one as Descartes thought and we presume), only the three of the right hemisphere deal with original experience. And this in different ways. While maia (the Asat) is the origin, maia is also wired with a geometry capable of letting forms appear, while mythos, the place of gods and heroes, is already a world of forms. However, and this is the point of our discussion, when these two original and originating brains are translated by the right hemisphere of the neocortex they are translated as "visual images" they are seen as images even if originally they were waves and movement and tactility.

In other words, by the time the ritual priests take on the "visual images" to the sacrifice and the ritual, these visual images, originally, were neither images nor visual. Thus by constituting these images as the original text, the followers are removed from the origin, from the source of sensation and are led into a repetition of acts that may crystallize either in a crisis of faith or in a crisis of dogma. The believers may either end up losing faith (also sensation) or become dogmatic preachers in a game of endless logomachy. And the same with any other "text" bound by single language-games, like Western Theology.

Thus, according to the Rg Veda it is precisely because of this tendency that the culture calls for cyclical returns to the Asat: to lose all forms, verbal, audial, or visual and break the dragon Vrta open, again. And that exercise, in the Rg Veda, is the true meaning of sacrifice (vajna). The sacrifice is necessary because these languages are invariant biological epistemologies, irreducible to one another.

For clarification on the different components of the brain, see Alan McAllister (Human Spiritual Structure: The Brain, 1999).

Memetic engineering: Western magical arts?

Given such arguments it is appropriate to look again at what may be seen as European practices corresponding to those relating to the mandala. These include practices introduced by Gurdjieff relating to the enneagram (see also Anthony Blake. The Intelligent Enneagram, 1996) and defined as "the Work". More generally they include "magic", as practiced within a symbolically patterned circle. This is particularly valuable given the importance attached in both cases to the "elements" and "directions", to preparatory requirements and to the evocation of "sacred energies". It is also important given the significance attached by its practitioners (such as neo-pagans) to "reconnecting with the Earth" -- a challenge that might be considered vital given the worldwide preoccupation with "sustainable development" strategies.

In the light of de Nicolas' arguments, the declared preoccupations of practitioners of magic may be understood as verbal articulations of a commitment to bridge across boundaries and to integrate experiences that have a vital role to play in the human psyche. That said, it is important to acknowledge that the term magic is frequently abused and separated from a spiritual foundation. In any historical period, as with religion, magical arts are taken up in fashionable and often bizarre forms, by various groups and movements as continues to occur
at this time -- echoing curiously the fads and non-transparent preoccupations of those seeking to acquire and hold political power. The enduring magical tradition is derived from perennial philosophy, sustained by myth, legend, visionary cosmology and poetic insight. In some cultures many perverted forms of magic continue to be practised for ignorant or selfish ends. Trivial, resource-consuming, or ultimately sinister practices are degraded forms of the enduring tradition and can lead to dangerous forms of imbalance.

Magic is frequently associated with the occult as the preoccupation of secret cults in pursuit of secret powers in order to manipulate others. As with other disciplines, it can attract self-centred individuals of extremely dubious motivation. Through their efforts to draw attention to themselves, wider understanding of magic as a discipline is distorted. The potent powers to which magic is believed to offer access are held to be the common energies and properties of humankind and are not the monopoly of any conspiracies that may endeavour to exploit them. There is an irony to the fact that, in a world of increasing dependence for governance on media "spin", so much importance is now placed on the "magic" of presentation and the power and the "image" in articulating policies of "sustainable development. The role and practice of "magic" in modern society has been disguised within concerns about image and the stress on the need for creative imagination.

The following arguments have been adapted from the author's entry on magic in the Encyclopedia of World Problems and Human Potential (1994).

Magic is a set of methods for arranging awareness according to patterns; it is not a truth or a religion. Nor is it even a philosophy, in the strict sense of the word, although there are echoes of profound philosophy in most magical traditions. It is basically an artistic science in which the practitioner controls and develops imagination to cause changes in the outer world. The serious application of magical methods leads to transformation and it is the transformation which is of value and not the methods themselves. All magic derives from controlled work with the imagination. Magic does not work because its propositions are essentially real or true; it works because practitioners become imaginatively involved in these propositions. Thus for controlled periods of time under non-habitual circumstances, they behave as if they were true. It is not a question of becoming habituated to falsehood but rather of the magician growing through the patterns, whether true or not, and emerging beyond them into a clarity of awareness that was not possible before the experience of transition and transformation.

From the perspective of a magician, the propensity of people for engaging daily in activities which they know are fruitless or harmful, sustained by a pattern of values and habits, achieves its apparent coherence through a form of fantasy-sharing that holds the illusion together collectively and individually. This same propensity is used by magic to motivate inner transformation rather than outer identifications. When the awareness of values changes (in contrast to changes of values) the externally perceived world may be transformed by magical means. This possibility is facilitated when the symbols used are those of the culture with which the practitioners are familiar. Once the perception of the external world can be transformed by such means, magic then enables changes within the individual through which further methods applicable to the transformed consciousness may be inwardly apprehended. Magic thus attempts to relate human consciousness to divine consciousness through patterns inherent in each. This is otherwise known as the Great Work.

A major premise of magic is that access may be obtained to many worlds or worldviews. The transformations which occur within the magician enable access to such inner worlds of consciousness in ways which transcend the limitations of purely intellectual endeavour or the inspirations of folklore. Images are deliberately evoked and cultivated as part of this process. Initially magic alters the focus or area of attention, drawing the vital; energies together with the discipline of a tradition and its restricting vessel or matrix. In a second stage the energies are redirected and gradually amplified through attuning to richer, more complex and more encompassing patterns. These integrative patterns have a resonant effect on the psyche. They may take the form of simple symbols, or may be imaginatively recreated as complex scenes, beings or other patterns. As such they may be used to focus and direct a wide spectrum of personal and group energies on many levels of awareness. In a third stage, the awareness having been attuned to various patterns normally inaccessible to everyday consciousness, begins to operate in other worlds or dimensions through the effect of the magical patterns and key symbols. Finally the practitioner is projected into the alternative worlds of experience, often with considerable energy.

The increasing ability to change worldviews follows from a reassembly and redirection of the practitioner's energies. Such changes enable the practitioner to gain a more accurate understanding of the shared world. The value of such transitions to other world realities is that they contribute to the overall liberation from the particular illusion of the coagulated consensual worldview. They also ensure fruitful exchanges between such distinct realities and the entities that inhabit them. The intent is therefore not to escape this world but rather to transform it. The transformation begins within new directions of awareness sought in early training. It finally permeates the practitioner through to the physical body. Whereas religions seeks to save the world, the magical disciplines affirm a particularly subtle aspect of this insight, namely the possibility of transforming all worlds.

Through the practice of magical arts during magical development, the individual progressively learns to balance the reality-worlds within individual consciousness through ritual and planned activity by which life becomes attuned and rhythmic rather than random and chaotic. At the same time the individual endeavours to energize the imaginative constructs and the contacts established through transformative rituals and powerful mediation. The spiritual power of the practitioner is directed outwards towards material ends, flowing through the psychic body complex, transforming the awareness of the practitioner before it reaches any other defined goal. These two processes may be integrated in one harmonious living pattern, a magical life of enlightenment, in which the practitioner seeks a continual interaction between the individual and the worlds occupied by his awareness.

Magic has frequently been considered evil, especially by organized religion and as a result of the actions of those who exploit the gullible. As a neutral set of artistic and scientific techniques for controlling the imagination, magic (as with any set of methods), may indeed be employed by those who are imbalanced to enhance their own image of themselves. Evil may then be considered as associated with that imbalance, but not with the principles, however they are abused. Many modern religions, especially Christianity, make use of magical practices identical in principle to those of the pagan religions they displaced. Such religions also exhibit special concern at the evocation
of gods and goddesses as being a completely regressive spiritual tendency. However this reservation should now be seen in the light of the insights of archetypal psychology in which the imaginative value of such symbols for the psyche is recognized as one way of facilitating individuation. Just as some religions make specific use of icons and other images as an aid to prayer, magical traditions use specific images of deities to gain specific results with the imagination and its effects upon the outer world.

In fact it has been argued that the emergence of individual awareness and personal ego commenced in primitive societies by magical, symbolic means. The dasein (being-there-ness) must be defended against loss, just as the physical body has to be defended against sickness and death. Otherwise the individual is totally overwhelmed by the environment and ceases to be able to support him or herself (fascinans). This defence is symbolically enacted for a whole group by a shaman who first allows himself to be possessed by a spirit and then fights off the spirit, regaining his "self-possession" and, in doing so, that of the group.

It is in this connection that the traditional role of masks becomes apparent as a symbol and focus of power, magic and mystery -- now widely explored in contemporary society through role palying. When a mask is worn, people shift their shape and become something other than themselves, embodying characters and spirits from mythology and literature, imagination and dream. As expressed by Duncan Eagleson, the magical power of the mask exists, not in the mask itself, but in the intersection of the mask with human consciousness, in the synergy that arises when a mask is worn, the connection made between the wearer and the spirit or character of the mask [more]. [see also Mask and Metaphor: when things are not what they seem, Parabola Magazine, Volume 6, Number 3, special issue]

As noted earlier, this direction of exploration is not without its dangers -- as has been repeatedly found in efforts to separate the powerful insights of paganism, shamanism, wicca and natural magic from their perversion and misuse. It is for this reason that the "bathwater" always tends to be thrown out -- with loss of the "baby" in the process. However, at a time when religion is estimated to be driving some forty violent regional conflicts around the world -- and is at the root of the righteous Christian-inspired intervention in Iraq -- perhaps these "dangers" need to be seen in wider context.

**Conclusion**

Such memetic exercises bring the focus back to the animal dynamics of this paper. Masks are often of animal form. The centre of some classical sand painting mandalas can traditionally depict three representative animals: a bird symbolizes desire, a pig ignorance, and a snake anger. These are considered the three "poisons" that fuel the twelve links of dependent origination. The contention of this paper is that it is the appropriate understanding of the ecosystemic dynamics of such animals -- in contrast to the "poisonous" dissociation through which they are cognitively set apart as expendable features of the environment -- that is the key to the "secret" balance to which the mandala points mnemonically. It is this balance which may well provide the cognitive underpinning to sustainable development.

It is an extreme irony that the "neo-cortical" preoccupations of the challenges to sustainable development of the planet are now typically formulated in terms of the challenges of the "elements" that figure so prominently in traditional memetic engineering practices. The debates at the highest level concern what to do about: "air" (pollution, ozone, emissions), "water" (scarcity, pollution), "energy" (shortage, oil, nuclear), and "earth" (soil pollution, available land, desertification). Missing from these debates is the experiential resonance of humans with their environment that prefigures debates that are increasingly arid -- whatever the passions of their participants for higher quality of life. Of greatest concern is that these debates, and the models that inform them, are designed in terms of a fragmented sense of reality. The complex feedback loops between the islands of neo-cortical reality are ignored to the extent possible. The dynamics between these conceptual islands are beyond the scope of neo-cortical academic and political discourse -- in marked contrast to the subtle whole-body healing disciplines, such as acupuncture, that seek to balance the "elements". And yet the dynamics (hard-wired in the reptilian and limbic brains of humans) are encoded in the behaviour of animals in navigating across the boundaries between air, earth, fire and water -- animal species that are increasingly endangered by the simplistic efforts to rationalize the environment.

It is possible that the "secret" of the balance to be discovered in traditional memetic engineering practises is secret only because, as an experiential insight, it cannot be effectively explicated in conventional language. As a philosopher, Antonio de Nicolás has also chosen to give form to this secret in many books of poetry [more], building on the traditional oral culture that gave rise to the Rig Veda whose four interacting conceptual languages he explored ([Meditations through the Rig Veda: Four-Dimensional Man, 2003]) -- and reviewed elsewhere ([Liberation of Integration through pattern, oscillation, harmony and embodiment, 1980]). The bridge between such poetry-making and the policy-making relevant to sustainable development has also been explored elsewhere (see [Poetry making and Policy making: Arranging a marriage between Beauty and the Beast, 1993]). In relation to governance, the need for a minimum of four complementary languages has also been explored (see [Four Complementary Languages Required for Global Governance, 1998]). For the individual confronted with an increasingly alienating society, the "secret" may lie in a different approach to time and the present moment that calls upon functions neglected by neo-cortical emphases (see [Presenting the Future, 2001])

Mandala construction may thus be understood as an example of an exercise in memetic engineering that works with the totality of the practitioner's conscious awareness in order to configure the world so represented so as to constitute the extended body of the participant -- whose awareness is necessarily expanded to encompass the implied complexity. Hence the term "en-minding the body" in the title of this paper. Enactive engagement with the environment, implying a degree of cognitive shapeshifting, is then vital for individual and collective thrival. Hence the subtitle of this paper.

Returning to George Monbiot's augments with respect to the ineffectual response to climate change, he concludes:

> So we slumber through the crisis. Waking up demands that we upset the seat of our consciousness, that we dethrone our deep unreason and usurp it with our rational and predictive minds. Are we capable of this, or are we destined to sleepwalk to extinction? ([With eyes wide shut. Guardian, 12 August 2003])
References


Animal Locomotion Walking and Running Questions [text]


Susan Blackmore. Memes, Minds and Selves. 1996 (Seminar in the series "About Biology") [text]


Linda R Caporael. Sociality: Coordinating bodies, minds, and groups. Psychology 6(1), 1995. [text]


Richard Dawkins. The Extended Phenotype. Oxford University Press, 1982


Diego Frigoli. The Psychosomatic Code of the Living: Analogy and symbols as integrative aspects of the relationship between man, nature and reality [text]

Liane Gabora. MemeStreams: the weaving of a conceptual tapestry. 1999 [extract]


Kas Loghue Graham. How to Make Memes and Influence People: Extract from a thesis for Chelsea College of Art and Design (see section on Memetic Engineering) [ bibliography]


David Hales. An Open Mind is not an Empty Mind: Experiments in the Meta-Noosphere Journal of Artificial Societies and Social Simulation, vol. 1, no. 4, [text]


Anthony Judge:
- Evoking Authenticity: through polyhedral global configuration of local paradoxes. 2003 [text]
- New Paradigms via a Renewed Set of Prefixes: Dependence of international policy-making on an array of operational terms. 2003 [text]
- Navigating Alternative Conceptual Realities: clues to the dynamics of enacting new paradigms through movement. 2002 [text]
- Psychology of sustainability: embodying cyclic environmental processes. 2002 [text]
- Patterning Archetypal Templates of Emergent Order: implications of diamond faceting for enlightening dialogue. 2002 [text]
- The "Dark Riders" of Social Change: a challenge for any Fellowship of the Ring. 2002 [text]
- My Reflecting Mirror World making my World Summit on Sustainable Development (Johannesburg, 2002) worthwhile. 2002 [text]
- Presenting the Future. 2001 [text]
- Enhancing the quality of knowing: through integration of East-West metaphors. 2000 [text]
- Personal globalization. 2001 [text]
- Missiles, Missives, Missions and Memetic Warfare: Navigation of strategic interfaces in multidimensional knowledge space. 2001 [text]
- Being the Universe: a Metaphoric Frontier Co-existent Immanence of Evolutionary Phases. 1999 [text]
- From Statics to Dynamics in Sustainable Community. 1998 [text]
- Four Complementary Languages Required for Global Governance, 1998 [text]
- Poetry making and Policy making: Arranging a marriage between Beauty and the Beast. 1993 [text]
- Future Coping Strategies: Beyond the constraints of proprietary metaphors. 1992 [text]
- Through Metaphor to a Sustainable Ecology of Development Policies. 1989 [text]
- Liberation of Integration through pattern, oscillation, harmony and embodiment, 1980 [text]
- The Territory Conceived as the Map: in search of radical design innovations in the representation of human activities and their relationships. 1979 [text]


Humberto R. Maturana, Francisco J. Varela and Robert Paolucci. The Tree of Knowledge: The Biological Roots of Human Understanding. Shambhala, 1992


John M Perkins with Diane Cooper. Shapeshifting the Environment into a World of Peace [text]

John M Perkins. The Shape of Things To Come: Shapeshifting (Interviewed by Carol Bedrosian) [text]


Robert Sanders. Animal locomotion as high science: Future robots will learn their moves from cockroaches, crabs and centipedes [text]

Laura Sewall and David Abram. Sight and Sensibility: The Ecopsychology of Perception. J. P. Tarcher, 1999


David Skrbina. Participation, Organization, and Mind: toward a participatory worldview. Center for Action Research In Professional Practice (University of Bath), 2001 [text]


Francisco Varela and Jonathan Shear (Eds.). The View from Within. Imprint Academic, 1999 [summary]


Andrew Weitzman. Memetic Engineers [text]

Adam Westoby. The Ecology of Intentions: How to make Memes and Influence People: Culturology. 1994 [text]

Kenneth R. White. Shapeshifting in Celtic Myth. 2002 [text]

Michael Wilson. Memetic Engineering PsyOps and Viruses for the Wetware, 1993 [text]