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Inclusionality and sustainability – attuning with the currency of natural energy flow and how this contrasts with abstract economic rationality

Abstract

This paper explores how the way organisms relate energetically to changing circumstances in their natural neighbourhood differs in some fundamental respects from human behavior induced by economic incentives and controls. It explains how the fundamental principles of much current economic and management practice arise from the partial representation of reality by abstract mathematical and scientific logic and self-definition. This partiality singles human identity out from the wider context of natural identity, resulting in an inversion of priorities from seeking sustainable, co-creative evolutionary relationship to striving for supremacy. By revealing the omission in the foundations of abstract logic, this paper shows how a more natural, 'inclusional' form of reasoning, based on energy flow, could transform and restore our human sense of place as *inhabitants*, not 'exhabitants', of the world. Such a logical and psychological transformation is necessary for developing systems of economic and social governance that encourage rather than impede sustainable human-environmental relationships. The underlying principles of these systems align with those of traditional gift flow and the dynamics of heterogeneous natural ecosystems. Here, energy is relayed continuously and reciprocally between sites of supply and sites of receipt, hence sustaining diverse, complementary functionality and avoiding cancerous monopolization. According to these principles, notions of exclusive ownership and competition or co-operation amongst independent individuals or groups are logically and ecologically unsustainable as well as a source of profound human conflict.

Keywords: abstract logic, energy flow, inclusionality, natural logic, rationality, sustainability.

JEL classification: B59.

Introduction

Energy is the currency of nature. The way that energy flows within and through natural boundaries shapes and mobilizes the cosmos, whether in the form of massy local bodies or mass-less radiation. So the story of modern physics tells us.

But what *is* energy, and how might an understanding of natural energy flow contribute to our knowledge of the evolution and sustainability of organic life – including human life, on Earth? How might this understanding relate to, contrast with and enhance current forms of human governance and economic management? These are the fundamental questions I discuss in this paper.

In classical Newtonian mechanics, 'energy' is understood in terms of the relationship between 'force', 'mass' and 'motion'. Here, 'mass' is a measure of the amount of matter in a body, which is also a measure of its *linear inertia* or extent to which it resists acceleration when subjected to a 'force'. 'Force' is the physical quantity that 'does work' either by changing the motion of a body, by imparting acceleration to it, or by deforming the body. The ability of a force to do 'work' is 'energy', of which there are two kinds. Massy bodies have 'kinetic energy' by virtue of their motion. When work is done against a restraining force,

'potential energy' is stored, ready to be converted into kinetic energy when a body resumes motion.

As I will expand upon later, there are deep problems in the partiality of the logical premises underlying these definitions. The default condition of nature is assumed to be stasis. Space is treated merely as the distance over which mass, force and energy are stretched (or stretch themselves), such that they have variable density or frequency, and has no other influence beyond their limits. In this default condition, matter is inert and space passive. The very possibility of motion is therefore made ultimately dependent on some inscrutable external forceful agency or 'unmoved mover' to get it going. But if such agency can only be contained or applied locally, where *is* it? There is clearly something, or rather *somewhere*, missing from this classical description, which leads energy in the guise of mass and force paradoxically to be mentally confined within and excluded from the boundaries of discrete, completely quantifiable units.

The idea of packaging energy within and outside completely discrete units (i.e. as atomic particles in material bodies and photons in electromagnetic radiation) clearly relates to the notion of a quantifiable currency that can be exchanged between independent individuals or groups in human organizations. Monetary units might thereby be thought of as equivalent to energy units, a measure of effort made in the discovery and gathering of natural products or

in the value added through their transformation into desirable commodities. If so, then some correspondence could be expected between the sustainability of natural ergonomics and human economics.

Despite this superficial similarity, there are two main physical reasons why, in reality, energy and money amount to very different kinds of currency: the variable fluidity of natural system boundaries and the continuity of space as a limitless omnipresence. The latter cannot physically be abstracted from the former and treated as a completely quantifiable commodity that can be cut up uniformly, along with 'time', into discrete sub-units.

There is also a deep psychological reason, associated with the human fear and perception of death and darkness as the end and enemy of life and light. This fear and perception may, above all, lead many of us mentally to try to seal ourselves and others within unnaturally discrete boundary limits that *feel secure*, yet only set the scene for profound opposition and conflict. To soften its edges, there is a need not just to learn *about* nature from our own local perspective as distanced subjective observers, but more *imaginatively* and *reflectively* also about our selves *from* nature's limitless perspective in which we are included as *inhabitants* (Rayner, 2010a). We may then be better prepared to cope with Hamlet's 'slings and arrows of outrageous fortune' than by attempting to 'take arms against a sea of troubles, and by opposing (think we can) end them'.

1. Natural sustainability. How organisms relate dynamically to changing environmental circumstances?

To be entirely self-contained is to be an inert, closed structure with no capacity for take up or loss of energy between inner world and outer world. The nearest any life forms actually get to this condition is when they form survival capsules such as spores, seeds, pupae and cysts that carry them through periods of scarcity. This is what real biological 'survival', as just one aspect of sustainability, entails. In such a dormant condition they are incapable of any active growth or relationship with others. But no sooner is any activity resumed that can support growth, so too is any life form's capacity to lose as well as take up energy through its necessarily permeable bodily boundaries and those of others in its vicinity. Such is the truth of the saying that you can't have your cake and eat it! Energy is used in the process of acquiring it.

It is, therefore, clear that availability of energy is the principal influence that governs the growth, organization and function of living systems. Any activity or pattern of development in which energy

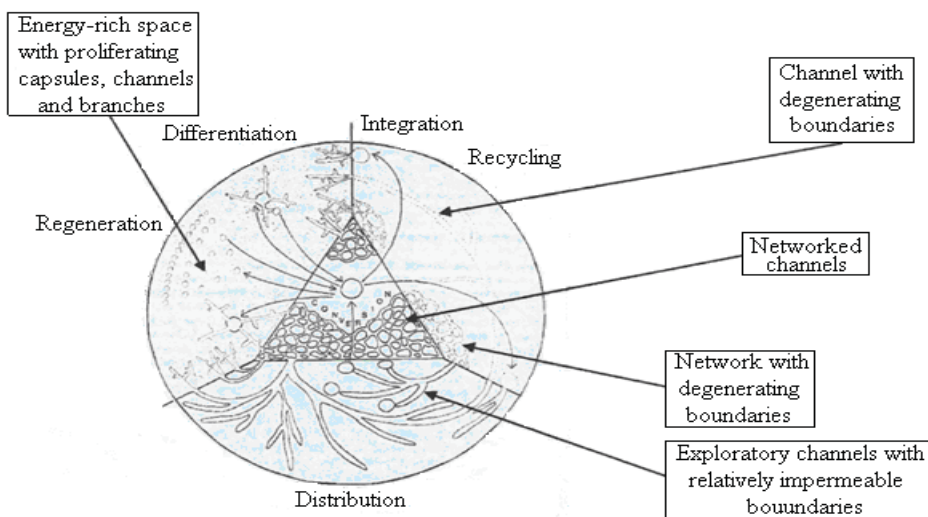
loss through permeable boundaries persistently exceeds energy acquisition will result in unsustainable deficit. For any living system to sustain itself, its primary need is, therefore, to be able to attune its activities and development to correspond with energy availability and hence with the local conditions of its habitat. This availability varies, both in amount and rate of supply due to seasonal and climatic fluctuations, and where and in what form it is located. It also changes due to the growth, death and decomposition of the systems themselves, which respectively deplete and replenish supplies as they come under one another's simultaneous mutual influence.

Real life does not inhabit an even playing field of energy, space and time, nor is it governed by a local sovereign power or bureaucracy that prescriptively tells it what to do or judges what it does. Instead it continually both changes and responds to changes in the contextual circumstances of its natural neighbourhood in an improvisational process of autocatalytic flow, which gives rise to evolutionary and ecological complexity and succession (Rayner, 1997, 2004). This process of 'natural inclusion' has been described as 'the co-creative, fluid dynamic transformation of all through all in receptive spatial context' (Rayner, 2006). Through it, an opening is made dynamically for an extraordinary diversity and complexity of interdependent forms and patterns of life to co-evolve over myriad nested temporal and spatial scales. The breathtaking variety that we can find in a crumb of soil, a patch of chalk grassland, a coral reef and a tropical forest comes into being under the guidance of no more and no less than the responses and contributions of its membership to natural energy flow in a natural 'sustainability of the fitting' (Rayner 2008; 2010b).

Correspondingly, the permeability, deformability and contiguity (connectivity) of the boundaries of real organisms, populations and communities do not remain constant throughout their life span (Rayner, 1997). Rather, they change in dynamic relationship with the availability of energy predominantly assimilated from sunlight into organic compounds via the process of photosynthesis, and rendered into chemical form (adenosine triphosphate) via the oxidative-reductive reactions of respiration as a form of combustion. Moreover, these changes themselves entail alterations in boundary chemistry induced by and involving shifts in availability and production of oxidizing and reducing power (Rayner, 1997; Rayner et al., 1999). Real living systems are fluid internal combustion engines, in need of fuel and needing to attune with variable supplies of fuel in order to sustain themselves.

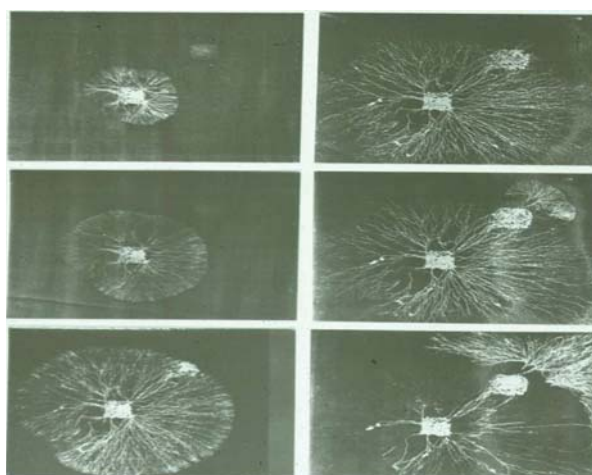
Hence the inescapable truth is that the ecological and evolutionary sustainability of natural life forms, from the cells and tissues in a human body to the trees in a forest depend upon close attunement with the diversity, complementary nature and changeability of all within their neighbourhood, to which they themselves contribute. When energy supplies become scarce, sustainable living systems pool and redistribute internal resources within integrated structures and survival capsules, they do not compete to proliferate faster on the dwindling supplies than

their neighbours. When supplies are abundant they proliferate and differentiate (Rayner, 1997; Figure 1). Moreover, as is beautifully illustrated by the exploratory patterns of some kinds of fungi, this ability to attune their capacity to differentiate and integrate activity in dynamic relationship with energy availability allows life forms to locate and sustain supplies in heterogeneous habitats with extraordinary efficiency. They do this through a combination of all – round exploration and directional focus (Figure 2, 3).



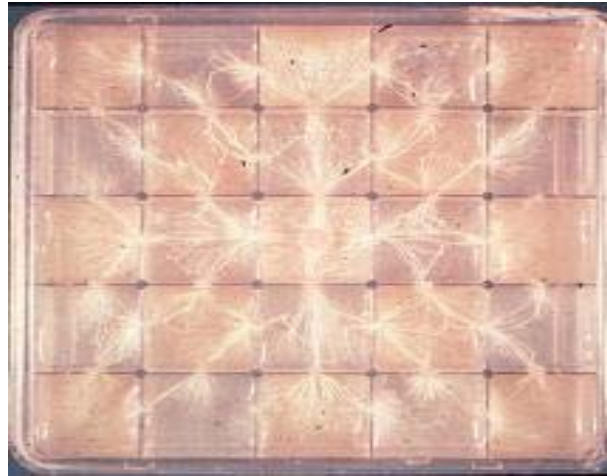
Notes: This interplay enables energy to be assimilated (allowing regeneration and proliferation of boundaries), conserved (by conversion of boundaries into relatively impermeable form), explored for (through internal distribution of energy) and recycled (via redistribution/reconfiguration of boundaries) in spatial capsules, channels, branches and networks of life forms in dynamic attunement with their natural neighbourhood. Thin lines indicate relatively more permeable boundaries, thick lines relatively impermeable boundaries and dotted lines degenerating boundaries (from Rayner, 1997)

Fig.1. The interplay between boundary-proliferating (differentiation) and boundary-condensing (integration) processes in energy-rich (stippled) and energy-restricted circumstances.



Notes: A fungus finds an oasis in a desert, by fluid-dynamically spreading and narrowing its energetic focus. The wood-decaying fungus, *Hypholoma fasciculare*, has been inoculated into a tray full of soil on a block of wood ('starter' food source), with an uncolonized wood block ('bait' food source) placed some distance away from it. Distinct stages are shown in the radial spreading of the fungal colony from the inoculated wood block, followed by the redistribution and focusing of its energy in one direction following upon contact with the bait. Similar fluid dynamic patterns of gathering in, conservation of, exploration for and redistribution of energy supplies are found throughout the living world, from subcellular to ecosystem scales of organization (from Dowson et al., 1986; see, also, Rayner, 1997).

Fig. 2. Fungal foraging



Notes: Sustainable development in abundance and scarcity, illustrated by mycelial growth of the magpie fungus, *Coprinus picaceus*, in a matrix of 25 2x2 cm plastic chambers filled alternately with high and low nutrient media. Holes have been cut in the partitions just above the level of the medium. The fungus has been inoculated into the central high nutrient chamber, whence it has produced alternating prolific and condensed patterns of development. Growth linking between chambers has been reinforced into persistent 'cables', whereas mycelium unable to extend further has been prone to degenerate. Please compare with Figures 1 and 2 (photograph reproduced by courtesy of Louise Owen and Erica Bower).

Fig. 3. Sustainable development

Sustainability, not *supremacy*, is, therefore, the key to evolutionary and ecological continuity. Natural energy flow is variably fluid, circulatory and redistributive from higher concentration (relative 'abundance') to lower concentration (relative 'scarcity'), as illustrated, for example by atmospheric and ocean currents. The primary need for all life forms is not to seek competitive advantage through the unilateral accumulation of energy 'wealth' at the expense of their neighbourhood, but to sustain themselves and their offspring as variable channels for natural energy flow. They are more like members of a relay team (continually receiving, temporarily retaining and eventually passing on what sustains life) than a set of autonomous individuals striving to be first past the post. To succeed in this they have to be open to the energetic influence of their neighbourhood at the same time as sustaining the distinctiveness, but not discreteness, of their inner worlds from their outer worlds through their dynamic boundaries. Any growth that overwhelms what it depends upon isn't sustainable in the long run, no matter how profitable an enterprise it might seem to be in the short term. Any loss of distinctiveness removes the capacity to relate in versatile and complementary ways to changeable circumstances. Real natural community life, as an expression of heterogeneous energy flow, isn't intolerant of variety. It can't sustain a monoculture of too many the same if its inflows and outflows are to remain balanced. By the same token, 'negative' and 'positive' simply represent 'receptive' and 'responsive' influences affecting the *direction* of flow within a circulation between receivers and donors, *not* the subtraction or addition of 'one' from or to 'an other' (cf. Figure 4).



Notes: This painting illustrates the dynamic interplay between differentiation and integration, irregularity ('error') and regularity, and negative draining and positive outpouring of natural energy flow within living system boundaries. The erratic fire in the venation of a lobed ivy leaf is bathed in the integrating embrace of a heart-shaped leaf which converts negative blue and mauve into positive scarlet and crimson. The midrib of the heart-shaped leaf emerges as bindweed which communicates between extremes of coldness and dryness.

Fig. 4. Loving error (oil painting on board by Alan Rayner, 1998).

Any ecological or evolutionary model that treats an individual or group as a discrete, autonomous object or subject with the set objective of promulgating and preserving itself at all costs as sole survivor of a war of attrition is therefore partial and unsustainable in a changeable world of natural energy flow. Yet just such partial treatment underpins the Darwinian concept of 'natural selection' as 'the survival of the fittest' or 'preservation of favoured races in the struggle for life' (Darwin, 1859). It also underpins the notion of

economic incentive that drives human social governance to abstraction, an over-definitive representation of reality, at the expense of our evolutionary and environmental sustainability.

2. Financial force – the ‘selection pressure’ of economic incentive

There is clear anthropological evidence that prior to barter and financial transaction, human social organization was and in some indigenous communities still is primarily orchestrated according to principles of ‘gift flow’. These correspond closely with the circulatory and redistributive supply, receipt and temporary retention of natural energy flow (e.g., Hyde, 2006; Taylor, 2005). Even in modern cultures, intangible qualities of love and artistic creativity are a shared source of profound human pleasure and caring that defy, and are defiled by, any attempt to commoditize or quantify them.

At the heart of traditional gift flow is *trust* in the principle that what is freely given is equally freely returned in the long-run, such that whoever gives away most also receives most, and *vice versa*. This harmonizing principle is broken as soon as anyone accepts without giving or *vice versa*. Such restrictive practices give rise to a breakdown of trust that gives rise to further restrictive practices, setting the scene for a vicious cycle of competition, conflict and increasingly rigorous legislation to define trading practice and monetary transactions. By the same token, such restrictive economic rationality is associated with the localization (privatization/nationalization) of self and/or group identity and individual or public ‘rights’ of property *ownership*. Sometimes systems of gift flow may operate within family/social groupings alongside rigidly structured trading or economic practice between groups. This implies a hard boundary limit between the two and a resulting ‘double standard’ of the kind identified by Hyde (2006) as ‘the double law of Moses’, which permits repayment of a loan to be demanded from an other, but not from a ‘brother’. This duality corresponds with the neo-Darwinian notions of ‘reciprocal altruism’, ‘kin-selection’ and ‘inclusive fitness’ but leaves moot the question of where and whether kinship begins and ends and how it arises, both genetically and contextually (Rayner, 1997).

I will discuss the rationalistic logical and psychological origins of this breakdown of trust associated with the notion of ownership and self-autonomy in the next Section. Here, I want to reflect on how it can lead to profound social disparity and discontent, notwithstanding its origin in what may sometimes

appear to be or is actually represented as a benevolent desire for social ‘justice’.

No sooner is an absolute two-way or one-way discontinuity set up between individual or group-interest and other-interest, than the harmonizing flow that balances giving and receiving within a community is liable to be blocked or subverted. This leads to fragmentation and corruption into hierarchical power relationships in which the few may live at the expense of the many or *vice versa*. These problems are exacerbated by *prescriptive* consumption and enclosure in *anticipation of scarcity or abundance* instead of in direct attunement with actual availability. The resultant dislocation of ‘credit’ and ‘stakeholding’ from the waxing and waning of natural energy flow gives rise to what have been called the ‘tragedy of the commons’ and its counterpart, the ‘tragedy of the anti-commons’. It goes some way towards explaining the perverse tendency for human population growth to increase when there is least available to sustain it and *vice versa* (cf, Martin, 2006).

The tragedy of the commons (Hardin, 1968) arises when individuals or their stock collectively over-consume a shared but localized resource in order each to procure a larger share than their neighbours. The ‘tragedy of the anti-commons’ (Heller, 1998) arises when prescriptive enclosure of common ground leads to inequitable distribution to a privileged few associated with under-consumption of available resources and a growing gap between rich and poor. Both of these tragedies arise from the adversarial notion of opposition of one against other and wasteful eliminative competition in favour of the most profligate that is embedded in simplistic Darwinism and economic rationality. As McTaggart (1992) describes:

“Economic rationalism is not merely a term which suggests the primacy of economic values. It expresses commitment to those values in order to serve particular sets of interests ahead of others. Furthermore, it disguises that commitment in a discourse of ‘economic necessity’ defined by its economic models. We have moved beyond the reductionism which leads all values to be discussed as if they were economic ones (devaluation) to a situation where moral questions are denied completely (demoralization) in a cult of economic inevitability”.

Neither of these tragedies can arise from naturally sustainable, non-human patterns of growth and territoriality that are closely attuned with energy availability (Rayner, 2006). Both are aggravated by systems of financial reward, borrowing and interest that are or become uncoupled from real effort, diversity and natural availability of resources, where ‘market

forces' are radically different from 'natural influence', and actively encourage cheating, sequestration and monopolization. How could such systems have come into being, and what kind of thinking perpetuates them?

3. Adverse abstraction: dislocation from natural neighbourhood

Notions of adversarial 'competition' and coercive 'co-operation', which respectively underlie individualistic 'capitalism' and collectivistic 'socialism', are predicated upon an abstract logical assumption. This is that individual or group entities can be defined independently from their spatial context and correspondingly that their 'future' can be fully defined by present or 'initial conditions'. It gives rise to the familiar idea that undesirable present 'means' can justify desirable future 'ends'. But can it actually be intellectually justified? Is it consistent with evidence and does it make consistent sense? In a word, no, it is not and does not, because energy/matter cannot physically be isolated from space (Tesson, 2006; Shakunle, Rayner, 2009). If natural form was purely material, it could consist of no more than a dimensionless point with no shape or size. If natural form was purely spatial, it would be featureless. If nature consisted purely of solid, massy particles and space wasn't a natural presence, nothing could move. If space was just an infinite emptiness surrounding discrete objects, there would be no place to situate an external agency to move these objects around. If space wasn't within and throughout as well as around natural form, it wouldn't be possible for form to be distinguishable or to flow as liquid or gas or to have variable qualities of density, bounciness, flexibility and conductivity (Whitehead, Rayner, 2010).

Human beings may be cognitively and psychologically predisposed to make this assumption through a combination of our inter-related capacities for categorization, sociality, abstract thought, tool and language use and awareness of mortality (Rayner and Jarvilehto, 2008; Rayner, 2010b). On the other hand, the imagination that comes alongside these capacities offers the creative potential to escape the restrictions imposed by abstract objectivity through what is actually the more comprehensive worldview of natural inclusionality (see below, Rayner 2010a). As terrestrial, omnivorous, bipedal primates unable to digest cellulose but equipped with binocular vision and opposable thumbs that enable us to catch and grasp, we are predisposed to view the geometry of our natural neighbourhood in an overly definitive way (Fig. 5). We see the world in terms of what it can do for us and to us as alienated observers or *abstracted* 'exhabitants', not how we

are inextricably involved in it as *natural inhabitants*. We see 'boundaries' as the limits of definable 'objects' and 'space' as 'nothing' – a gap or absence outside and between these objects (Rayner, 2004).



Notes: This painting, made when the artist was depressed after a year of postgraduate scientific research, depicts the limitations of the detached view of the observer excommunicated from nature. After a long pilgrimage, access to life is barred from the objective stare by the rigidity of artificial boundaries. A sun composed of semicircle and triangles is caught between straight lines and weeps sundrops into a canalized watercourse. Moonlight, transformed into penetrating shafts of fear encroaches across the night sky above a plain of desolation. Life is withdrawn behind closed doors.

Fig. 5. Arid confrontation (oil painting on board by Alan Rayner, 1973)

This perception of completely definable objects separated by intervals of space as 'gaps of nothingness' sets the scene for the hard line logic of abstract rationality to become established in the foundations of our mathematical, scientific, theological, linguistic, governmental and economic endeavours. It also profoundly affects our perceptions of 'self' and 'self-interest'. The Aristotelian axiom that 'one thing is not another thing, and, specifically, that 'one self cannot be another self' leads to what C.S. Lewis (1942) called 'the philosophy of Hell', in which 'to be means to be in competition'.

Every Figure is rendered *completely* discontinuous from the contextual space that it manifests from and within. The number, 1, becomes a lone Figure – *all one* – an independent singleness, a complete 'whole unit' or 'oneness' without neighbourhood. 'I', as an individual self-identity, is set narcissistically apart from its environment, which it must command or obey if it is not to succumb in the struggle for its own existence. The 'environment', what Einstein declared to be 'everything that isn't me', becomes viewed one-sidedly as a source of threat and promise, not the very ground from which the self manifests and into which the self returns. Nothing ap-

appears more of a threat in this abstract environment than ‘nothingness’ – the receptive transparency and darkness of the void that seems ever-ready, in the guise of ‘death’, to dissolve the illusion of independent existence upon which the self stands on its own two feet. Everything possible is done to defer this ultimate fate, by walling the self away from its origins and destiny. Maintaining order *against* the forces of uncertainty (Hamlet’s ‘sea of troubles’) becomes the order of the day. Yet with the desire for complete order, paradoxically, comes the attitude of human mind that in reality most threatens the possibility of sustainable relationship with the natural world we inhabit.

It is easy to see that this partial perception of nature and human nature in unnatural opposition could lead to profound human conflict and jealous possessiveness. With the continuous presence of space throughout and beyond all form erased from consideration, ‘subjective self’ and ‘objective other’ are brought into fear-full confrontation. Priorities are inverted from seeking sustainable relationship with others in a natural ‘Garden of Eden’ or ‘communion of diversity’, to seeking cancerous dominion over other as the only certain route to ‘self-preservation’ (cf. Taylor, 2005). Sustaining ‘Ego’ becomes the focus of attention at the expense of the natural neighbourhood upon which individual self-identity actually depends to sustain itself. Trust of others breaks down into xenophobia, and trade, power struggle and monetary transaction replace natural redistribution of resources from sites of abundance to sites of scarcity. A ‘Poverty trap’ is set. Natural territoriality and aggression are subverted into war and genocide. Angry declarations of independent human ‘rights of self’ take unnatural precedence over recognizing interdependent ‘human needs’ for love, respect and care. Colossal amounts of energy are wasted in busying ourselves in unnecessary competition and avoiding the boredom that comes of deprivation and excess. What a sorry state to trap ourselves in?

A question therefore arises. Is this trap humanly inescapable, or is there a way we can educate ourselves out from it, through a more natural and comprehensive perception of our place in Nature?

4. Natural inclusionality – an evolutionary logic for the development of a new environmental economic principle and emerging practice

All that may ultimately be needed to unlock ourselves from this unnatural confinement imposed by abstract rationality is the simple understanding that space cannot be cut, confined or excluded and so is a continuous presence throughout and beyond the energetic boundary interfacing of natural Figures as

flow-forms. By the same token, boundaries are energetic interfacing between inner and outer realms, not fixed limits. This *simple move from regarding space and boundaries as sources of discontinuity and discrete definition to sources of continuity and dynamic distinction* provides the basis of what, in ecological and evolutionary terms has been called ‘natural inclusionality’. The underlying logic of natural inclusionality can be described as ‘the understanding of all form as flow-form, an energetic configuration of space in Figure and Figure in space’, such that space, as a receptive (non-resistive) presence, is not assumed to be discontinuous (i.e., to stop at discrete boundary limits) (e.g. Rayner, 2010a; Shakunle, Rayner, 2009). Correspondingly, we can recognize the impossibility of defining or measuring anything in absolute numerical terms anywhere, because all form has both a ‘*figural*’, energetic inner-outer interfacing or dynamic boundary, which makes it distinct, and a ‘*transfigural*’ (a term first conceived by Lere Shakunle in 1985) – ‘through the Figure’ – spatial reach that cannot be sliced or limited. The transfigural space throughout and beyond the Figure pools it within the co-creative, influential neighbourhood of all others: ‘self’ as an ‘including middle’ finds identity in its non-local neighbourhood as neighbourhood finds identity through its local ‘self’. Without transfigural space, Figures are rendered into lifeless bodies, integral or fractional numbers and idealized geometric points, lines and solids. With transfigural space included, we can escape the confinement and inconsistencies of the ‘excluded middle’, discrete boundary logic of ‘one opposed to other’ that has held human imagination to ransom for millennia. This enables us to move on to a more natural and comprehensive form of reasoning in the *fluid boundary logic* or *fluid transfigural logic* of each in the other’s mutual influence. The real meanings of ‘zero’ and ‘infinity’ as *qualities of space* and sources of creativity, not abstract quantities of material, are brought into our natural accounting systems, not excluded by abstract definition.

Here some fundamental differences between rationalistic and natural inclusional perceptions of connectivity and continuity emerge:

1. In rationalistic thought, continuity is equated with ‘connectedness’ because space is regarded as void, a source of discontinuity or disruptive gap between and around ‘things’ as discrete objects. Hence the only way of deriving continuity in this ‘whole way of thinking’, is either by totally excluding space and boundaries from form as a continuous line or network of widthless threads, or

by totally conflating space with form in a seamless (boundary-less) whole. Such exclusion or conflation is neither consistent with evidence/experience nor does it make consistent sense.

2. In natural inclusional and transfigural thought, space is a continuous omnipresence that cannot be cut, confined or excluded, and form is *dynamically continuous* through its energetic inclusion of space in Figure and Figure in space. Distinction and difference are hence accommodated in a natural fluid continuum, without contradiction. Local identity is recognised as a dynamic inclusion of non-local space in which all forms are pooled together (but not absolutely merged) in natural communion as flow-forms.
3. Correspondingly, the treatment of continuity by abstract rationality as the same as connectedness – as exemplified in conventional calculus, where continuity is approximated by connecting infinitesimal discontinuous units – is an idealized construct that is physically impossible. The very idea of complete ‘whole units’ existing anywhere, at any scale in Nature as an energetically open, fluid system does not make sense. The *fluidly variable connectivity* of natural inclusionality arises from the coming together (contiguity/inter-connectivity), fusion (confluence/intra-connectivity) and dissociation (individuation/differentiation) of energetic paths, corridors or channels of included space in labyrinthine branching systems and networks (as in Figures 1-4), not the ‘ties that bind all into a web of one’ (Rayner, 2004; Tesson, 2006; cf. Barabasi, 2002).

How might natural inclusional logic contribute to the development of economic systems that encourage rather than impede sustainable, co-creative human-environmental relationships? In the long run, the hope might be at the very least radically to overhaul our current financial systems, to align with natural principles of energy availability and flow. In the shorter run, and perhaps as a prerequisite, a change in mental attitude concerning the true nature of life, love, pleasure and suffering needs to be brought about, along with a shift in values towards love, respect, care, generosity and honesty and away from avarice and xenophobia (Rayner, 2010c).

A change in mental attitude could be possible through educationally enhancing awareness of the psychological, social and environmental damage arising from abstract rationality, at the same time as providing the vision of a healthier, more creatively improvisational and sustainable way of reasoning about life and evolution (Rayner, 2010b).

The difficulties of bringing about such change are, however, as great as they are in overcoming any serious human addiction, and considerable sensitivity and receptivity is needed from all concerned (Pryor, 2003; Pryor and Rayner, 2005a, b). Indeed the roots of many human addictions may themselves be traced to attempts to remove the pain associated with living amidst the contradictions of a rationalistic culture that misguidedly divorces reason from emotion.

Here, a cognitive or ‘mental imaging’ difficulty that many people have with deeply understanding natural inclusionality may arise through confusing ‘presence’ with ‘tangibility’. If ‘space’ is to be recognized as a ‘presence’, this makes people to try to make it ‘substantial’ in some way, for example as ‘aether’, ‘space-time fabric’, ‘dark matter’, ‘dark energy’, ‘subtle energy’, ‘dark flow’ etc. No sooner do they do this, than it becomes definable and/or divisible in some way as a singular ‘whole’ (independent singleness). Since this doesn’t make sense, because you can’t cut or resist what has no tangible resistance, the mind may then revert to regarding ‘space’ as ‘absence’ or ‘nothingness’, which can’t ‘interact’ with ‘tangible form’ and so is regarded as a source of discontinuity and distance between one form and another.

This is the foundation of ‘mind-matter’ and ‘one-many’ dualism/dichotomy (Rayner, Jarvilehto, 2008), from which there is no escape *unless* the key insight of natural inclusionality and transfigurality is appreciated that ‘space’ is neither ‘nothingness’ nor ‘somethingness’, but ‘no-thingness’ (intangible), non-resistive, continuous (and thereby transfigural) presence, which figural (energetic) presence can dynamically conFigure/relate through but not inter-act with (Shakunle, Rayner, 2008). No energetic boundary can resist the transfigural omnipresence of space. It is itself a dynamic configuration of space, it can only offer variable degrees of resistance (impermeability) to figural presence.

Correspondingly, a ‘living I’ cannot be a hermetically sealed, autonomous unit isolated from its neighbourhood, because the space within its distinctive but not absolutely definitive bodily boundaries is continuous with the space beyond these boundaries. It finds identity not in its inner self, alone, but in its variably receptive, reflective and responsive energetic relationship with its limitless and changeable surroundings. It lives as an energetic inclusion of space in Figure and Figure in space, a natural dynamic inclusion of its context. It is a ‘natural inclusional I’, not an ‘abstract I’.

Meanwhile, a culture that habitually and inconsistently teaches us we are born selfish at the same time as demanding that we love our neighbour as our self is enough to send anyone scuttling to the psychotherapist (cf. Dawkins, 1989). Do we seek to liberate ourselves from this inconsistency in safe, easy steps, for example by trying to quantify the monetary value of the natural world, so that we at least take it into account when making future plans, or do we risk just recognising it as nonsense and drop the habit altogether? The danger of taking easy steps out of addiction is that one can still get stuck on them, as, for example when exchanging heroin for methadone, or reductionism for holism. Ultimately, abstention from habit may prove the best recourse, painful though the withdrawal may be from what seems essential but really is not.

By acknowledging ourselves as local inclusions of natural energy flow, it is always possible gracefully to accept what we receive, to nurture and make the best of it, eventually to pass it on. Such is the way of cultures that operate the co-creative relay of a gift economy (Hyde, 2006). But trouble starts as soon as it seems possible to define and own what's morally or functionally best and remove or exclude what doesn't pass muster. To make such judgements it would be necessary to step *completely* outside the flow of what we are inescapably immersed in order to take a 'God's eye view' or, in Darwinian terms, the view of a 'natural selector'. This isn't possible, but when we nonetheless attempt to do it, as observers distanced from what we observe, we need to realize that what may appear superficially to be good for the persistence of the individual or group may not be good for the sustainable flourishing (well-being and well-becoming) of all.

Only when we include each in the dynamic balance of the other may it truly be possible to comprehend what's good for the sustainability of both, even though this may appear, from one side or other, to be good for the survival of neither. In this place of balance, all is dynamically included in one, and one is dynamically included in all, each giving to and receiving from other in continual circulation, until and unless one seeks to gain permanent monopoly at the other's cost. Such is the nature of the game of 'Monopoly' that when the winner wins, the game stops and everyone loses interest. The assumption, still widespread throughout modern political cultures and enshrined in game theory (e.g., Dutta, 1999) and neo-Darwinism, that 'diversity and creativity equals competition', is fallacious: competition, in the sense of mutually or unilaterally exclusive opposition, *destroys* diversity and creativity (Rayner, 1997). Such has been the unsustainable, 'Rise and Fall' story of human economic and social

imperialism, which seeks to capitalize by diverting and rigidly walling in the flow from abundance to scarcity. It is not the sustainable story of natural energy flow within and across fluid living system boundaries, whereby 'self' naturally includes 'other'. That is the story that we may need to admit the truth of, at this time of social, psychological and environmental crisis. We need to ask not 'what can we do about Nature outside us', but 'what can nature do about us in her midst?' Then an imaginative turn from the habit of abstract rationality may come within reach.

5. Immediate prospects

Meanwhile, it still has to be admitted that it is not easy to change mental attitudes and turn whole systems of deeply entrenched rationalistic logic inside-out in the short run! So, the question arises as to whether and how any immediate changes could be made in current economic and management practice to encourage truly sustainable ways of life and catalyse the necessary mind-shift? In this respect, the desire of the current coalition government in the United Kingdom to cut *financial* expenditure at the same time as promoting 'The Big Society' draws attention both to the real prospects of 'change for good' – and to the difficulties of fulfilling these prospects without radical social and political re-thinking.

Below are listed some of the radical possibilities available for the development of a truly *liberal* (fluidly receptive and responsive to both individual and collective needs in a complex, continually changing world), *democratic* (involving governance for all through all) and *accountable* (intellectually and emotionally well-reasoned) programme. Many of these are not far removed from what environmental and social activists have been calling for over recent decades. Here, though, they are grounded – through natural inclusional logic – in the 'real world' terms of 'what is truly natural', not in the currency of human abstraction from nature that inexorably drives us into discontent, conflict and deficit, forever seeking complete and unattainable 'satisfaction'. They address, both explicitly and implicitly, not only the symptoms of an unsustainable way of life, but also its foundations.

1. Focus expenditure on encouraging projects with intangible outcomes that nonetheless can be expected to enhance the sense of belonging, well-being, well-becoming and environmental awareness in local communities. Here it is to be recognised that an enormous, if not infinite 'proportion' of what sustains human flourishing cannot be bought or quantified, and that those who help to bring it – e.g.,

community workers, teachers, nurses, visual and performing artists, guiders – are, unless they somehow achieve ‘celebrity’ – neither well paid nor costly to equip. Such ‘soft targets’ should be the last to withdraw financial support from, not the first.

2. Redirect expenditure *away* from projects designed to increase individual, nationalistic, technological, commercial or organizational *prestige* at the expense of sustainability. Here it is to be recognised that elitism of all kinds is a form of social parasitism that drains the resources of the many into the gratification of the few. No individual or group or artefact excels in its own right, but is always utterly dependent on support from its neighbourhood. Moreover, excessive *financial* reward for ‘success’ is liable to deflect motivation away from seeking the common good and towards avarice and xenophobia. Modern ‘celebrity culture’ and the recent banking crisis are symptoms of this deflection.

3. Use all available means to minimize conflict by enhancing human understanding, and redirect expenditure from the development of weaponry. Here it is to be recognised that expenditure on the manufacture and deployment of weaponry, from small arms to nuclear warheads, is grotesque by comparison with expenditure on projects aimed at enhancing environmental sustainability and human quality of life. So too is the human, environmental and financial cost of conflict itself. Through natural inclusion, it becomes clear that human conflict is the product of an alienating and abstract way of thinking about nature and human nature that does not stand to reason. This understanding needs to be enhanced, both at grass roots and amongst elite representatives at the ‘United Nations’.

4. Promote synergistic relationships in diverse communities of all kinds. Here it is to be recognised that diversity is vital to evolutionary co-creativity: complementary relationship, not opposition.

5. Promote truly democratic governance in which *all* views are adequately represented and taken into account. Here it is to be recognised that dictatorship and majority rule (whether democratically elected or not) engender deprivation and resentment amongst those subjugated, not a desire or ability to contribute to collective understanding and synergy. Indigenous ‘sharing circles’, and ‘King Arthur’s Round Table’ are perhaps the best illustrations of what truly democratic governance implies – which is very different from adversarial party politics.

6. Disassemble hegemonic power structures and monopolies. Here it is to be recognised that all forms of expression of sovereign power are fundamentally undemocratic. Moreover, it is to be recalled that competition and conflict to gain power or financial reward *destroy* diversity rather than sustain or generate it.

7. De-formalize and diversify educational practice. Here it is to be recognised that much current formal education and assessment serve the interests of *conformity* with the *status quo*, rather than the leading out into wider awareness that is vital to human empathy, creativity and pleasure.

8. Transform central governmental control into distributed governmental influence. Here it is to be recognised that centres of executive control are oppressive and inefficient by comparison with receptive centres of spatial influence through which fluidly bounded social formations sustain coherent correspondence – as exemplified by indigenous and intentional sharing circles and dialogue circles.

9. Discourage consumerism and cynical advertising. Here it is to be recognized that enormous human effort is currently spent on generating unnecessary artefacts and persuading consumers to purchase them in order to keep the wheels of the economy grinding. Modern business is much more busy and wasteful than it needs to be, depriving people of room in their lives to relax, rest and enjoy life. Renewal in response to natural cycles of generation and degeneration is more sustainable and satisfying.

10. Encourage contentment with and protection of natural variability. Here it is to be recognized that natural variety, both amongst human beings and in natural ecosystems, is not only the ‘spice of life’ but also essential to environmental and evolutionary sustainability. All forms of social governance and environmental management and education need to hold this continually in view.

Conclusions

- ◆ Current economic management practice is founded on unrealistic and unsustainable pre-suppositions.
- ◆ Natural inclusion, as the co-creative, fluid dynamic transformation of all through all in receptive spatial context provides a more realistic understanding of ecological and evolutionary processes than individual or group selection.
- ◆ Natural inclusional logic does not split or deem it necessary to posit the independent existence of a material world free from the influence of a non-material world. Neither does it posit the existence of a non-material world separate from matter. Natural inclusional logic is grounded in the co-creative fluid communion of non-material space and figural form. Recognising and acting upon this perception of reality changes the focus of every aspect of environmental and economic management.
- ◆ Natural inclusional logic therefore does not separate individual economic interest from so-

cial or environmental interest. These must be viewed as mutually inclusive.

- ◆ Radical philosophical, psychological, social and political transformation is needed for humanity to develop sustainable ways of life.
- ◆ This transformation can be made possible by ensuring that the catalytic influence of receptive spatial context is brought imaginatively into

view during all considerations of environmental, social and economic issues and practice.

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