INTEGRATING BIOSEMIOTICS AND BIOHERMENEUTICS IN THE QUEST FOR ECOLOGICAL CIVILIZATION AS A PRACTICAL UTOPIA

Arran Gare

ABSTRACT: 'Ecological civilization' has been put forward as a utopia, as this notion has been defended by Ernst Bloch and Paul Ricoeur. It is a vision of the future that puts into question that which presently exists, revealing its contingency while offering an inspiring image of the future that can mobilize people to create this future. Ecological civilization is a vision based on ecological thinking, seeing all life as interdependent communities of communities. Humanity's place in nature is redefined as participating in communities, both human and non-human, including the global ecosystem. From this perspective, the end of life in both ethics and politics should be to augment life through augmenting the conditions for life, that is, through 'ecopoiesis' or 'home-making'. What is involved in this has been clarified by work in biosemiotics and biohermeneutics where life is identified with semiosis, the production and interpretation of signs. Advancing biosemiotics and biohermeneutics, I will argue that living processes can be understood as proto-narratives organizing living processes to advance the conditions for life. They are inchoate in Ricoeur's sense because they are not reflectively formulated as such but are being lived out. Developing our understanding of the world involves understanding these inter-related proto-narratives, including the proto-narrative that has operated in the creation of the biosphere and semiosphere, and recognizing the potential of human culture as part of this semiosphere to make explicit and re-emplot these proto-narratives. Most importantly, it is to make explicit and further develop the proto-narrative of the global ecosystem to augment the conditions for life. This will involve articulating a new grand narrative of not only humanity but of terrestrial life, orienting human communities at all levels to create and sustain a global ecological civilization.

KEYWORDS: Biosemiotics; Hermeneutics; Utopia; Imagination; Social Imaginary; Ecological civilization; Semiosphere; Paul Ricoeur; Ernst Bloch; Cornelius Castoriadis; Russell Jacoby

INTRODUCTION

We are living in an era of mass extinctions, and the main driving force for this is the globalized market. Now deregulated and freed from the constraints put in place after WWII to make markets serve national communities, this formation is driven by the quest of a transnational class of financiers, entrepreneurs and corporate managers to maximize corporate profits. The destruction of ecosystems throughout the world is destroying the resilience of the global ecosystem and its capacity to respond to perturbations. Greenhouse gas emissions, destabilizing climate, are partly responsible for what is happening, but they are only part of the problem. The outcome could be the destruction of the current regime of the global ecosystem, which has been ideal for humans and largely accounts for their flourishing. Any new global ecological regime is unlikely to favour humans. There will be a collapse of civilization, and possibly, the elimination of humanity. At best, billions of people are likely to die along with the extinction of a great many species and their associated ecosystems. While there is growing awareness of this crisis, responses are clearly inadequate. On almost all measures, things have got worse since the threat we face was fully recognized in the 1970s. This includes efforts to reduce greenhouse emissions, which continue to increase, making it increasingly likely that humanity will fail to prevent a runaway greenhouse effect. Rainforests and ocean ecosystems continue to be destroyed.

Among ruling elites it is claimed that markets, based on the rights of people to pursue their own interests, will provide the appropriate feedback. The globalized market, that is, the very formation that caused and is causing environmental destruction, will be its solution. As Joel Kovel, Jason Moore and Minqi Li have convincingly argued, it will not (Kovel, 2007; Moore, 2016; Li, 2016, 168). Michael Moore showed in the film *Planet of the Humans* that in USA claims to be addressing environmental problems are tokenistic. Environmentalists around the world calling for more action, including Green Parties, function as little more than pressure groups and are ineffective because they have not faced up to what is driving ecological destruction. What has to be challenged is the globalized market, imposed and sustained by what Ray McGovern, who worked for the CIA for twenty-seven years, called the Military-Industrial-Counter-Intelligence-Media-Academia-Think Tank complex (or MICIMATT).

However, few of those who recognize the need for this challenge have come

to terms with the failure of alternatives, most importantly, Soviet communism, and to a lesser extent, Maoism and democratic socialism. They have really lost their faith in the possibility of creating a better form of society while not acknowledging this even to themselves. This includes Western Marxists who reacted against Soviet Marxism. Russell Jacoby who analysed the failure of Western Marxism in *Dialectics of Defeat* (1981), argued in a later work, *The End of Utopia: Politics and Culture in an Age of Apathy* (1999), there has been a collapse of intellectual visions and ambitions: 'A new consensus has emerged: There are no alternatives. This is the wisdom of our times, an age of political exhaustion and retreat' (p.xii). As Fredric Jameson observed, it appears easier now to imagine the end the world than the end of capitalism.

It is this political exhaustion and lack of vision which is the problem. In the face of the global neoliberal regime imposing the logic of unconstrained markets everywhere, concentrating all power and wealth in the hands of the global corporatocracy, there are only ineffectual protests (McCoy, 2017, ch.4; Hudson, 2022). This is at a time in which the corporatocracy and their allies, claiming to be upholding the rights of individuals, have hijacked the institutions of nation states and international financial institutions and deployed advanced technologies of social control, including military technologies, to undermine people's liberty on a grander scale than ever before (Robinson, 2004; Hudson, 2022).

This lack of vision is really a failure of imagination, and the consequences of this were predictable. Fred Polak (1973) had shown in his study *The Image of the Future*, that the existence or absence of inspiring images of the future largely determines the trajectories of societies. Societies, pessimistic about the future, decay, while those in which people believe a better future is possible, flourish. As he put it:

> Any student of the rise and fall of cultures cannot fail to be impressed by the role played in this historical succession by the image of the future. The rise and fall of images of the future precedes or accompanies the rise and fall of cultures. As long as a society's images is positive and flourishing, the flower of cultures in in full bloom. Once the image begins to decay and lose its vitality, however, the culture does not long survive. (p.19)

The fall of an image of the future was evident in the dying days of the Soviet Union. Alexei Yurchak in his book, *Everything Was Forever, Until It Was No More: The Last Soviet Generation* (2006), coined the term 'hypernormalization' to

characterize this. He claimed that everyone in the Soviet Union knew the system was failing, but could not imagine an alternative to the status quo, and politicians and citizens alike were resigned to maintaining the pretence of a functioning society that would eventually realize the ideal of communism. This delusion became a self-fulfilling prophecy and the fakeness was accepted by everyone as real. The whole society collapsed. In 2016 the documentary *Hypernormalization* produced by British filmmaker Adam Curtis showed how in the West a similar condition prevails. Financiers and technological utopians have given up on the complex 'real world' and built a simpler 'fake world', run by corporations and kept stable by politicians. While Margaret Thatcher's claim that there are no alternatives is accepted across the political spectrum, the problems generated by the neoliberal order are treated as mere glitches in the system, or ignored. A pretence of a functioning democratic society is maintained and fakeness is accepted by almost everyone as real.

This fakeness is evident in the image presented by the global elite of technologically generated economic advances through the creation of a global free market along with the export of democracy upholding the rights of individuals. Little effort is required to see that in reality economic advances are not improving the conditions of most people's lives, the institutions of democracy have been subverted, rights based in institutions that evolved over centuries, such as universities, have been undermined, most people have lost their economic security, the basis of genuine liberty, and wars to extend democracy into developing countries are really the exact opposite of what they purport to be. As William Blum argued in *America's Deadliest Export: Democracy* (2014), they are wars to impose institutions that facilitate control by the US ruling elites of these countries in order to plunder their resources and expropriate their wealth, with brutal consequences. Imposing markets has generated what William Robertson characterized as *The Global Police State* (2020), characterized by unprecedented levels of surveillance and social control. The massive concentration of wealth and income associated with the expansion of the financial sector has destabilized the global economy (Hudson, 2022). And efforts to deal with ecological destruction are failing miserably. In the West the only effective response to globalized capitalism has come from right-wing populist movements and religious fundamentalists, neither of which take ecological destruction seriously. This lack

of effective response to all this manifests the extent of the paralysis of imagination on the part of critics of globalized capitalism, even when they do recognize that the dynamics of this system are now a threat to the future of humanity.

What we are experiencing is a world in which the utopian element of culture has been eliminated. Karl Mannheim through his historical research observed in *Ideology and Utopia* (1959, 253 & 262), initially published in German in 1929, predicted the effects of this:

> Whenever the utopia disappears, history ceases to be a process leading to an ultimate end. The frame of reference according to which we evaluate facts vanishes and we are left with a series of events all equal as far as their inner significance is concerned. The concept of historical time which led to qualitatively different epochs disappears, and history becomes more and more like undifferentiated space. All those elements of thought which are rooted in utopias are now viewed from a sceptical relativist point of view. … [T]he complete elimination of reality-transcending elements from our world would lead us to a "matter-of-factness" which ultimately would mean the decay of the human will. Herein lies the most essential difference between these two types of reality-transcendence : whereas the decline of ideology represents a crisis only for certain strata, and the objectivity which comes from the unmasking of ideologies always takes the form of self-clarification for society as a whole, the complete disappearance of the utopian element from human thought and action would mean that human nature and human development would take on a totally new character. The disappearance of utopia brings about a static state of affairs in which man himself becomes no more than a thing. We would be faced then with the greatest paradox imaginable, namely, that man, who has achieved the highest degree of rational mastery of existence, left without any ideals, becomes a mere creature of impulses.

These predictions have been realized with the postmodern condition, with the depoliticization of young people and deconstructive postmodernists celebrating fragmentation and intellectual incoherence as liberating. These postmodernists have been followed by posthumanists who portray humans as nothing but information processing cyborgs, not essentially different from artificially created cyborgs which, with the advance of AI technology, are destined to supersede humanity (Gare, 2021). Jacoby summed up the response of intellectuals to this in chapter four of his book, *The End of Utopia*: 'Intellectuals: From Utopia to Myopia'.

EFFORTS TO REVIVE UTOPIAN THINKING

A root cause of this lack of vision is the eclipse of Idealist philosophies by utilitarianism, social Darwinism and, closely aligned with these, orthodox or vulgar Marxism. Orthodox Marxists followed Engels (1978) who distinguished between scientific socialism, based on discovering the laws of the evolution of humanity assuming that the driving force of history is the development of the forces of production, and utopian socialism, which he dismissed. This lack of vision had been recognized by the Marxist, Ernst Bloch, who sought to explain the failure of Communists in Germany in competition with Naziism in the 1920s and 30s, and by the post-Marxist, Cornelius Castoriadis, who grappled with the failure of Marxism in France after WWII. Bloch (2000) focussed on the importance of inspiring hope, which the Communists had not provided. He argued for an ontology of not-yet-being, reintroducing openness to the future. The task for political action is to grasp what was in process of becoming, thereby to unearth in the heart of actuality a striving towards potentiality. Castoriadis focussed on the role of social imaginary as the foundation of all institutions and the importance of the radical imagination for questioning, taking responsibility for and transforming these institutions. His concern was to free us from the social imaginary of gaining total technological control of the world and to revive the social imaginary of gaining autonomy.

Consistent with Bloch and Castoriadis, and perhaps a more fruitful examination of utopian thinking, has been provided by the work of Paul Ricoeur (Adams, 2017). In his *Lectures on Ideology and Utopia* (1986), Ricoeur examined the current cultural crisis associated with the absence of a utopian element in culture. As with Castoriadis, Ricoeur argued that every society has a social-political imaginary. Ideology, he argued, is the sedimented meanings of this social imaginary. It affirms society in its identity. However, a utopian element in this imaginary is also necessary. As George Taylor, who edited the English translation of this work, summed up Ricoeur's conclusion:

> The utopia puts in question what presently exists. … We are forced to experience the contingency of the social order. The utopia is not only a dream, though, for it is a dream that wants to be realized. … A society without utopia would be dead, because it would no longer have any project, and prospective goals.' (p.xxi)

For it to function as a project, it is necessary to provide intermediary steps leading from the past to the envisaged future. This is now lacking. As Ricoeur observed in dialogue with Richard Kearney, (1984: 30):

> The problem today is that apparent impossibility of unifying world politics, of mediating between the polycentricity of our everyday political practice and the utopian horizon of a universally liberated humanity … [W]e are without paths to utopia.

This work was undertaken by Ricoeur as part of his general research on imagination. In a series of books, Ricoeur undertook major studies of symbolism, metaphors and narratives. Each of these is required to imagine effective utopias. Symbols, associate with words, inspire people. Metaphors, associated with sentences, are required to radically reconceive the world and our place within it. Producing narratives is required to reflect upon and re-emplot the inchoate narratives we are living out that prefigure the narratives we are configuring (Ricoeur, 1984). These inchoate narratives are the narratives we have been socialised into and through which we link our present with the past and the future, and which enable us to understand the narratives we construct and recount. Unless utopian images of the future are related to ideals of the past embodied in these inchoate narratives, they will not inspire or genuinely engage people. Recovering these inchoate narratives in new emplotments, refiguring them to face up to current circumstances and then refiguring our lives accordingly, enables us to liberate 'the unfulfilled future of the past.' (Ricoeur, 1996, 8). As Ricoeur elaborated:

> It is principally the founding events of a historical community which should be submitted to this critical reading in order to release the burden of expectation that the subsequent course of its history carried and then betrayed. The past is a cemetery of promises which have not been kept. It is a matter of bringing them back to life like the dry bones of the valley described in the prophecy of Ezekiel (Ch.37). (p.8f.)

Ricoeur has not had much impact on political culture, however. As Peter Thompson (2013: 1-20), suggested, utopia has not been totally eliminated from people's thinking, but it has been privatized. Why should hope have been privatized? The privatization of hope conforms to a pattern of modern culture in which science is taken to explain the objective world, and all that is left beyond this is subjective experience. The objective world grasped through mathematics and science in order to make predictions, is nothing but a world of mechanisms devoid of meaning, and the subjective world is an inexplicable intrusion into this meaningless world. It is another manifestation of Cartesian dualism, which afflicted orthodox Marxism with its base/superstructure model of society,

strongly influenced by classical economics, and its denigration of the significance of the superstructure except as a product and instrument of the base. It is assumed more straightforwardly in neo-classical economic theory where the only value is the subjective experience of individuals, expressed in what they choose to sell or purchase. In opposition to scientism, Idealists defended symbols, metaphors and narratives, privileging Spirit over Nature and upholding the primacy reality of communities. However, Idealism blinded people to their place in nature and became implausible with the advance of evolutionary theory in which humans were seen as nothing but the gene machines which have won out in the struggle for survival.

Against the background of these Cartesian assumptions, including the mechanistic view of nature, the power of symbols, metaphors and narratives were neutralized. History was debunked, then incorporated into public relations and advertising with complete cynicism towards the quest for historical truth. This dismissal of historical truth was parodied by George Orwell in *1984*. Going beyond Orwell, Aldous Huxley in his dystopian novel *Brave New World* portrayed a society that had accepted Henry Ford's claim that history is bunk. As Melanie Klein has shown in *No Logo* (1990), fake histories presenting ways of life to be bought have now been incorporated into advertising, selling high-consuming ways of living as the only end worth striving for. This devaluing or corruption of symbols, metaphors and narratives is manifest in the collapse of the humanities in the new, transnational business corporation model of universities where to survive, cultural studies departments have embraced their role as components of the entertainment or advertising industries. In the clash of the two cultures described by C.P. Snow, the arts and humanities have been resoundingly defeated. The very idea of a utopia as defended by Bloch, Castoriadis and Ricoeur, is no longer taken seriously.

BEYOND CARTESIAN DUALISM THROUGH ECOLOGY AND BIOSEMIOTICS

To counter this, it is necessary to combat this Cartesian dualism and the mechanistic world-view that had engendered it. It is necessary to recognize that humans with their culture are creative or destructive participants in a creative nature, and that cultural transformations are at the same time, transformations of

our relation to the rest of nature and thereby transformations of nature. This involves rejecting the opposition between the sciences and the humanities, in the process, redefining what is science and what are the humanities. Doing so requires the revival of the philosophy of nature, questioning and replacing the conception of nature that made human existence as conscious beings, including human culture, unintelligible. Natural philosophy is a tradition that was kept alive and reached a high point with the work of Friedrich Schelling, and has continued in the work of process metaphysicians and scientists rejecting the Newtonian paradigm of science (Gare, 2014). It involves reconceiving nature as relational processes in such a way that the emergence of humans with all their complexity, including their ability to create and develop science, becomes intelligible. Bloch, Castoriadis and Ricoeur all understood this, and wrote works on natural philosophy. However, natural philosophy was only a minor component of their philosophy. Bloch referred back to the radical Aristotelianism of Avicenna, Castoriadis criticised *ensemblistic-identitary* or *ensidic logic* and argued that mathematics has limited potential to grasp reality, while Ricoeur referred back to Spinoza. None of these philosophers made any significant contribution to natural philosophy or drew upon or contributed to the sciences influenced by post-Newtonian process metaphysics, despite their sympathy for such developments.

With the global ecological crisis, overcoming Cartesian dualism is no longer just an intellectual matter. Climate science, geology, environmental history, ecological economics and above all, ecology, have come to the fore in efforts to comprehend our situation. Ecology, which includes human ecology, provides the transdiscipline that can relate each of these disciplines to each other. Through the development of anti-reductionist ideas in ecology, natural philosophy has been given a new lease of life, making it possible to revive what had appeared to be the defunct discipline of natural history. Robert Ulanowicz has argued that ecology should replace physics as the pre-eminent discipline for defining and advancing science. As he put it in his book *Ecology, The Ascendent Perspective* (1997, 6):

> Ecology occupies the propitious middle ground. … Indeed ecology may well provide a *preferred* theatre in which to search for principles that might offer very broad implications for science in general. If we loosen the grip of our prejudice in favour of mechanism as the general principle, we see in this thought the first inkling that ecology, the sick discipline, could in fact become the key to a radical leap in

> scientific thought. A new perspective on how things happen in the ecological world might conceivably break the conceptual logjams that currently hinder progress in understanding evolutionary phenomena, development biology, the rest of the life sciences, and, conceivably, even physics.

Ulanowicz has further developed this argument in *A Third Window* (2009).

There are a number of elements being integrated in recent developments in theoretical ecology. The most important of these elements are non-linear thermodynamics, hierarchy theory (according to which emergence occurs through the interpolation of enabling constraints) and other developments in complexity theory, including second-order cybernetics, field theories of morphogenesis, and biosemiotics, including biohermeneutics and eco-semiotics. While all these are intimately related, here I want to focus on developments in biosemiotics, which I take to include biohermeneutics and ecosemiotics.

Biosemiotics was promoted as a discipline by Thomas Sebeok (Sebeok & Umiker-Sebeok, 1992; Favareau, 2010, 35ff.). It was first established as a discipline in Estonia and Denmark, and then expanded through the Czech Republic, Slovakia, other Scandinavian countries, Italy, Russia, USA and elsewhere. In Estonia and Denmark, the most important progenitors of biosemiotics were taken to be Jacob von Uexküll, who argued that all organisms define their environments as *umwelten*, that is, surrounding worlds that have meaning for them and to which they respond accordingly, and Charles Sanders Peirce, who had made the study of signs the centre of his philosophy. Von Uexküll's ideas were developed by interpreting them through Peircian semiotics. Peirce has also been the main inspiration for American biosemioticians. Italy has been the centre for the development of code biology while Slovakia, the Czech Republic and Russia have also been influenced by hermeneutic philosophers such as Heidegger and Gadamer, and accordingly are also centres for biohermeneutics. The relationships between biosemiotics, code biology and biohermeneutics are still open for further development. For biosemioticians, semiosis is the defining feature of all life, including single-celled organisms, plants and ecosystems. For the most part, they reject Peirce's pansemiotic suggestion that in the universe might be composed exclusively of signs. Semiosis is identified with life, and as such has to be made intelligible as an emergent phenomenon in nature (Barbieri, 2008).

Peirce argued that semiosis is triadic, characterized by a sign, an 'immediate'

object signified by the sign, and an interpretant of the sign, with the 'dynamical object' causally influencing the interpretant. What makes such semiosis possible is that there are real universals in the particularities of the world (that which today would be referred to as 'natural kinds'), beings characterized by some degree of regularity with real possibilities. Semiosis is a temporal process and can go on endlessly, as interpretants and their objects become signs for more developed signs with better defined objects, engendering further interpretants. To begin with, Peirce was concerned with human reasoning and with developing symbolic logic. Here, interpretants are symbolic signs, for instance, sentences expressing propositions within a language or mathematical diagrams, facilitating imaginative conjectures about what is possible, or even impossible, from which necessary conclusions can be drawn. Interpretants can be developed through abduction, the creative aspect of reasoning, generally involving the use of analogies or metaphors to interpret what is being investigated, and deduction and induction. Deduction is drawing out the implications of signs, while induction is identifying instances that can be signified and appreciating whether they conform to expectations.

Biosemioticians, developing Peirce's suggestions, argued that interpretant can be actions, the development of forms, or the production of particular proteins within an organism (Kull, 2009; Lacková, & Faltynek, 2021). In each case, there can be the equivalent of abduction, with creative responses to problematic situations generating new signs of these situations, deductive inferences from such signs, which can be actions or growth of forms or production of specific proteins, and induction, whereby situations or instances that can be signified by such signs are recognized, along with appreciating whether as recognized, they conform to what is anticipated. Such induction can be very basic, such as identifying what is food to be ingested or what is a predator to be avoided and responding to the success or failure of responses based on such identification and associated anticipations.

The most primitive forms of semiosis do not involve 'objects' as such, but vague differentiations, perhaps most importantly, the living being itself differentiating itself from its environment, involving situating itself as an enduring entity within its environment and responding to what is differentiated by it as significant in its environment, its *umwelt*. In the terminology of the mathematical

biologist, Robert Rosen (1999, 259ff.), this involves the organism having a model of itself, although this terminology can be misleading if 'model' is taken to be a fractionated component of the organism rather than a function of the whole organism in the context of its environment. Here, identifying processes is more fundamental than identifying 'objects'; it is identifying the processes of living. This basic semiosis is evident in organisms having a primitive sense of their own existence and significance, constraining interactions between processes to maintain themselves in existence, and even augmenting the conditions for their existence.

While semiosis in non-human life is characterized by iconic (related by resemblance) and indexical (causally related) signs, humans are distinguished by the development of symbolic signs (related by convention) which make possible the dissociation of semiosis from immediate action or generation of form. Symbolic signs are central to the development of human language and culture (Deacon, 1997). However, symbolic semiosis presupposes iconic and indexical semiosis not only in thought, but in actions, biological forms and most basically, in endo-semiosis, including the production of proteins. All of these should also be understood as interpretants, ultimately participating in the semiosis of the whole organism responding to its environment, and as such, are signs engendering further semiosis. Human culture, with its distinctively symbolic semiosis, should always be understood in relation to these other forms of semiosis on which symbolic semiosis is built (Kull, 2009). As Mark Johnson argued (1987; 2007), the body is in the mind. The relationships in ecosystems as characterized by biosemioticians are first and foremost semiotic bonds which form semiotic niches (Kull, 2010). Organisms themselves can be regarded as highly integrated ecosystems effected through constraining component processes (Depew and Weber, 1996, 474f.), and so these eco-semiotic bonds are the condition for the other forms of semiosis.

The kinds of inter-relationship between forms of semiosis is illustrated by the relationship between flowering plants, bees and bee-keepers. Flowers are interpretants of flowering plants of signs of their environments of what is required to reproduce, serving as signs to bees, which can pollinate flowers, that there is nectar to be had. This is a symbiotic relationship in ecosystems in which flowers function as semiotic bonds. The actions of bees, flying to the flowers, often after

fairly complex forms of communication in the hive involving dancing to indicate where the flowers are to be found, are also interpretants. Bee keepers, interpreting their environments, take their hives to where the flowers are likely to be found, and then extract the honey the bees have collected, store it and distribute it. Their actions are also interpretants. The semiosis involved in all such growth and activities presupposes and is dependent upon the complex endo-semiosis within organisms bounded by membranes. The transport and selling of the honey is made possible through human institutions, including language, which also facilitates teaching apprentice bee-keepers their trade, and scientific research into bees, flowering plants, and semiotics itself, all of which are complexes of semiosis involving various kinds of interpretants.

This is just a small part of the global ecosystem which functions through complexes of semiosis, making up the global semiosphere, as Jesper Hoffmeyer (1993, ch.5) characterized it, with human culture with its institutions and practices and forms of communication and enquiry being just components of this semiosphere. Conceiving all this through biosemiotics also grants a place to creative evolution in which interpretants can be creative responses to new situations, creating new chemical structures and processes, new biological forms and new kinds of action, as well as new cultural products, including institutions and ideas, making possible ever more new forms of symbiosis facilitating new synergies. Peter Turchin (2016) pointed out, humans are the most cooperative species on Earth. Their development of new forms of symbiosis and new synergies through such cooperation, facilitated by symbolic semiosis, that accounts for their success, not egoism in a ruthless struggle for survival and domination by individuals.

BIOSEMIOTICS, BIOHERMENEUTICS AND PROTONARRATIVES

Although Peircian semioticians grant a place to analysis, identifying and examining individual instances of semiosis, Peirce's theory based on an ontology of relational processes, is essentially anti-reductionist. It gives a place to both external and internal relations. It not only shows how each instance of semiosis gives rise to further semiosis which can be characterized by increasing complexity, but how complex forms of semiosis are the context within which individual instances of semiosis take place. While there is some rivalry between

proponents of Peircian biosemiotics and proponents of biohermeneutics, I have argued elsewhere (Gare, 2022) that once the holistic aspects of Peircian semiotics in general and biosemiotics in particular are appreciated, these approaches are entirely compatible, especially when biohermeneutics is understood to accord a place to proto-narratives operative in the morphogenesis of organisms. However, to properly appreciate the relationship between the two it is necessary to take seriously and examine Peirce's anti-reductionism.

This is a major challenge. We are dominated by a culture in which it is assumed that we should begin by identifying the 'atoms' of anything being investigated. Advances in physics are characterized in terms of particle physics, for instance, or more recently, in terms of information. However, in physics fields are now recognized as more fundamental than particles. The current use of Shannon's notion of information as equivalent to negative entropy (another 'atom'), taking this as a basic unit of the universe, was questioned by Shannon himself in the 1950s (Gare, 2020). Robert Rosen (1999, 147) characterized information as a possible answer to a question, thereby presupposing a context for posing the question. For those at the cutting edge of research in other sciences, the concept of fields is now central (Gare, 2017a). Along with physical fields, biofields of various types are being recognized as essential components of life, while in the human sciences, the notion of fields has been invoked by the French anthropologist and sociologist Pierre Bourdieu and others to go beyond methodological individualism. Information is an answer to a question posed in a particular field of inquiry. 'Individuals' are then always seen as individuated components of fields, dependent upon these fields while not completely determined by them.

When it comes to semiotics, structuralists tried to identify the most basic units, which they characterized as phonemes, showing how increasingly complex signs (lexemes, morphemes etc.) are built from these basic units. In Peircian semiotics, rather than broader semiosis being built out of more basic semiosis, more specific semiosis emerge within the context of broader semiosis. This is clear when examining scientific reasoning, the original focus of Peirce's work. Specialized disciplines or fields of research presuppose metaphysical theories as interpretants of what is being as such (formed and forming matter, atoms, force fields, or relational processes, for instance). Metaphysical theories are the broader research programs defining the primary existents of the universe to be further investigated.

The scientific enterprise itself consists of fields within fields often in hierarchical order, with the broader fields associated with more general interpretants, the broadest being metaphysical theories, being the condition for the development of more specific fields of enquiry. This is also the case of epigenesis in multi-celled organisms, associated with differentiation and the generation of specific biofields and their associated forms.

From two cells combining to form a very basic biotic field constraining its components to maintain the existence of the organism, what emerges during epigenesis is a sequence of increasingly differentiated biofields associated with various organs, eventually forming a whole organism able to interact effectively with its environment, maintaining a metabolism, disposing of wastes or entropy, and growing or acting to access further usable energy. From the perspective of semiotics, each of these developments is a new instance of semiosis, the various emergent fields and the organs they generate being interpretants of signs within the environment associated with the broader fields, all of which are interpretants or aspects of and conditions for interpretants of signs composing the whole organism in developing as a functioning whole. There is growing complexity in the various levels of semiosis. Semiosis usually involves hierarchical ordering, but there can also be heterarchical ordering whereby these fields and associated semiosis are components of each other without being reducible to each other. In fact, as I have argued elsewhere (Gare, 2019a), such heterarchical ordering combined with hierarchical ordering is the condition for semiosis as Peirce conceived it. However, it is the semiosis of the whole organism, and beyond that, of the species and their ecosystems (sometimes referred to as 'ecofields'), that is the origin of and the starting point for the development of such hierarchical and heterarchical orders. All this is clarified by showing how Peircian biosemiotics supports and advances C.H. Waddington's work on epigenesis based on the notion of dynamic biofields, as I have shown elsewhere (Gare, 2022).

In short, the most basic semiosis for any organism, or for any ecosystem, is the whole organism, or the whole ecosystem, maintaining itself in existence. Earth as a living being or Gaia as James Lovelock characterized it, maintaining the conditions for being alive, is the most basic bio-field or eco-field, and its activities in this regard, are the most basic semiosis of all life. The defining feature of the biosphere as a living being is that it has memory enabling it to cope with

change; that is, it is characterized by semiosis. AS Markoš and Švorcová (2019) have argued, such memory and its utilization must transcend the lifespan of any individual organism. It is communities of organisms that 'construct, keep, and access vast assemblages of historical memory… [T]he community must be able to search the fitness landscape in which it lives, and through this search co-construct the biosphere' (p.iii). Prokaryote cells able to exchange RNA and DNA facilitating memory and communication, as individuated components of Gaia, are possibly central to this global semiosis (p.55). For biosemioticians, evolutionary advances are not based on random variation and selection through competition but are constrained by the semiosis of the ecosystems of which they are part. As the orthogenesists argue in opposition to orthodox Darwinism, evolution is directed (Popov, 2018). The most important advances are the development of new forms of symbiosis facilitating new synergies made possible by semiosis. We are all symbionts, Lynne Margulis pointed out, beginning with our eukaryotic cells. These contain mitochondria that originated as bacteria, and form symbiotically related multi-celled organisms (Margulis and Sagan, 2000). Where there are mutations, what mutations take place are not random mistakes in the copying of DNA but are influenced by the organism as whole responding to its environment, as Barbara McClintock, among others, argued.

When examining how all instances of semiosis in such epigenesis are related to each other, the relations are essentially of the same form as the inchoate narratives that, without reflection, orient people in their actions, where more general actions, including group or joint actions, generate a multiplicity of subordinate actions in hierarchical order. While aspects of epigenesis can be modelled through mathematics, such as René Thom's catastrophe theory, the creativity and openness to the future in epigenesis, with responses that can be creative at any level, limits the applicability of mathematics to characterize such development. Mathematical modelling of epigenesis is only applicable in limited cases where changing contexts can be ignored. As Stuart Kauffman argued, mathematical entailment breaks down where adjacent possibles are embraced, as when a developing organism forms or acts in an entirely new way in response to a stressful situation (Kauffman and Gare, 2015). Despite the lack of symbolic semiosis in the epigenesis of organisms, whereby these inchoate narratives could be reflected upon and be re-emploted to reconfigure how they take on form, act

and live, they are still essentially narratives. All subordinate interpretations and actions, which are instances of semiosis, are constrained to serve and contribute to the final end of the whole organism, which itself is an interpretant of signs of itself in its environment. As such, these semiotic acts are components of the lived story of the developing organism. As I have argued elsewhere, they can best be characterized as proto-narratives (Gare, 2022).

This is easier to show in the case of the epigenesis of organisms than in ecosystems; however, as has been argued, organisms are simply highly integrated ecosystems, and less integrated ecosystems could have the properties of organisms in a more basic, less constrained form. Ecosystems also develop to a mature state which maximizes the transformation of energy into entropy while dissipating this entropy, while minimizing entropy production for a given biomass, ensuring that all useable energy is used, doing so while maintaining themselves in existence despite environmental perturbations. Doing so, requires memory and selection of relevant strategies (Markoš and Švorcová, 2019, iii). Ecosystems consist of other ecosystems developing in the same way, which they loosely constrain to serve this end, while themselves being loosely constrained by the broader ecosystems of which they are part. As James Lovelock and Lynn Margulis, among others, have argued, the entire Earth is a living ecosystem in this sense. It uses energy from the Sun to produce living forms, transforming geological, oceanic and atmospheric processes, and to counter increasing solar radiation and keep the Earth cool, removing greenhouse gases from the atmosphere to facilitate the dissipation of entropy as heat into outer space. In doing so it has produced and maintained the ideal conditions for life, although there were some major irregularities, such as the oxygenation of the atmosphere, and periods of mass extinctions. Evolutionary progress, Lovelock suggested, takes place through life forms that foul their own nests being eliminated.

From a semiotic perspective, there is more to it than this, though. Ecosystems develop by creating new niches that make possible the exploration of, and even the creation of, new possibilities. Ecosystems are not so much 'autopoetic' - systems producing their own components, but 'ecopoietic' - systems creating new 'homes' or niches within which new life forms can emerge and establish themselves and explore and realize new possibilities (Gare, 2010). These in turn create more niches or 'homes'. When all this is taken into account, the evolution

of life on Earth can also be seen as a proto-narrative, although a proto-narrative with more contingencies, unpredictable consequences and less coherence than the proto-narratives associated with the morphogenesis of organisms. Despite being less coherent, there is a final cause operative, transforming the Earth to augment the conditions for life at all levels, augmenting the resilience of terrestrial life, but doing so not mechanically but by creating the conditions for the emergence of ever more complex components with their own proto-narratives constrained by broader proto-narratives, and ultimately, the proto-narrative of the global ecosystem. Conceiving evolution in this way involves reviving natural history as a major discipline.

ECOLOGICAL CIVILIZATION AS AN EFFECTIVE UTOPIAN VISION

Against this background, it is now possible to see the importance and viability of seeing 'ecological civilization' as the utopian vision that is required to unite people and mobilize the whole of humanity against the forces for global ecological destruction. It upholds a vision of a global civilization oriented to augmenting the conditions for life, including augmenting the life of the multiplicity of communities of which people are part, including nations and subordinate civilizations (Gare, 2016). My claim is that it has the potential to overcome the difficulties standing in the way of reviving the genuine utopian components of the social imaginary by unifying world politics, as Ricoeur put it (Kearny, 1985, 30), 'mediating between the polycentricity of our everyday political practice and the utopian horizon of a universally liberated humanity, while providing the means to chart paths to realizing this utopia'.

The notion of 'Ecological civilization' had its origins in the notion of 'ecological culture' promoted in the Soviet Union among radical environmental scientists. This was translated as 'ecological civilization' by Chinese environmentalists (Gare, 2019b). These Chinese environmentalists persuaded the Chinese government to accept this vision of the future. Various thinkers and social movements in Western nations have since embraced this quest for ecological civilization. There is no final agreement on what ecological civilization means, however, debates on this issue along with efforts to develop the notion are indications of the healthy state of efforts to promote this vision of the future. The fruitfulness derives for the most part from the fecundity of work in ecology. At its

core, 'ecology' is developed as root metaphor for reinterpreting humanity in all its dimensions, including its place in nature, and for revealing new possibilities capable of being realized. In its more radical formulations, ecological civilization upholds a vision of the future as a world-order of communities of communities, as Herman Daly and John Cobb Jr called for in *For the Common Good* (1994, ch.9), upholding democratic federalism, freeing individuals and communities to live in a way that augments the life of the ecosystems of which they are part, including human ecosystems. It supports many of the ideas of eco-socialists and eco-Marxists; however, because socialism and Marxism mean such different things to different people, it is easier to embrace the term 'ecological civilization' and use it to assimilate all that is best in socialism and Marxism, include opposition to commodity fetishism and the alienation of people from their humanity (species-being), from each other, from their creative potential (labour power) and from nature generated by this fetishism. This commodity fetishism is the root cause of the destructive exploitation of people and nature in the modern world, especially in semi-peripheral and peripheral regions of the modern world economy. Ecology provides the concepts by which humans can redefine their relations to each other and to the rest of nature and could replace those deriving from economics that have become, as Marx argued, the forms of existence in the modern world. At a broader level, they provide the basis for working towards a multi-polar world with communities at all levels organized with the appropriate institutions to control their economies rather than a world dominated by one hegemonic power imposing markets to maximize the conditions for profitability of transnational corporations. The vision of ecological civilization focuses on developing the conditions for living beings, including humans, to flourish, developing their full potential to augment life, rather than maximizing profits or simply developing the forces of production.

As I have argued elsewhere (Gare, 2010), ecology provides the basis for rethinking ethics and politics as 'ecopoiesis', that is, as 'home making' at multiple levels. Thinking in terms of communities, where even individuals are regarded as communities within broader communities while consisting of communities of individuated living structures and processes, all communities must be concerned with maintaining themselves against destructive trends in their environments and constituents, while also augmenting the conditions for the communities that

augment the conditions for their existence. These can be overlapping communities, communities within communities, or communities in more complex relations. Ultimately, this involves functioning in a way that augments the life of all broader communities, including humanity as a whole and the global ecosystem, of which each community or complex of communities is part. The ethics and politics of ecopoiesis generalizes the injunction of Rabbi Bar Hillel 2000 years ago from individuals to all communities, including national communities: 'If I am not for myself, Who for me. If I am not for others, What am I? If not now, When?' That is, in opposition to chauvinistic nationalism it promotes the liberation and development of each nation as the condition for the development of all nations.

The notion of ecopoiesis provides support for the Idealist tradition of political philosophy according to which society should be designed to remove all obstacles to the development of people's potentialities to contribute to the common good (Tyler, 2012; Higgins & Dow, 2013), and to this end, sought to institutionalize rights to pursue and uphold truth and justice without fear of retribution. However, these ideas should now be understood and defended on naturalistic foundations and thereby extended (Gare, 2017b: 183-193). The notion of ecological civilization supports institutionalist ecological economics which examines what kind of institutions are required to control markets to ensure they serve the common good of communities and to ensure that economic activity advances the real wealth of society and individuals, including improving the health of the ecosystems of which we are part and the psychological well-being of each individual (Vatn, 2005; Spash, 2015). At the same time, institutional economics upholds a different idea of what it is to be human in opposition to *homo economicus*, implying the potential through the development of humanity to create superior forms of society than those based on possessive individualism. Institutionalist ecological economics can incorporate the quest to be free of macro-parasites, the oligarchs and other rentiers who have perfected the financial institutions to put people and countries into debt to enslave people to extract rents, and, as Michael Hudson (2022) has shown, have been subverting democracy and crippling economies in the West. Human ecology can then function as a transdiscipline, integrating the most important ideas from post-reductionist, post-Cartesian economics, politics, psychology, sociology and

geography to provide a coherent framework for understanding all the complexities of communities, societies and civilizations and the relationships between people in the broader context of nature, including power relations in all their complexity, in so doing, providing the perspective required to formulate public policy (Adams, 1975; Gare, 2002).

All this illustrates the potential of ecology to overcome the fragmentation of our understanding of the current world and to envisage what kinds of economic, social and political orders and institutions we should be striving to create. In this sense, through human ecology we can explore possibilities and chart paths to realizing the ideal of ecological civilization. This will involve people coming to define themselves and their relations at all levels through the categories of ecology in place of the Hobbesian, Lockean and Benthamite categories, originating in the Seventeenth Century scientific revolution, that have dominated modernity, including vulgar Marxism. That is, creating an ecological civilization will involve not only utilizing concepts from ecology to understand and define their situation in the world and to work out how change it, but embodying the perspective of ecology in the institutions and ways of living constituting individuals, organizations, communities, societies and civilizations. This will involve incorporating while refiguring the narratives defining the diverse civilizations of the world in this global civilization, without destroying their identity and diversity, which, from an ecological perspective, has to be valued.

However, something more is required to inspire and engage people, to take seriously these values in what they aspire to and the way they live. This should be assisted by recognizing and understanding the proto-narratives of ecosystems, including the global ecosystem. These narratives are underway, and the proto-narratives of ecosystems have been constraining physical and biological processes since the beginning of life on Earth to augment the conditions for life. This is really the argument of James Lovelock (1979) in promoting the Gaia hypothesis, although not characterizing its development as a narrative. Formulating a narrative of a struggle for an ecological civilization is not just about upholding a vision of the future, but is a recovery and bringing to consciousness the narratives which engendered humanity and of which we have been and are subconsciously participants. It involves a configuring of a narrative that is already prefigured in living, even when our ways of living have developed into defective forms

subverting this prefigured proto-narrative of life. However, doing so is only possible through understanding the narratives currently dominating societies and civilizations, how they relate to institutions and power structures, and what are the possibilities of changing these. The forms of thinking that are to be embraced also have to be able to provide insight into the past and what currently exists, if a real path to what is aspired to is also revealed by these forms of thinking, that is, the ecological world-view. Configuring a narrative of questing for ecological civilization is part of the process of overcoming our alienation from this proto-narrative of life, and thereby our alienation from nature by creating new forms of social, economic and political life. This will involve recovering what has been lost with modern civilization. With the new emplotment of the grand narrative of humanity configured, we, as individuals and communities, can then refigure our lives, incorporating the idea of ecological civilization, aligned with and augmenting the proto-narrative of life, into the way we live.

The proto-narratives of ecosystems were better understood and appreciated in some respects by supposedly primitive societies, such as Australian Aboriginals who did not own their land, but felt that they belonged to the land. The Indian ecofeminist, Vandana Shiva, quoted Chief Seattle of the Suquamish tribe in America making the same claim: ''the sap which courses through the trees carries the memories of the red man. This we know, the earth does not belong to man; man belongs to the earth (Shiva, 2005, 1). These proto-narratives were also better understood by non-European civilizations. In defending 'earth democracy', Shiva drew upon the Indian notion of 'earth family' (*vasudhaiva kutumbkam*), 'the community of all living beings supported by the earth' (p.1). In China, Daoism concerned to find the right path, clearly appreciating this proto-narrative in working out how we should live, illustrates this. In Western civilization, it was evident in the Renaissance Nature Enthusiasts, the most eminent proponent of which was Giordano Bruno who was burnt at the stake in 1600, and then with the Romantics, with Friedrich Schelling, the Prince of the Romantics, being its most brilliant exponent. Schelling was explicitly concerned to revive Natural History as a theory of evolution and to conceive human history in the context of this. Opposing the neo-Darwinian debasement of evolutionary theory, the Romantic challenge was advanced through the development of process metaphysics and advances in science beyond the Newtonian paradigm, including

those associated with biosemiotics and biohermeneutics. While being the most advanced science, at the same time, this is a rediscovery of lost wisdom, the inherited traditional narratives of the past, linking us and our aspirations to this past. In accordance with Ricoeur's conclusion, but on a broader scale, recovering and reformulating the proto-narrative of the global ecosystem is a liberation of 'the unfulfilled future of the past.' (Ricoeur, 1996: 8). The strength and influence of Vandana Shiva in India, Pan Yue in China and Carolyn Merchant in USA are partly due to their success in relating the past to the present and the future in this way.

Of course there is more to articulating this utopian vision and finding paths to it than recognizing the proto-narrative of life from which we have been alienated. Recovering it has to be associated with the re-emplotment of this proto-narrative together with diverse proto-narratives of more local ecosystems and the traditional narratives of different communities, societies and civilizations and their institutions into a new dialogic grand narrative of creating an ecological civilization (Gare, 2017b, 208ff.). This should be articulated to enable individuals and communities at all levels, up to humanity as a whole, to situate themselves as active participants in this grand narrative committed to augmenting life, able to participate at each level in defining, questioning, reformulating this grand narrative and its goals, finding paths to realizing the vision promised by it, embodying it in their thinking and in their lives, no matter what their place in nature, society or civilization. As Ernst Bloch proclaimed in his book *The Spirit of Utopia* (2000, 1):

> I am. We are.
>
> That is enough. Now we have to begin. Life has been put in our hands.

agare@swin.edu.au

BIBLIOGRAPHY

Adams, Richard Newbold. 1975. *Energy & Structure: A Theory of Social Power*. Austin: University of Texas Press.

Adams, Suzi (ed.). 2017. *Ricoeur and Castoriadis in Discussion: On Human Creation, Historical Novelty, and the Social Imaginary*. London: Rowman & Littlefield.

Barbieri, Marcello. 2008. 'Life is Semiosis: The Biosemiotic View of Nature', *Cosmos and History*, 4(1): 29-51.

Bloch, Ernst. 2000. *The Spirit of Utopia,* [1964]. Trans. Anthony A. Nassar, Stanford: Stanford University Press.

Blum, William. 2014. *America's Deadliest Export: Democracy*. London: Zed Books.

Daly, Herman E. & John B. Cobb Jr. 1994. *For the Common Good.* 2nd ed. Boston: Beacon Press.

Deacon, Terrence W. 1997. *The Symbolic Species: The co-evolution of language and the brain.* New York: Norton.

Depew, David J. and Bruce H. Weber. 1996. *Darwinism Evolving: Systems Dynamics and the Genealogy of Natural Selection*. Cambridge, Mass.: MIT Press.

Engels, Friedrich. 1978[1880]. 'Socialism, Utopian and Scientific'. In: Robert C. Tucker (ed.), The *Marx-Engels Reader*, pp.683-715. New York: W.W. Norton & Company,

Favareau, Donald. 2010. 'Introduction: An Evolutionary History of Biosemiotics'. In: Donald Favareau (ed.). *Essential Readings in Biosemiotics: Anthology and Commentary*. Dordrecht: Springer, pp.1-80.

Gare, Arran. 2002. 'Human Ecology and Public Policy: Overcoming the Hegemony of Economics', *Democracy and Nature*, 8(1): 131-141.

Gare, Arran. 2010. 'Toward an Ecological Civilization: The Science, Ethics, and Politics of Eco-Poiesis', *Process Studies,* 39(1): 5-38.

Gare, Arran. 2014. 'Speculative Naturalism: A Manifesto', Cosmos & History: The Journal of Natural and Social Philosophy, 10(2): 300-323.

Gare, Arran. 2017a. 'Chreods, Homeorhesis and Biofields: Find the Right Path for Science through Daoism', *Progress in Biophysics and Molecular Biology,* Issue 131, December: 61-91.

Gare, Arran. 2017b. *The Philosophical Foundations of Ecological Civilization: A Manifesto for the Future*. London: Routledge.

Gare, Arran. 2019a. 'Biosemiosis and Causation: Defending Biosemiotics Through Rosen's Theoretical Biology, or, Integrating Biosemiotics and Anticipatory Systems Theory'. *Cosmos and History: The Journal of Natural and Social Philosophy*, 15(1): 31-90.

Gare, Arran. 2019b. 'The Ecosocialist Roots of Ecological Civilization', *Capitalism, Nature, Socialism,* 32(1): 37-55.

Gare, Arran. 2020. 'Semiosis and Information: Meeting the Challenge of Information Science to Post-Reductionist Biosemiotics', Biosemiotics, 13(3): 327-346.

Gare, Arran. 2021. 'Against Posthumanism: Posthumanism as the World-Vision of House Slaves', *Borderless Philosophy*, 4: 1-56.

Gare, Arran. 2022. 'Life Processes as Proto-Narratives: Integrating Theoretical Biology and Biosemiotics Through Biohermeneutics', *Cosmos & History: The Journal of*

Natural and Social Philosophy, 18(1): 210-251.

Higgins, Winton & Geoff Dow. 2013. *Politics Against Pessimism: social democratic possibilities since Ernst Wigforss*. Berne: Peter Lang.

Hoffmeyer, Jesper. 1993. *Signs of Meaning in the Universe.* Trans. Barbara J. Haveland, Bloomington: Indiana University Press.

Hudson, Michael. 2022. *The Destiny of Civilization : Finance Capitalism, Industrial Capitalism or Socialism*. Islet Verlag.

Jacoby, Russell. 1981. *Dialectic of Defeat : Contours of Western Marxism.* Cambridge: Cambridge University Press.

Jacoby, Russell. 1999. *The End of Utopia: Politics and Culture in an Age of Apathy*. New York, NY: Basic Books.

Johnson, Mark. 1987. *The Body in the Mind: the Bodily Basis of Meaning, Imagination, and Reason.* Chicago: University of Chicago Press.

Johnson, Mark. 2007. *The Meaning of the Body: Aesthetics of Human Understanding.* Chicago: University of Chicago Press.

Kauffman, Stuart and Arran Gare, 2015. 'Beyond Descartes and Newton: Recovering life and humanity', *Progress in Biophysics and Molecular Biology,* 119: 219-244.

Kearney, R. 1984. *Dialogues with Contemporary Continental Thinkers.* Manchester: Manchester University Press.

Klein, Naomi. 1999. *No Logo*. New York, N.Y.: Picador.

Kovel, Joel. 2007. *The Enemy of Nature: The End of Capitalism or the End of the World?* London: Zed Books.

Kull, Kalevi. 2009. 'Vegetative, Animal, and Cultural Semiosis: The Semiotic Threshold Zones', *Cognitive Semiotics,* 4: 8-27.

Kull, Kalevi. 2010. 'Ecosystems are Made of Semiotic Bonds: Consortia, Umwelten, Biophony and Ecological Codes', *Biosemiotics,* 3: 347-357.

Lacková, Ludmila and Dan Faltynek, 2021. 'The lower threshold as a unifying principle between Code Biology and Biosemiotics', *BioSystems*, 210, 2021: 1-8.

Li, Minqi. 2016. *China and the 21st Century Crisis*. London: Pluto Press.

Lovelock. J.E. *Gaia: A New look at Life on Earth.* Oxford: Oxford University Press.

Mannheim, Karl. 1953 [1936]. *Ideology and Utopia.* Trans. Louis Wirth and Edward Shils. London: Routledge & Kegan Paul.

Margulis, Lynn and Dorian Sagan. 2000. *What is Life?* Berkeley: University of California Press.

Markoš, Anton and Švorcová, Jana. 2019. *Epigenetic Processes and the Evolution of Life*. Boca Ranton: CRC Press.

McCoy, Alfred W. 2017. *In the Shadows of the American Century: The Rise and Decline of US*

Global Power. Chicago: Haymarket Books.

Moore, Jason W. 2015. 'Introduction: Anthropocene or Capitalocene? Nature, History, and the Crisis of Capitalism'. In: Jason W. Moore ed. *Anthropocene or Capitalocene? Nature, History, and the Crisis of Capitalism*. Oakland, CA: Kairos.

Polak, Fred. 1973. *The Image of the Future*. Trans. and abridged by Elise Boulding, San Francisco: Josey-Bass.

Popov, Igor. 2018. *Orthogenesis versus Darwinism*. Trans. Natalia Lentsman. Cham, Switzerland: Springer.

Ricoeur, Paul. 1984. *Time and Narrative, Volume I*. Trans. Kathleen McLaughlin and David Pellauer, Chicago: University of Chicago Press.

Ricoeur, Paul. 1986. *Lectures on Ideology and Utopia*. George H. Taylor, ed. New York: Columbia University Press.

Ricoeur, Paul. 1996. 'Reflections on the New Ethos of Europe'. In: Richard Kearney ed. *The Hermeneutics of Action*. London: Sage: 3-39.

Robinson, William L. *A Theory of Global Capitalism: Production, Class, and State in a Transnational World*. Baltimore: John Hopkins University Press.

Rosen, Robert. 1999. *Essays on Life Itself*. New York: Columbia University Press.

Sebeok, Thomas A. & Jean Umiker-Sebeok eds. 1992. *Biosemiotics: The Semiotic Web*. 1991. Berlin: Mouton de Gruyter.

Shiva, Vandana. 2005. *Earth Democracy: Justice, Sustainability and Peace*. Cambridge: South End Press.

Spash, Clive L. 2015. *Routledge Handbook of Ecological Economics*. London: Routledge.

Robinson, William I. 2020. *The Global Police State*. London: Pluto Press.

Taylor, George H. 1986. 'Editor's Introduction'. In: Paul Ricoeur, *Lectures on Ideology and Utopia:* ix-xxxvii.

Thompson, Peter. 2013. 'Introduction: The Privatization of Hope and the Crisis of Negation'. In: *The Privatization of Hope: Ernst Bloch and the Future of Utopia*. ed. Peter Thompson and Slavoj Žižek. Durham: Duke University Press.

Turchin, Peter 2016.. *Ultrasociety*. Chaplin: Connecticut: Beresta Books.

Tyler, Colin. 2012. *Civil Society, Capitalism and the State*. Part 2 of The Liberal Socialism of Thomas Hill Green. La Vergne: Imprint Academic.

Ulanowicz, Robert E. 1997. *Ecology: The Ascendent Perspective*. New York: Columbia University Press.

Ulanowicz, Robert E. 2009. *A Third Window: Natural Life beyond Newton and Darwin*. West Conschohocken: Templeton Foundation Press.

Vatn, Arild. 2005. *Institutions and the Environment*. Cheltenham: Edward Elgar.