

CREATIVE EVOLUTION A THEORY OF CULTURAL SUSTAINABILITY¹

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Abstract

This article argues, from a biosemiotic perspective, that culture is natural and evolutionary, and that ideas (expressed in practices, including aesthetic ones) are cultural organisms much like natural organisms. It argues that the insights developed by biosemioticians are, symptomatically, part of a new evolutionary cultural development which, in turn, allows us to see that all cultural forms derive from new recombinations of older, or antecedent, forms. The past sets *formal* limits upon the future (what is meant by a *telos*). The purpose of this article is to draw attention to the teleological forms of semiosis via which nature (biosemiosis), then culture (human semiosis), has evolved. It does this in order to argue for a renewed understanding of natural and cultural life as processual and dialogical, and, thus, for a renewed understanding of the importance of the *located* (although now increasingly 'global') relationship between past, present, and future. In particular, the article is critical of the still prevalent (political and scientific) view of modernity which Stephen Toulmin identifies as 'the myth of the clean slate'. A final part of the argument thus alludes, incompletely, to the difficulties and dangers presented by the 'modernity idea' of the revolutionary *coup* (cut) which seeks to draw a line between where we have been and where we can go.

Keywords C.S. Peirce, biosemiotics, cultural evolution, cultural and aesthetic sustainability



The United Nation's World Commission on Environment and Development—the Brundtland Commission 1987—defined sustainable development as follows: 'Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs' (United Nations 1987). It notes, in other words, that natural resources are finite, and that just as we depend on the past for our life in the present, so the flourishing of future generations depends on what we do now. The future grows out of the past. This is a story of the sustainability of life and the observation of the complex interrelationship of earth and life. In effect it is also the story of evolution. However, is evolution precisely what the neo-Darwinians have claimed it

is: purposeless, random, mechanical? Or, rather, might it be made of creative, and perhaps sometimes mysterious, purposes? And are nature and culture really entirely different things—each random and purposeless in their own ways? I think they are not. The sustainability of nature and the sustainability of culture are intimately related. The second flows from the first and, in turn, flows back upon it. So what, in this great cycle of information between society and environment, might it mean to ask about the evolutionary movements of culture and art and sustainability?

This is a material question, but it's not simply about material resources as such. We all know about that. I think it must be a question about two things. The first is about the value of art in a culture, as an important part of a culture's life. So the first part of the question is about why art—as made objects and as practice—might be particularly valuable. The second concerns the question of sustainability, and what it might mean to say that culture, and its way of self-knowing in art, is something it's important to keep going, not simply as a series of unrelated acts or instances but as a continuity and purpose. And, of course, a living continuity does imply a history and an evolution.

Both these questions—this way of thinking about art as being somehow particularly important, and this way of thinking about culture in terms of the sustaining of traditions which might be part of a larger cultural evolution—have been very unfashionable in the past 30 or so years. Under the name of something called postmodernism, or of a condition called postmodernity, the idea of the artist as someone possibly doing something special has been derided as romantic, and the lyric 'I' as merely the romanticised voice of the bourgeois individual. In a not dissimilar key, the idea of the preservation of traditions has too often been seen as nostalgic and anti-progressive. The romantic, for all their initial enthusiasm for the modern revolutionary gesture, is eventually seen as a sort of conservative failure of the revolutionary spirit—one who comes to see the analytic radicalism of modernity as hostile to an organicist view. In this view, the preserver of traditions is the more frank conservative; but both are, in the end, anti-progressives.

There are too many confusions and simplifications going on here for this account really to hold. It is riven with the sorts of attempted splittings of the world into two easily identified categories—good here, bad there—which are the mark of the melancholic response to loss, and especially the loss of a meaningful way of living. Indeed, postmodernism, itself, is similarly riven. It is characterised by 'double-coding': at once, both modern techne and nostalgic reference, self-conscious pastiche of signs and meanings and knowing parody winking at the impossibility of stable signs and meanings. It is language all knotted up in itself, attempting to deconstruct (in the Derridean sense of expose) its own impossibility. It is a techne, a tool, which has lost its hold on the world—as if in

reflection of the ways in which modern techne, too, seems to threaten us with world losing.

These confusions which the idea of the postmodern seems to embody are confusions—perhaps *late* modern rather than truly *post*modern—which suggest that the categories of the modern world, the world of modernity, no longer serve us: ‘radical’, ‘conservative’, ‘progressive’, ‘reactionary’, ‘forward-looking’, ‘nostalgic’, ‘left’, ‘right’, all seem increasingly inadequate ways of carving up experience. ‘Radical’, in the sense in which John Stuart Mill used it to describe Jeremy Bentham, for example, derives from the Latin for ‘root’. It means ‘to go down to the root’, with the implication of the ‘rooting out’ or ‘uprooting’ of unconsidered traditions of law and thought. ‘Conservative’, as Mill applied it to Coleridge, means ‘conserving’ in the sense of being aware of the possible importance of ideas and practices which have been preserved in a tradition over time. Coleridge, Mill noted, thought we ought to pay attention to the good sense which might be embodied in traditions handed on. If they survived—and this is a proto-evolutionary argument of course—there might be good reasons for their survival. And, of course, the various violences of the nineteenth and twentieth centuries—continuing unhappily into the twenty-first—have made us more reflective equally about the Enlightenment promise of freedom, and the Enlightenment threat of its opposite.

Culture is Natural

If you take the view—as I do, and will go on to argue from a biosemiotic perspective—that culture is natural and evolutionary, and that ideas (expressed in practices) are cultural organisms much like natural organisms, you might expect that these late modern cultural confusions will exert evolutionary pressures manifested in the production of new organism-ideas. Biosemiotics, I want to suggest, is precisely one such new evolutionary development. It derives—as all new organic and evolutionary forms do—from new recombinations of older, or antecedent, forms. What evolution teaches us is that nothing comes from nothing. So if we take ecology, which is to say evolutionary theory, seriously, then we must take cultural ecology and evolution seriously too. The second grows from the first. Maybe it’s time, without losing the critical attitude of modernity evoked by Bentham, to learn to value also the conserving inclinations of Coleridge. I will discuss how we might do this by dwelling on the insights, for nature and for culture, offered by biosemiotics.

My argument will develop through six stages: first, a brief discussion of the evolution of biosemiotics;² second, a consideration of ‘mind’ drawing on its debt to cybernetic theory and recursion; third, a discussion of Charles Sanders Peirce’s semiotics of abduction, and ‘the play of musement’, as an early formulation of semio-cybernetic recursion; fourth,

a return to 'mind' as biosemiotic and ecophenomenological; fifth, and developing from the account of cognition as ineluctably embodied and enworlded, some thoughts concerning the importance of cultural sustainability in terms of the cultural archive which is the semiotic material upon which all creativity (aesthetic, ethical, scientific, technological) depends. Sixth, and lastly, I shall offer some even briefer thoughts on the Protestant Reformation, and the spirit of revolutionary modernity, as finally corruptive of the very purposeful freedoms they sought to inaugurate. In sum I shall argue that an evolutionary and (bio)semiotically informed view of nature, culture and art might help us begin to rethink and historically recontextualise the nature and story of liberal modernity (and modernisms generally) along less rootless and less individualistic lines. One of Bentham's greatest admirers, J.S. Mill, nonetheless wrote that 'Bentham failed in deriving light from other minds' (Mill 1987, p. 146):

He had a phrase, expressive of the view he took of all moral speculations to which his method had not been applied, or (which he considered as the same thing) not founded on a recognition of utility as the moral standard; this phrase was 'vague generalities'. Whatever presented itself to him in such a shape, he dismissed as unworthy of notice, or dwelt upon only to denounce as absurd. He did not heed, or rather the nature of his mind prevented it from occurring to him, that these generalities contained the whole unanalysed experience of the human race (pp. 146–7).

It is precisely the evolutionary form of this 'whole unanalysed experience of the human race' which a (bio)semiotic conception of cultural making—of the relationship between past, creativity, and future—might help us begin to parse.

The Evolution of Biosemiotics

Biosemiotics develops from the bringing together—largely through the work of Thomas A. Sebeok—of a number of nineteenth- and twentieth-century sources. Its central insight is that the modern world consists of biotic, metabiotic and abiotic cybernetic systems which are all evolutionary, and thus natural. Although perhaps more familiar in its abiotic form in relation to humanmade machine systems characterised by complexity and information in the form of negative and positive feedback, the term cybernetics was defined by Norbert Wiener, in his 1948 book, as the study of control and communication in the animal and the machine (Wiener 1948).

Biosemiotics, itself, draws strongly upon the work of the American scientist and philosopher of logic Charles Sanders Peirce, who noted, famously, that 'this universe is perfused with signs' (Peirce 1998a, p. 394) and on the work of Jakob von Uexküll who used the protocybernetic

idea of feedback systems in the development of his idea of the semiotic nature of the *Umwelten* of organisms.³ From Uexküll we take the idea of the *Funktionskreis* (functional cycle) in which species and environment co-construct (within the limits of physics, chemistry and evolutionary biological patterns or form) worlds from signs. This can be imagined in terms of looping flows of semiosis which pass from the semiotic *Umwelten* of creatures (organisms and species: and limited by the evolved perceptive and interpretive capacities of species) through the perceptual life of their bodies (*Innenwelten*) where they are (mostly unconsciously) registered and responded to.

Complex multicellular creatures are composed of systems, or swarms of swarms, of cells which have learned to live together. The great systems of animal bodies—immune, endocrine, and nervous—are communicative semiotic systems (*Innenwelten*) in constant biocybernetic dialogue with their *Umwelten*. Indeed, we can say that all these biocybernetic feedback systems, as experienced in the percepts and responses of the organism, constitute ‘mind’. We humans have become (self) conscious of our semiotic processes (this is what human culture *is*), and have learned to direct them in self-conscious ways, but ‘mind’ clearly belongs, in however primitive a form, to *all* living things. The specificity of human mind lies in the human evolution of a capacity for abstracted symbolisation whereby one thing can ‘stand for’ something else in the absence of the thing itself. From a very primitive (and necessary to any evolution at all) discernment of self (or identity) from difference (other), humans have evolved a capacity for metaphoric *abstraction*. But what we call metaphor (the recognition of similarity, and thus substitution, in difference) belongs to life right from the start. As Denis Noble writes,

Genetic and cultural forms of evolution share this messiness, or, to use a less derogatory term, inventiveness. For it is through a complicated series of bodes that nature has arrived at the huge diversity of life as we know it. Tangled intricacy is the mother of nature’s invention.

The idea of metaphor is important here, too. On that basis, we can say that, as the genome has developed, nature has switched from one metaphor to another. It has plundered the treasure chest of old DNA modules to form new combinations and to give old genes new functions (Noble 2006, pp. 103–4).

From Peirce, though, we can take some idea of the ways in which metaphor might work as a source of creativity—an evolutionary recycling, recombining, and repurposing of old forms into new—in human culture. Exploring this will involve a consideration of what Peirce called the ‘logic’ of abduction (or sometimes retroduction). This, I will argue, is the attempt at an early formulation of what cybernetics calls the logic of recursion.

Abiotic cybernetic systems evolved by humans in human culture are characterised by the sort of energy we call information. But the biotic and metabiotic evolutionary systems upon whose emergence abiotic systems depend are characterised by the energy flows of 'information' better understood as *communication*. The difference between information and communication is that the latter always also means *interpretation*. From its earliest evolutionary beginnings in what Lynn Margulis (1999) has described as symbiogenesis, the living world consists of communication. In the beginning was not 'the word', but rather the sign and its interpreters. The Information Revolution of the second half of the twentieth century should, more accurately, be called the Communication Revolution. It may be that, with this, the abiotic systems we have evolved, connected cyborg-like to our own biotic and metabiotically evolved systems, also have something interesting to tell us about the nature of mind itself. I shall return to this at the end.

A number of implications flow from the biosemiotic view of cybernetic systems. The first must be that culture is evolutionary and natural. The second, which follows, is that culture is best understood according to the organic models from which it evolves. Quite a lot of work has already been done on this: cities, societies, ideas, are all more like living organisms than like dead things (De Landa 1997). When thinking about the role of evolution in cultural forms—or cultural morphologies—we can learn much from paleobiologists' descriptions of the evolution of natural morphologies. At the end of *Your Inner Fish*, for example, Neil Shubin writes:

Looking back through billions of years of change, everything innovative or apparently unique in the history of life is really just old stuff that has been recycled, recombined, repurposed, or otherwise modified for new uses. This is the story of every part of us, from our sense organs to our heads, indeed our entire body plan (Shubin 2008, p. 201).

With the emergence of culture, body plans become mind plans. Thus we might suggest, for example, that the symbiogenesis which Lynn Margulis describes as 'failed eating', whereby single-celled life evolves into multicellular life in 'the abortive cannibalism which ends in the truce called sex' (Margulis 1999, p. 126), contributes not only to our understanding of the alimentary nature of all relationship, but also to our understanding of the tensive play of identity and difference which is the basis both of metaphor and of ethics. Earlier biological patterns—or what Peirce described as 'nature's tendency to take habits'—are repeated, reformulated and repurposed in later cultural ones. The bodily mouth I eat with has its counterpart in the mind-mouth whereby, loving you (my sweet, and 'good enough to eat'), I let you inside my mind. And if I lose you, the terrible sensation of mental pain is felt in the gut too, as though part of my insides had gone: which they have.

In what follows, I want to focus on how processual systems (including the systems of process which are each of us) *learn*—on how that recycling, recombining, repurposing and modifying for new uses might actually go on. One of the reasons I want to do this is to show how a biosemiotically informed view of natural and cultural evolution might help us to think about the relation between past and present, and the interpretation, or reading and re-reading of signs, a little differently. Another reason is to suggest, albeit briefly but relatedly, how the revolutionary gesture of modernity which was inaugurated by the Protestant Reformation might have led to characteristic models of the world (and to a kind of science) in which knowing is hyper-rationalistic and thought of as abstract and disembodied, self-conscious calculation and excessive material accumulation are overvalued in relation to other goods, and the mysterious life of signs and their interpretations by cognitively embodied and environed creatures is very poorly understood.

What biosemiotics supposes is a model of evolution via layered evolutionary (biosemiotic) strata in which biosemiotic, and then anthroposemiotic, complexity is induced as a result of the creative meeting of signs from without and within. Although many people think of metaphor as ‘not real’ (as in ‘it’s only a metaphor’), in fact metaphor is the paradigmatic model of creative life (physical and psychological) wherever it is found. It is the discovery of similarity in difference such that new meanings are possible. Because we are so used to thinking of ‘meaning’ in terms of linguistic signification (and often as abstraction), it is easy to forget the pragmatist observation (made by Peirce) that the meaning of something lies in the effects it is capable of producing in the world at any particular time and place. In other words, and as biosemiotics argues, all living things consist of signs and communicative feedback systems. Not only words, but bodies too, have meanings, and those meanings (and their complexity) are made (or creatively bodged as Noble would say), and have evolved, over time (as, indeed, is the case with languages and cultures). We might say that the meaning of *anything* lies in the effects it is capable of producing in the world at any particular time and place. The semiotic information produced by any organism’s environment is capable of producing new semiotic configurations (living metaphors) which, via re-entry and systemic repetition/reproduction, eventually become emergent evolutionary strata in species.

Mind

These processes, by which emergence, and self-organised, or autopoietic, development gets into systems, were finally named as ‘cybernetic’ from the Greek word for governor or steersman (*kybernētēs*). The governor of a system of information (like the steersman on a boat) responds to the

information (from boat on water) by 'correcting' it with other information ('feedback') in the desired direction. Such corrections consist of two types of feedback: 'positive', which is excitatory to the system, and 'negative', which is dampening. 'Positive' and 'negative' do not, of course, equate to 'good' and 'bad'.

In a 1975 conversation with Margaret Mead organised by Stewart Brand, Gregory Bateson said, in relation to a discussion of teleology by Arturo Rosenblueth, Norbert Wiener and Julian Bigelow in a groundbreaking paper entitled 'Behavior, Purpose and Teleology' (Rosenblueth et al. 1943) published in *Philosophy of Science* in 1943, that 'the whole of logic would have to be reconstructed for recursiveness' (Bateson 1976). In other words, living systems do have a teleological logic, but it is driven not by an end outside and beyond the system, but by the system's own logic of self-organisation, or autopoiesis. This autopoietic logic, the paper's authors and also Bateson recognised, is the logic of recursion and re-entry. Traditional human logic, characterised by the linear and self-conscious knowledges provided by rational deduction and induction, would have to be able to offer an account of this important, but unrecognised, recursive aspect. Bateson also recognised that recursive logic in practice is almost certainly non-conscious, and is thus dependent upon being passed through difference: a sign, he said, is 'a difference which makes a difference' (Bateson 2000, p. 315). Mind is thus always an effect of the encounter with, the passing through us, so to speak, of difference. And it is clear that a great deal of mind (as evolution also indicates) is not only not conscious, but depends upon remaining unconscious. In the process of celebrating and elevating our powers of self-conscious reasoning, we have made the mistake of devaluing (or not counting as 'reason' at all) those mysterious processes where creative semiosis goes on—and indeed must go on—behind nature's veil. Too much conscious fiddling with a problem, too much *consciousness*, is (as many human beings in fact know) positively injurious to the finding of solutions. Creative activities (Keats's 'diligent indolence' (Keats 1819)) for example, as well as Peirce's 'play of musement' (Peirce 1998b)) not only tolerate this but welcome it.

Thus Bateson also noted, later in the same conversation, that, in effect, self-conscious living cybernetic systems (here meaning human beings) could not handle too much abstraction because it tended to produce too much self-reflexivity: human beings dealing with abstractions are obliged to factor themselves, and their own handling of abstractions, into their thinking, and this produces too much positive feedback, or 'noise', in the system. This is because a lot of what we know takes the form of what Michael Polanyi calls 'tacit knowledge': 'we know more than we can tell' (Polanyi 1967, p. 4).⁴ The sense or meaning of being is pragmaticist; like words and contexts, meaning is discovered in 'doing' and in effects. Things which we can 'do', and say we know how to do, like

playing an instrument or driving a car, are in fact 'known' in our body-minds. And thinking very self-consciously about them is ruination of the praxis itself. This praxis, though, is by no means all conscious. Learning, the system growth of 'me' or identity, depends on passing through difference or 'not me'. Thus Bateson talked about the need to have 'some data [i.e. of difference] flowing through the system'. He said:

I set my classes an assignment. If they can, they will handle it purely abstractly. And they then get off into an awful mess of ill-drawn abstractions which act upon other ill-drawn abstractions. But if you can make them fool around with data of any sort, while they're playing with the abstractions, then you get something. I keep a fish tank going there, because a fish tank is a nice thing, really, to have in the back of your mind while you're thinking about whatever it might be. Norbert Wiener, when he had a problem, used to sit with the wind blowing on a curtain (Bateson, 1976).

Abduction and 'the Play of Musement'

In fact, half a century before, Charles Sanders Peirce had attempted to reconstruct a semiotic logic for recursiveness which he called abduction, or retroduction. It seems to me that recursiveness, and the need to have some other data flowing through the system so as to dampen too much self-reflexive positive feedback, is pretty much what Peirce was on about with his idea of the 'play of musement' as the condition of what he called abductive or retroductive logic. Peirce's 'play of musement' is a relaxation of self-conscious thought so that intuition and guesswork—parts of the metabiotic system we don't have self-conscious access to—can play their essential part in the generation of hypotheses. The dreamy state necessary to abductions is 'some [other] data flowing through the system'. Go for a walk, Peirce said, 'Enter your skiff of Musement, push off into the lake of thought, and leave the breath of heaven to swell your sail. With your eyes open, awake to what is about or within you, and open conversation with yourself; for such is all meditation' (Peirce 1998b, p. 437). It's another version of watching a fish tank, or Wiener's 'wind blowing on a curtain'. The practice of the best art is similarly indirect; we know that the best poetry is never simply about what its words literally say. It works by having some other data flowing through the system which makes rich interpretation possible. In John Clare's 'The Flood', for example, the other data flowing through the system is the flood running under Lolham Brigs. This allows Clare to talk about, and us to read if we will, the effects of enclosure, on the living beings who experienced them, in a much more vitally informative way—with all its affects experienced in our own interpretive, intuitive moves—than any 'objective' pamphlet

against enclosure could ever manage. In seen, heard, or connoted image, we feel the wonderful abductive movements of another living mind.

Peirce's abduction depends upon 'the play of musement' in which we are able happily to tumble back, in a relaxed state of reverie, across the signs composing antecedent strata. This is an essentially intuitive activity—guesswork—but Peirce notes, too, the ubiquity of its successfulness. Abductions are not always successful, but they very often are, and are not entirely random either. And this is because there is an evolutionary fit, a structural coupling, between mind—which, from a cybernetic semiotic point of view, is logically immanent in all things—and world. This coupling lives in signs in time; what we can 'read' and 'see' belongs to the past and autopoietic making of nested teleologies: our own, our families', our places', our kind's, our world's. What we can become is dialogically made, but its materials are the past, both individual and collective, both human and more-than-human (Abram 1997). The evolution of abstractions in articulate language has led to a forgetting of this 'fit' and its history (a point pursued by Nietzsche in 'Reason in Philosophy' in *Twilight of the Idols* (1968), for example). It's also worth remembering that Darwin's theory of the tree-like structures of biological evolution drew its initial inspiration from the work of his linguist cousin, Hensleigh Wedgwood, in philology and the tree-like structure displayed in the evolution of languages (Richardson 2007, p. 90ff). Abductions derive, as do metaphors, from the possibility of discovering new relations of similarity in difference in older antecedent body and mind plans. Newness derives from the discovery that old habits, or patterns, can be reformulated, 'recycled, recombined, repurposed, or otherwise modified for new uses'. Both natural and cultural evolution depend upon creative recursions to and of past forms. The results of such abductive (or retroductive) recursions appear to consciousness as the light going on over the darkness in our heads whereby we discover a new idea. As Peirce notes, our conscious forms of logic always work with what is already known:

Abduction is the process of forming an explanatory hypothesis. It is the only logical operation which introduces any new idea; for induction does nothing but determine a value, and deduction merely evolves the necessary consequences of a pure hypothesis.

Deduction proves that something must be; Induction shows that something actually is operative; Abduction merely suggests that something may be (Peirce 1998c).

As the title of Rosenblueth, Wiener and Bigelow's paper suggests, the logic of recursion means that the way a system can grow (be creative) depends upon where it has been, its lived history. This is clearly a truth of all living systems from ecologies to animals to humans and their cultures; what is true of the larger system is repeated in the smaller ones.

The telos of a system is constrained by its past (out of which autopoietically it grows); absolutely *anything* is not possible. But a system's capacity for creative invention lies in its constant engaged semiotic being with environments natural and cultural. Very clearly, every system (and every organism which informs it and is informed by it) has maximal semiotic conditions for such telic flourishing (the fullest expression of a being of its kind). We might call this maximal semiotic richness. This might well include a certain amount of difficulty as well as pleasure, and it's certainly not to be confused with maximal money (and certainly not minimal), but we can surely see that where richly semiotic creatures such as humans are concerned, that maximal richness will be a semiotic richness. Our question will be what counts as semiotic richness, and how is it known, in and by humans?

Ecophenomenological and Biosemiotic Mind

In order to think about the place of retroduction/recursion in cultural (and natural) systems, and in order to develop a view concerning the significance of the idea of cultural sustainability and semiotic richness, we need to have in place at least a brief sketch of 'mind' from an ecophenomenological and biosemiotic point of view. Mind is not, of course, reducible to brain. Brain is the necessary co-ordinational matrix wherein bodily experiences (natural and cultural) are received and registered as electro-chemical messages composed of signs carried by neurotransmitters. These are what Candace Pert calls 'molecules of emotion' (Pert 1999). Finding out what kind of a state we're in is closely tied to the registering of affects. The registering of those messages from the body's reporting both of internal states (physical and affective) and experience of external environments (i.e. *Innenwelt* and *Umwelt*—and equally affective) appears as neuron firings and patterns of neuron firings. These affective sensuous experiences of *Innenwelt* and *Umwelt* associated with neuron firings in the brain *are* mind.

It seems to me that there is no mystery about how neural patterns can be experienced as mind by an organism. The latter results from the body's experience of the world as signs which are affordances (Pickering 2007). 'Mind' results from the sensible evolutionary conjuncture of a body which needs to know what it's doing in a place over time. 'Over time' necessitates memory—however primitive—as record. For a life imbued with the will to continue, record must be repeatable for both the organism which endures over sufficient time to reproduce itself (this is analog memory, closely tied to the evolution of habits), and also be repeatable as an encoded record to be handed on (this is digital memory). Thus we can be sure that all animals with brains have 'mind' (as analog and digital capacity) in some degree. Similarly, we can hazard that the ability

to handle degrees of abstraction (which some birds and animals appear also to be able to do) illustrates degrees of self-consciousness.

Since we can understand evolution (the evolution of more complex forms of life) broadly in terms of layers of complexity (first natural, then gradually cultural), I would say it is safe to assume that the accomplishment of more complex 'mind', with increasing self-consciousness and culture, is bought at the cost of a reshuffling whereby antecedent layers fall into relative obscurity in comparison. What this means is not simply that the importance of affective life tends to be occluded as logical rationality increases, but that some pretty extraordinary capacities—and almost certainly the sources of our enormous human creativity—become, so to speak, 'lost' to us too by falling into unconsciousness. It is, however, precisely these evolutionarily antecedent layers which are available to us by recursion and re-entry in conditions of 'musement'. The strange condition of the latter seems to move from peaceful dreaminess (accompanied by a pleasant sensuous alertness to environmental space aesthetically experienced) to eventual emergence of non-verbal imagery felt by the mind's hands, so to speak, in the same way that interesting objects are explored. In his 1945 *An Essay on the Psychology of Invention in the Mathematical Field*, Jacques Hadamard quotes Roman Jakobson concerning such embodied 'internal thought':

Signs are a necessary support of thought. For socialized thought (stage of communication) and for the thought which is being socialized (stage of formulation), the most usual system of signs is language properly called; but internal thought, especially when creative, willingly uses other systems of signs which are more flexible, less standardized than language and leave more liberty, more dynamism to creative thought... (quoted in Sebeok 2001, p. xii).

A related aspect of abduction is what I can only call its animism; this involves a very practical willingness to respond to chance promptings (in the way which animals seem to do), as though the world were alive with obscure meanings, and in the fiduciary mode Polanyi describes as 'post-critical' (Polanyi 1974).

This biosemiotic phenomenological view of mind is familiar in related accounts of embodied cognition. As John Pickering notes in 'Affordances are Signs' (2007), it has a long history from Peirce and William James, through Henri Bergson, A.N. Whitehead, Martin Heidegger, and Merleau-Ponty, up to more recent developments in the work of George Lakoff, Mark Johnson, Mark Turner, Gilles Fauconnier and others (Lakoff & Johnson 1980; Lakoff 1987; Lakoff & Turner 1989; Lakoff & Johnson 1999; Fauconnier & Johnson 2002). The general drift of research such as this is to challenge the idea that human thought is characterised only, or even mostly, by conscious logic, and to argue instead that it is driven by

metaphor derived from embodied experience as the basis and development of embodied cognition. As biosemiotician Jesper Hoffmeyer writes considering the phenomenological sense of intentionality as conscious 'aboutness' in philosophy:

This inescapable 'aboutness' seems to be a broader phenomenon than just consciousness. From a biological point of view there is nothing surprising in this 'aboutness'. Only animals have nervous systems and brains; these have never been found in plants—and from the dawn of evolution their purpose has been to control bodily actions, behavior... 'aboutness'—human intentionality—grew out of a bodily 'aboutness' (i.e., the behavior necessary for assuring reproduction and survival)—what could be described as *evolutionary intentionality*, the anticipatory power inherent in all living systems. We still cannot escape the fact that our minds remain embodied (Hoffmeyer 1996, p. 47).

Setting aside the possibility, as argued by some phytosemioticians, that plants do have something like 'mind' in chemical proto-brains in their root systems (Baluska et al. 2004), we can certainly say that embodied cognition belongs to the whole system, the whole creature, not just its highly self-conscious parts.

In other words, we must conceive of mind as being produced firstly of signs as bodily affordances. The environment, or *Umwelt*, we have evolved to respond to—as von Uexküll noted it is for every organism—made up of signs which are meaningful in the context of our survival and reproduction. Famously, this means that the tick's *Umwelt*, for example, is very semiotically limited, whereas the domestic dog's *Umwelt*, or the bonobo's, is rather extensive. In this sense, although the organism is the evolved co-ordinating or organisational centre of mind—or in hives, herds, flocks and shoals the semiotically closely linked group is—it must be more accurate to say that this organisational centre is distributed. First, it is distributed as loops of semiosis which make the swarm of swarms which form every organism's *Innenwelt*; second, it is distributed inasmuch as these first sets of loops are only potential until they start receiving signs (or messages) from their environmental *Umwelt*; third, it is distributed in terms of semiotic mimesis for any social creatures; fourth, it is distributed culturally for the higher apes, for some birds and mammals in regular contact with humans, and for humans themselves extensively. As has been said in various ways by many others, creatures are nested, looping systems of bio-semio-cybernetic communication (Hofstadter 2007). 'Mind' is distributed intelligence (of natural and socio-cultural *Umwelt* and *Innenwelt*) recursively elaborated in praxis (including the praxes of others recorded in the archive and learned again in renewed praxis): not 'thing', but semiotic *process*. Extent of 'mind' equals extent of semiosic affordance.

In other words, a full consideration of 'mind' must surely recognise that it depends upon brains and bodies, but is not reducible to them. Mind, as Gregory Bateson long ago suggested, is an ecology. More strongly, it is a biosemiotic and semiotic ecology of which human semiosis in language forms merely the latest evolutionary part. The reductionism of modern science is important in developing our deeper understanding of the intricacies of related elements, but it cannot do justice to the richness of the interdependence of the web of semiotic relations. This is becoming increasingly clear both in epigenetic research—in which we now understand very well that gene expression is dependent upon the activity of proteins in the whole cell which are, in turn, responding to activities within the organism–environment continuum as a whole—and also in the related development in understanding downwards causation. Let me give a small recent example.

In January 2009, *New Scientist* reported on the research undertaken by Anthony Auger's team at the University of Wisconsin. These findings were presented at the Society for Neuroscience meeting in Washington DC in November 2008. The *New Scientist* article reported that if the belly of a newborn rat is stroked for a few hours a day, chemical 'caps' will appear on its DNA that make its brain look more like that of a male.

Writing on tests done on rats in the laboratory of Anthony Auger at the University of Wisconsin, Devin Powell reports that some biological sex differences (normal development of male genitals, for example) may be the result of maternal treatment of infant animals after birth. Auger's team stroked the bellies of female rats providing the form of attention usually reserved for males. When the brains of these rats were later examined, it was discovered that the number of oestrogen receptors in the hypothalamus of stroked females was lower than normal, and similar to levels in normal males. Auger's team also noted that the pattern of chemical caps called methyl groups, which sit on the DNA and code for oestrogen receptors, was more like that of males. This suggests a link between the inhibition of oestrogen receptors by caps and the relative paucity of oestrogen receptors in the hypothalamus of stroked females. Julie Markham of the University of Maryland School of Medicine in Baltimore says that Methylation is 'a short cut, a way for organisms to reduce the amount of information they have to encode in their genome', so it appears that the semiotic activity of maternal rats in the infant rats' *Umwelt* affects the infant rats' *Innenwelt*'s semiotic activity also (Powell 2009, p. 8).

Epidemiology and psychoneuroimmunology have turned up comparable results concerning downwards causation in which the effects of socio-cultural environments—the experience of status, for example—correlate to animal and human health and life expectancy. Whoever coined the phrase 'sticks and stones may break my bones but words can

never hurt me' was simply wrong. 'The universe', as Charles Sanders Peirce suggested, 'is perfused with signs'; and those signs and messages, both consciously and unconsciously perceived, make us what we are—for good and bad.

Cultural Sustainability and the Archive

Earlier, I said that cultural sustainability depends upon the cultural archive which is the semiotic material upon which all creativity (aesthetic, ethical, scientific, technological) draws. Nothing, as evolutionary theory teaches us, comes from nothing. Individual minds are the necessary nexus of creative insights; but, once we understand that embodied 'mind' is distributed both 'locally' (in a brain in a body) and more widely in a web of natural and cultural connections (a brain in a body in an environment full of semiotic interference patterns), we can come to see that the cultural creativity which is manifest in the ideas and practices of individuals always depends on a semiotic (and biosemiotic) web preserved in digital memory (i.e. an archive capable of being handed on; DNA memory in biological codes, and cultural memory in language codes) which is dependent upon analog communication (i.e. repetition, or education) in the present. Analog memory is mimesis of both natural and cultural *habits* in the present of organismic life. What is handed on in living things are species codes which are both realisable, and also capable of creative transformation, in individuals. The force which bears down upon the creative transformation of such realisable encodings is natural (and in humans cultural) selection. Creative newness is realised in individuals, and especially in those whose environments are semiotically rich, but the latter is both natural and cultural; it belongs to the telos of the species.

Perhaps we are now in a position to consider further what counts as semiotic richness and how we recognise it. While answering this question thoroughly would take a book, we can I think hazard as starting point that, cognition being embodied, what leads to flourishing in culture will be a (metaphorically extended) version of what leads to flourishing in nature. Clearly, this involves the capacity, to put it at its broadest, to be nourished by the world, to be receptive to all its affordances as signs, and to be able to discriminate between what is good to take in and what is not. These discriminations of taste, or judgement, are, though, complicated in humans by the complexity of the human habitus in which signs are not only iconic and indexical (as they are in nature) but are also freighted with symbolic connotation and our interest in forms of social power. Of course, all social animals are interested in the latter—probably for good reasons of group leadership and survival. But our signs of power have become highly complex and multi-articulated, not least in the linkages

between economic growth, the military-industrial complex, and earth-plunder. At the same time, the logic of modernisation is to treat both earth and those without power understood solely in these terms as what Heidegger called 'standing reserve' (Heidegger 1993). This requires both disenchantment and the organisation of what Foucault called biopower: the instrumental ordering and use of living things.

With this, we can perhaps come close to an idea of what semiotic richness consists in by saying that it involves the capacity for enchantment or wonder. Just as abduction means 'carrying away' (as we carry away one sign-meaning from and to another by semiotic association in metaphor—from Gk. *Metapherein*, transfer, from *pherein*, to bear), so enchantment means having the capacity for being carried into the liveliness of things within and beyond us—whether words, paint, music and ideas, or people, animals, nature and earth. But, of course, for this to happen, the environment (cultural and natural) must have its own richness, its own creative liveliness. The natural world treated as dead 'standing reserve', and the human world treated similarly as objects of use by the powerful, is deadened and stupefied. Deductions and inductions are merely rational manipulations. The more isolated they are from abductive logic, the more deadened they become in imagination and use. Rejoined to abductive intuitions, rejoined, that is, to hunches, informed guesses, and receptivity to hints from the world, the more lively they become in imagination and of use (Phillips 1998). Abductions form what Polanyi calls the fiduciary basis of all knowledge—and, as such, they can often seem quite strange, and even spooky.

The Politics of Modernity and the Protestant Revolution

Near the beginning of this article, I noted that the distinctions of political modernity have become problematic—not least because of the psychical and material violence attached, from the Protestant revolution onwards, to the idea and practice of radical and revolutionary new beginnings. The fantasy of the absolute cut (*coup*) in history, in which inheritance and memory is disavowed, simply allows the structures of the inherited past to reappear in distorted forms. Premodern forms of organisation and power, whether sacred, or profane and worldly, simply re-emerge in secular (holy or unholy) dress. This leads to modes of misrecognition and delusion (the fantasies of secular utopianism and instrumental reason; science and technology as sources of modern redemption in a disenchanted world; the rationalisations of secular power, for example) which may be more damaging, because more occulted, than the more frank enchantments they replace. (This point is, of course, persuasively argued in part by Foucault in *Discipline and Punish* (1977)). Stephen Toulmin makes a similar argument about the impossibility of the 'clean slate' fantasy in

Cosmopolis (Toulmin 1990, pp. 175–9)). Contemporary ecological concerns with biological and cultural conservation, and also with apocalyptic scenarios resulting from climate change, are doubtless no freer of fantasmatic elements than other earlier modern and premodern formulations; but we can, perhaps, also see in these—and especially in the acknowledgement of numinous human experience they often contain—some symptomatic attempt at recollection of what threatens to be lost.

Finally, I want to look briefly at one possible reason for the particular turn which modern science took in Europe from the seventeenth century onwards. One can imagine that a Goethean participatory and interpretive science could have been just as practically successful as the supposed objectivist ‘view from nowhere’ which characterises our modern scientific cast of mind (Seamon & Zajonc 1998). So why the hostility to immersive interpretation in processual life, the insistence on nature as dumb matter, that we in fact find in the dominant Western scientific world view since the seventeenth century?

In the medieval world view, the book of nature is the great book where God’s creative acts are written to be read by men. This calls forth a great interpretive effort. Similarly, the difficulty of reading scripture—God’s other great book—demands complicated exegetical strategies also, not least to assure the believer that God loves and will save him. In *Burning to Read*, James Simpson argues that Luther’s conversion experience in the early years of the sixteenth century derives from his hatred of the impossibility of what the word of God says (Simpson 2007). But this textual hatred—a hatred of the impossibility of final interpretation rather than a toleration of processual affordances—is what finally allows Luther to understand that God’s words are both literally true (they require no Jesuitical interpretations) and cannot be understood by humans because God is *inhuman*. Where salvation is understood as a final state—rather than, say, as Keats’s ‘negative capability’ of creative process itself—no works, practical or interpretive, will bring about salvation. Only faith alone in this *Deus Alienus* is capable of bringing about truth and possible salvation. This Lutheran conversion to salvation by faith alone renders all God’s works, both great books we might say, utterly inhuman. The reading of layers of signs and meanings is futile. All there is is the literalness; there is nothing human or human-like about it at all. It’s worth noting that this futility of all attempts to read and interpret, of this belief that sense can be made because the world is full of signs and sense, is precisely the lesson which Orwell makes Winston Smith learn in *his* conversion experience at the end of *Nineteen Eighty-Four* when he, too, learns simply to love the inhuman law of Big Brother. Smith is the new Luther of inhuman systems: ‘rational’, ‘scientifically determined’, meaningless.⁵

In time, even Luther’s faith passes from his cultural inheritors, and is transformed into a blank literalness in a meaningless and inhuman

natural world governed by determining laws without purpose. In our world, faith in imaginative abductions is still, just about, allowed in the arts and humanities; but in the sciences—where, of course, it still secretly goes on—it must not even speak its name. Thus, the recursive logic which Peirce called retroduction/abduction, in which the future is made out of the repurposed past re-entered into the system, still has a hard job getting recognised as a part of properly scientific method.

For the truth is that to allow recursive abduction is to allow free play to a human telos which is fundamentally incalculable because it depends on intimations—feelings, hunches, guesses—which are more like faith than self-conscious ratiocination. To claim that there is a way of knowing, as *real* knowledge, which springs from the autopoietic growth of living systems themselves, and which can only be explained in terms of inclinations and intuitions, seems to be to say that all self-conscious planning and willing is a distraction. But this is not what is meant. Human beings must will and plan. The question, rather, is one of emphasis and of what Brian Goodwin has called ‘participatory knowledge’ in which intuitions are collectively pooled (Goodwin 1994). This leads me back to the cyborg techne of the Communication Revolution and the growth of the bio-web into the World Wide Web. The emergence of the latter has, of course, provoked an interest in the democracy of ‘distributed knowledge’ (Surowiecki 2005).

With the advent of the World Wide Web, a global cyborg cybernetic system, we discover that the linear logics of deduction and induction offer insufficient accounts of the getting of knowledge. When pursuing your search terms, you are confronted with endless possibilities via hypertext links. The way you proceed through these cannot be described by deduction and induction alone. To click is not, in fact, to deduct: it is to abduct. What this global mind, activated by embodied human minds, teaches us is something about the nature of mind itself. Although silicon computation is built on binary logic, the ways humans actually proceed through the Web is via hunches and guesses: new search term combinations, new metaphors, new hypotheses. In *The Web's Awake*, Philip Tetlow argues that the Web does, indeed, share crucial features with living organisms (Tetlow 2007). Understanding the semiotic intelligence of the web we have made may, thus, help us understand the biosemiotic web whose patterns of signs and immanent mind made this new mind—biotic, metabiotic and abiotic recombined and repurposed—possible. The Web and the open source Wiki are models of participatory knowledge as open, constantly self-adjusting and responsive, praxis.

The philosophy of pragmatism which Peirce developed (he later came to call it pragmatism) is essentially evolutionary. It says that the ‘meaning’ of something lies in its effects in the world. Meanings are neither fixed by being derived from ideal platonic forms nor static and context

free. Like natural evolutionary forms (which are biological 'meanings'), they evolve by a series of bodes and accommodations to environmental, or 'contextual', pressures. They are 'old stuff that has been recycled, recombined, repurposed, or otherwise modified for new uses'. We see this in culture in the evolution of languages; it is quite hard to change the accepted meaning of a word, but, once a new usage has become sufficiently widespread (i.e. like a gene expression throughout a species), the fight to maintain older forms is increasingly doomed. This evolution may involve losses as well as gains. The contemporary increasing use of 'enormity' (something very shocking) for 'enormousness' (something merely very big), and 'disinterested' (impartial) for 'uninterested' (not interested), may be symptomatic of lost distinctions we would prefer to preserve; and perhaps the fight should be carried on in such cases where linguistic richness seems threatened. Similarly, the loss of the world's many different languages (which maintain subtleties and insights of different ways of conceiving the world) to the monoculture of one should be resisted in the same way that we resist the loss of ecological richness in diversity.

But the lesson that future forms—biologically and now culturally—evolve from past forms should not be lost to us. The idea of the revolutionary cut (*coup*) which wipes out the past is a childish and violent fantasy. So, too, is the idea that a seed grown in one environment (democracy in America, for example) can be unproblematically transplanted to flourish in foreign soils under foreign conditions and foreign histories. Though globalisation increasingly means the globalisation of a common culture, we should remain alert to the necessary differences, of time and place between different 'islands' of culture, which Darwin noted between finches' beaks in the various islands of the Galapagos.

For the past 30 or more years, we have lived through an intensified period of increasingly technocratic and utilitarian modernity in which the sense of something changed was named as postmodernity. In fact, I think this is modernity in its supernova phase, burning fiercest as it dies. In this period, the test of a life well-lived, and one that is set daily before our children both in the media and in narrowly utilitarian approaches to education, is money and celebrity: our value systems both ethical and economic seem tottering towards collapse. The legacies of Luther and Bentham have left us obsessed with 'the modern' and 'the radically new', more often than not as ceaselessly instrumental innovation understood in scientific terms, in which a sense of the past as significant (i.e. meaning full, and filled with potential re-readings which will *make* the future) is derided as mere nostalgia—as though human care for the past meant nothing. Thinking human culture as *not* natural, and modernity as revolutionary break with the past, we have forgotten not only that the present and future, everywhere and most certainly in science, grows out of the

past, but also *how* they grow. They grow by adaptation, and, as I have argued, adaptation is that inventive improvisation which in humans we call play. In human language, we play with ideas via the iconic similarities-in-difference which we call metaphor. The arts and humanities exemplify this imaginative creativity; they are the living bearers of living culture every bit as much as science is. We are *Homo ludens*, driven by what Kant in *The Critique of Judgement* called *Spieltrieb* (play drive).⁶ For Kant, both biological life and human art must be understood as teleological processes. There are many ways of understanding the world truly, and artist and world are joined by similar processes of being shaped by, and shaping via interpretation, a shared world. The finished work of art itself is the mark (as way station) of that particular individual's way (their particular telos) of understanding the world. But the sources for every individual telos belong to a shared world of cultural processes. In this way works of art are bearers of every culture's living processes as reworked and remodelled in the subjective experience (both conscious and unconscious) of the artist. Full of meanings and purposes, these semiotic (and biosemiotic) processes are autopoietic and teleological: the teleological form of the future is made from improvisations and recombinations of what is now, and of what has been in the past. Every human creature is a unique collection of particular experiences, but the materials they draw upon, the *sensus communis*, are shared riches.

The biosemiotic view I have sought to develop above suggests that cultures which do not understand the ways in which the past still lives in the present will tend to live its truth in unrecognised and pathological forms—whether as obsessive attempts at control of unrecognised patterns and forces (the position of the sceptic or cynic), or in mass hystericalisation which 'sees' such patterns, but projects them indiscriminately (the position of the believer without a definite belief). It suggests, in particular, that new semiotic technologies of communication, for all their creative potential, will tend to provide foci for such unrecognised pathologies (Luckhurst 2002). To *see* the old in the new is (for humans) both to disempower its dangers in *unrecognised* repetition (in the Freudian sense of pathological 'fantasy') and also to value the wonder of creative evolution in *all* living forms. But nature's tinkering improvisations are metaphor-like abductions: the work of iconic sign relations indexically encoded in (and as) evolutionary time. Natural evolution seems to consist in (or of) something like 'semiotic faith' in the generative order of the sign. Perhaps such faith in abductive process—not as dead doctrines of belief, either in political religions or in the religion of positivistic science, but as 'artistic' semiotic receptivity which goes beyond what has counted as 'reason' in the limited modernity view—will be the mark of *our* move, after Enlightenment modernity, into the truly *postmodern* world of semiotic (and biosemiotic) self-consciousness.

Modern science has found an empirical *method* of taming and focusing creative profusion; but, as Polanyi noted in *Personal Knowledge*, and as research into creative processes acknowledges, serendipity and intuition still play their secret parts (Polanyi 1974; Boden 2004). In modern technological and technocratic cultures, though, the importance of abductive and handed-on knowledges—of the sustaining of cultural life, and the different times and rhythms of artistic living creatively—is suppressed in the interests of rapacious greediness for power and control of life's productivity. In the ceaseless pursuit of permanent revolution, even modernity's greatest seeds—equality, democracy, and the obscure wonder of creative freedom itself—are grubbed up from the earth where they were sown. A (bio)semiotically-informed point of view might, hopefully, change this.

Notes

- ¹ This article is the winner of the Dactyl Foundation, New York, 2009 Essay Prize.
- ² A much more thorough account of the evolution of biosemiotics can be found in Favareau (2007).
- ³ The German '*Umwelten*' is normally translated as 'environment'. In this case I am always using *Umwelt* ('environment' singular) or *Umwelten* (plural) in von Uexküll's sense of '*signifying* environment': the surrounding world or worlds which are semiotic (i.e. consist in sign relations) through and through.
- ⁴ For a helpful account of Polanyi's arguments concerning the fiduciary nature of all knowledge, and its source in the practical handing on of traditions, see Mitchell (2006).
- ⁵ It might seem that the new freedom to read the Bible in the vernacular introduces greater semiotic, interpretive freedom. In fact, both Luther and Tyndale expended great amounts of energy, in prefaces, scriptural guides and marginalia, in trying to ensure that newly liberated converts did not attempt their own flawed interpretations. See Simpson (2007), especially chapter 4, 'The Literal Sense and Predestination'.
- ⁶ See especially: on play, section 54 (Book II, Analytic of the Sublime); and on spontaneity of intuitive understanding and teleology, sections 76 and 77 (Div. II, Dialectic of Teleological Judgement).

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