# Ecological Subjects

'The ecological crisis sends us back to a general state of crisis in society, politics and existentialism.'

—Felix Guattari, *The Object of Ecosophy*

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In recent decades we have witnessed a growing awareness of the extraordinary scale and profundity of the global environmental crisis imitated by industrial capitalism and a cultural hubris regarding our very conceptions of "nature." Ecology, a term that emerged into popular consciousness in the sixties as a byword for radical "holistic" and "systemic" thinking, has returned to prominence in recent years across multiple fields signaling a renewed attempt to engage with broader environmental questions.

One of the most compelling extensions of ecological thought can be found in the late work of Felix Guattari. Although he does leave various clues, Guattari is indebted to the work of the nomadic scientist Gregory Bateson. Deleuze and Guattari's seminal text "A Thousand Plateaus" references Bateson's work, and their metaphorical model of rhizomes is a reworking of Bateson's relational "ecology of mind".

I aim to contribute to the ecosophical project through a brief consideration of Bateson's work within the broad context of ecological thought. In particular I suggest that understanding socio-economic-ecological systems in relation to social justice has become a key task of urban political ecology. Bateson's thought has some important contributions to make in the study of the basic relations between ecology, economics and the architectural-urban.

## ECOLOGY

Within the natural sciences, ecology is characterized as a non-reductive and frequently holistic approach which focuses on the organization and internal/external relational dynamics of 'wholes' or 'assemblages' (such as ecosystems). This is in contradistinction to the orthodox ideology of modern scientific practice which is based upon a reductivist analysis of phenomenal wholes into 'fundamental' parts. Throughout the twentieth century ecology co-evolved with associated disciplines such as cybernetics and systems theory, and many important theorists – including Ludwig von Bertallanfy, Gregory Bateson, Francisco Varela, Humberto Maturana and James Lovelock – migrated between these different areas, making contributions to all. Outside of the life sciences, ecology has come to signify something closer to a paradigm rather than a specific discipline, as a culture and

holistic science of systemic interconnection in general (in for example, the work of Fritjof Capra).

As a discourse, ecology brings together many contradictory roots. It exists as a hard scientific discipline, yet it also has allegiances with the environmental movement and ecocentric theory. In a wider sense ecology has an irreducible complexity; combining many of the insights of modern science mixed with intellectual, religious and romantic legacies, ideas and practices . As an illustration of these necessarily contradictory tendencies, ecocentric thinkers typically assert that western scientific methods view the natural world as something to be exploited and experimented upon. They then go on to cite scientific evidence collected as proof of this damage!

(There is of course no necessary problem with holding contradictions at one level of reasoning in such a way that they form a coherent whole at another stage of logic – indeed this is one major contribution that dialectical thought can make to ecological thinking).[1]

Today, ecology as a suffix is frequently used to signify a general systems theory based approach to any complex area. Think for example of the growing plethora of disciplines such as human ecology, social ecology, deep ecology, industrial ecology and political ecology, to name but a few. an ever-expanding series of ecology-based concepts - cybernetic ecologies; machine ecologies; stealth ecologies; performance ecologies - have been proposed in architectural theory and design.[2]

Clearly, ecological analysis articulates the stresses that contemporary industrial systems are placing upon the biosphere.

## ECOLOGY AND ECONOMY

Ecology, first coined in print by Ernst Haeckel who defined it as "the relations of living organisms to their surroundings,"[3] questions our definition of what is an organism and what is an environment. These questions are not as straight forward as common definitions might suggest. Alan Watts noted that "the boundary of the organism is also the boundary of its environment,"[4] and James J. Gibson similarly observed that "it is often neglected that the words "animal" and "environment" are inseparable. Each term implies the other."[5] Arne Naess, a deep ecology philosopher similarly stated that "environments are networks or fields of relations in which things participate and from which they cannot be isolated." Gregory Bateson, drawing upon Alfred North Whitehead, noted that the fundamental unit of evolution was not the organism, but rather the organism plus environment.

The "relations" that Haeckel refers to then are, in complex ways, networks of internal and external flows that operate at multiple organizational scales or orders. In the case of the human, they describe a set of organism-environment relations that must include social, cultural and economic agents. Nonetheless, the basic definition of ecology as the study of organism-environment relations, shares concerns with architecture and urbanism, which might themselves be broadly defined as the production of the environment of the human organism and

the study of the relations between individual and collective human entities and their environments.

Different forms of ecological theory typically work through and define different conceptions of nature. For example, in various forms of deep ecology there is paradoxically a distinct and thoroughly cultural conception of nature as that which is entirely other than and opposed to human culture, a nature that always "knows best." Adrian Forty has noted that "the distinction between the world created by man – 'culture' - and the world in which man exists – 'nature' - has been, perhaps, the single most important mental category ever conceived."[6] Certainly in ecological discourse the tension between a conception of nature in opposition to culture (as can be found in many versions of deep ecology) and a conception of culture as a part of nature (as found in urban political ecology) defines some of the clearest distinctions between different ecological traditions. Increasingly, some theorists suggest that ecological thought needs to move beyond the concept of nature entirely.[7]

Nonetheless, both of the strands that I am considering (UPE and Bateson) continue to use the term "nature," but in both cases human culture (or second nature) is dialectically part of nature.

In his analysis of *Capital* David Harvey developed Marx's conception of a human "relation to nature" in order to describe the sum of our metabolic interactions with the wider non-human world and our mental conceptions of these relations. Harvey states that:

> Construing the relation to nature as inherently dialectical indicates a range of possible transformations in human relations as well as a possible process of natural evolution, including the human production of nature itself, that renders this relation dynamic and perpetually open. While on the one hand such a formulation would appear to deny the possibility of any out-and-out or prolonged, let alone 'final', environmental crisis, it also carries within it the prospect for cascading unintended consequences and widespread disruptive effects for the continuity of daily life as we know it.[8]

Harvey's conception of our relation to nature must be understood within the context of an associated group of neo-Marxist theorists (others would include Neil Smith, John Bellamy Foster and Ted Benton), all of whom have consistently argued that a modern ecological theory can be found in Marx's conceptual framework. We need to understand Marx as a fundamentally ecological thinker. Foster in particular has attempted to reveal Marx's ecology, noting that:

> A thoroughgoing ecological analysis requires a standpoint that is both materialist and dialectical ... [A] materialist sees evolution as an open-ended process of natural history, governed by contingency, but open to rational explanation. A materialist viewpoint that is also dialectical in nature (that is, a non mechanistic materialism) sees this as a process of transmutation of forms in a context of interrelatedness that excludes all absolute distinctions .... A dialectical approach forces us to recognise that organisms in general do not simply adapt to their environment; they also affect that environment in various ways by affecting change in it.[9]

These texts provide an important part of the critical canon of urban political ecology. In a key paper, Erik Swyngedouw argued that "'metabolism' is the central metaphor for Marx's definition of labor and for analyzing the relationship between human and nature,"[10] and proposes that

> historical materialism has been among the first social theories to embrace and mobilise 'metabolism' and 'circulation' as entry-points in undertaking [Jameson's] 'ontologies of the present that demand archaeologies of the future'."[11]

Although UPE represents a distinct, contemporary attempt to think ecology as an urban and economic concept, this is by no means an entirely novel move. The word ecology is derived from Greek *oikos* meaning "household", and it might be translated as both the science of running a home and the science of running an economy. Ecology and architecture share this relation of dwelling and economics. In fact, it internalizes many of the same complex contradictions that characterize modern architectural knowledge and practice.

Ecology and economy share more that etymology. In important ways ecological theory is simply an economics of nature. This is suggested in one of the early proto- ecological texts, Linnaeus' 1749 *Oeconomy of Nature*, and confirmed in Haeckel, who stated in his initial definition that "by ecology we mean the body of knowledge concerning the economy of nature."[12]

Not surprisingly, there are a series of key concepts common to both ecology and economy, most notably growth, and circulation.[13] And as we have seen, Marx introduced process-organicist concepts into political economy. For Marx metabolism was an extraordinarily significant concept that described labor's fundamental process, the interface between the human organism and the broader web of life. He stated that:

> Labour, as the creator of use values, as useful labour, is a condition of human existence which is independent of all forms of society; it is an eternal natural necessity which mediates the metabolism between man and nature, and therefore human life itself.[14]

However, if a radical socio-political form of ecology, sketched by Marx, has developed in recent years, the mainstream of ecological discourse has unsurprisingly been shaped by the concerns of capital. Ecology transmitted metaphors between the analysis of economic networks, and the analysis of non-human living systems. It was, from the start, a body of applied knowledge that developed to manage the integration and expansion of the human economy into non-human economies. Ecology as a profession was one of a series of disciplines that emerged in the eighteenth and nineteenth centuries at the metabolic interface of capitalist production and the planet. Donald Worster has suggested that ecology has both Arcadian and imperialist roots, a double lineage that characterizes individual thinkers as well as ecological thought as a whole. For example, in the late eighteenth century the Dutch and English East India companies were among the first to employ scientists in an ecological capacity. These companies operating at the leading edge of capitalist development, involved in everything from colonial governance to the management of local landscapes and global material flows, required systems thinking.

Ecology continued to theorize an economics of nature based primarily in the study of how energy and matter flow through organisms and networks of organisms. In the post war period Eugene Odum adopted the term 'ecosystem'[15] and, in the 1953 Fundamentals of Ecology written with his brother Howard T. Odum, started to describe the flows of flows of matter and energy in simple diagrams. As Pepper notes:

> Energy and matter flow along pathways within a system before leaving it, and for an open system there is much exchange of matter between it and the environment, whereas a closed system is characterised by maximum recycling of material ... Mature ecosystems (e.g. Appalachian forests) display high organisation (i.e. minimal entropy) because they are more diverse than immature ecosystems. They have more species and more niches are filled, and they are able to capture more matter and slow down energy dissipation.[16]

H. T. Odum especially pioneered theories and practices around systems ecology and ecological energetics, which included studies of human- natural systems economics.[15] Odum noted that "the study of energy in nature does not necessarily imply an economic framework. But that is the way it is has been assimilated."[17]

#### GREGORY BATESON AND THE ECOLOGY OF MIND

Perhaps the single most innovative and important re-conception of the project of ecology emerged in the work of Gregory Bateson. For Bateson the tendency of ecological and systems thinkers like the Odum brothers and Forrester's MIT research group (authors of the Club of Rome's 1972 *Limits to Growth* report) to focus primarily on quantitative energy and material flows in ecological science was problematic for two reasons. First, ecosystems had to be considered as communicating and informational systems, even as mental systems, not just as material and energetic systems. Ecologists were "overemphasising energy exchange and attending insufficiently to information exchange,"[18] he argued. Secondly, he emphasized that to properly understand ecosystems, we need to find ways to think ecologically, recognizing ourselves as a part of the system being observed. Bateson does not refer to information systems that might sit 'on top' of more fundamental matter and energy flows. Rather he emphasizes that 'information' is immanent with the relations of these flows. He argues that in networks of interdependent energetic circuits (such as an ecosystem) some circuits will act in informational ways, changing other flows (which might also be acting in informational ways with respect to other flows etc). In line with his broader critique of science, he argued that confusions around the semiological character of ecological networks were compounded with even more erroneous instrumentalising tendencies. Specifically, he noted that ecology claimed the task of managing planetary systems, but that this task, according to ecological systems theory itself, was problematic. Bateson frequently referred to Ross Ashby's Law of *Requisite Variety* to describe how, ultimately, in complex systems a part can never control (or know) the whole without damaging reduction.

Like many other cyberneticians, Bateson's research focused around the question of how organized material, biological and social systems display mental characteristics.  He argued that the nature/culture dualism was a special form of the mind/matter dualism, and he developed an alternative ecological theory

of mind. The key to Bateson's model is a conception of "mental process" in matter that is based upon responses to information, which he defines as any "difference that makes a difference."[19] For Bateson, the ecology of the living world is full of mind, constituted relationally, in networks through activity, their actual material life-process. Ecosystems and organisms are ecologies of mind. Today we might refer to aspects of what Bateson meant by 'mind' as 'agency.' Human consciousness extends across and within these social and cultural ecologies (such as language) as an ecological condition. Consciousness is not in any simple way solely located in the individual brain. His work anticipated cognitive sciences' conceptions of an embodied and extended mind:

> The individual mind is immanent but not only in the body. It is immanent also in the pathways and messages outside of the body; and there is a larger Mind of which the individual mind is only a subsystem... immanent in the total interconnected social system and planetary ecology.[20]

For Bateson, the fact that our minds are ecologically extended allows him to propose a powerful thesis regarding the effects of environmental damage upon the human psyche, and a radical reformulation of environmental damage as a form of mental illness, which parallels in fascinating ways the conceptions of alienation in Marx. Using the example of Lake Erie, an ecosystem in a state of collapse Bateson wrote,

> You decide that that you want to get rid of the by-products of human life and that Lake Erie will be a good place to put them. You forget that the eco-mental system called Lake Erie is a part of your wider eco-mental system - and that if Lake Erie is driven insane, its insanity is incorporated in the larger system of your thought and experience.[21]

Should Bateson's critique of the post-war ecological focus upon managing matter and energy flows be asked again today? Bateson never really approached the questions that urban political ecology has posed about whose interests are represented by the organization, management and ownership of these metabolic flows. Nonetheless, his concern with describing the informational character of relational agency, and his reminder that we can never control and manage the totality of non-human agencies, could evolve into a radically open-ended "aesthetic" relation, presenting a powerful critique of more instrumental versions of ecological urbanism.

David Harvey, exemplary in engaging with ecological discourse, is critical of those aspects of ecocentric thought that are reactionary and nostalgic, even while he acknowledges that the traditions of organic and ecological philosophy, emphasizing process and relational thinking, share something with Marxian dialectical theory. He suggests that we might

> learn a great deal from trying to understand ecocentric lines of thought ... They help concentrate my mind on the qualitative as well as the quantitative conditions of our metabolic relation to the world and raise important issues about the manner of relating across species and ecological boundaries that have traditionally been left on one side in many Marxist accounts.[22]

## ENDNOTES

1. See in this regard the excellent Richard Levins and Richard Lewontin, *The Dialectical Biologist* (Cambridge: Harvard University Press, 1987).

2. All of these '-ecologies' taken from studio briefs in London architecture schools in recent years.

3. Ernst Haeckel, cited in Reiner Grundmann, *Marxism and Ecology*, (Oxford: Clarendon, 1991), p.1. In fact, the complexity of any critical and ideological understanding of ecological thought is soon revealed through a consideration of the work of its nominal 'founder,' Ernst Haeckel. One of the most important scientists of the late nineteenth/early twentieth century period, he is still well known still today on account of his extraordinary drawings of plants and organisms. He was an early (holistic- organic) systems thinker in biology,and helped to develop the concept of an environment. Marx and Engels considered his early scientific work favourably.Later in his career, Haeckel, like some in England, began to adopt social Darwinian positions. However, whereas social Darwinism expressed an individualist libertarianism (Spencer's 'survival of the fittest') in England, Haeckel's took a decidedly nationalist-collectivist turn. Haeckel actually denied the validity of the concept of humanity altogether, claiming that it was a internationalising socialist fiction and that actually so-called humanity was a mix of distinct species (some closer to the animal world than others), and that these were further determined by their environmental regions into national races. It was the combination of race plus region that defined the nation as an organism, competing for *Lebensraum*. Needless to say, Haeckel's version of organicism proved all too useful to fascist ideologues to adopt.

4. Alan Watts, cited in Douglas G Flemons,*Completing Distinctions - Interweaving the Ideas of Gregory Bateson and Taoism into a unique approach to Therapy* (Boston: Shambala, 1991) p.31

5. James J. Gibson, *The Ecological Approach to Visual Perception* (Boston: Houghton Mifflin, 1979) p.8.

6. Adrian Forty, *Words and Buildings: A Vocabulary of Modern Architecture* (London: Thames and Hudson, 2000) p.220. Forty does in factrefer to both Smith and Harvey in this chapter ('Nature').

7. See Timothy Morton, *The Ecological Thought* (Cambridge, MA and London: Harvard University Press, 2010), and Timothy Morton, *Ecology without Nature: Rethinking Environmental Aesthetics* (Cambridge, MA.: Harvard University Press, 2007).

8. David Harvey, *The Enigma of Capital - and the Crises of Capital* (London: Profile Books, 2010) p.74.

9. John Bellamy Foster, *Marx's Ecology* (New York: Monthly Review Press, 2000) pp.15-16.

10. Erik Swyngedouw 'Metabolic Urbanisation - The making of cyborg cities' in Nik Heynen, Maria Kaika and Erik Swyngedouw (eds.), *In the Nature of Cities - Urban Political Ecology and the politics of Urban Metabolism* (London: Routledge, 2006) p.26.

Harvey goes on to set out a clear project for a contemporary progressive politics, arguing that

> for Marxists, there can be no going back, as many ecologists seem to propose, to an unmediated relation to nature (or a world built solely on face to face relations), to a pre-capitalist and communitarian world of non-scientific understandings with limited divisions of labour. The only path is to seek political, cultural and intellectual means that 'go beyond'... The emancipatory potential of modern society, founded on alienation, must continue to be explored. But this cannot be, as it so often is, an end in itself, for that is to treat alienation as the end point, the goal. The ecologists' and the early Marx's concern to recuperate 'in higher form' the alienation from nature (as well as from others) that modern day capitalism instantiates must be a fundamental goal of any ecosocialist project.[23]

Architecture has, as a body of knowledge, consistently reflected upon, expressed, or put into relation, the human and the natural, the material and the mental, the local and the global, albeit often in highly problematic ways. A critical engagement with ecological and cybernetic theory as architectural research has the potential to generate an entirely new ecology of knowledge. Spatial environments are one of the primary ways by which we have socially extended and progressively alienated our organs and minds. Today, we need to re-conceive of what we understand by nature and our relationship to it. We need to propose new formations and new metabolisms of country and city, we need to re-theorize alienation, health and well-being, and radically re-imagine our ecological subjectivity. ◆

11. ibid., p.22.
12. Ernst Haeckel, *General Morphology of Organisms; General Outlines of the Science of Organic Forms based on Mechanical Principles through the Theory of Descent as reformed by Charles Darwin* (Berlin). Quoted in Frank Benjamin Golley, *A History of the Ecosystem Concept in Ecology* (New Haven, Conn.: Yale University Press, 1993) p.207.
13. Circulation was coined as a concept by the physician William Harvey, in his research on blood flow in the body, in the early seventeenth century. It was, as Adrian Forty has observed, soon adopted into architectural thinking (as circulation through buildings), and later political economy, as the circulation of money and goods. For a discussion of the conceptual history of circulation and metabolism (and in relation to Marxian political ecology) see Eric Swyngedouw 'Metabolic Urbanisation: The making of Cyborg Cities' in Nik Heynen, Maria Kaika and Eric Swyngedouw (eds.), *In the Nature of Cities: Urban Political Ecology and the politics of Urban Metabolism* (London: Routledge, 2006), pp.25-33. Adam Smith of course saw the free market economy as akin to an organism—a spectral entity whose "invisible hand' would emerge as a higher level of rational organisation.
14. Karl Marx, *Capital vol.1* (London: Penguin, 1990) p.133.
15. The term 'Ecosystem' was first coined by Roy Clapham in 1930, although its modern sense derives from Arthur Tansley (1935). Tansley replaced American plant ecologist, Frederic Clements' concept of 'super-organism' with 'ecosystem', which he defined as "a community of organisms and their physical environment interacting as an ecological unit."
16. David Pepper, *The Roots of Modern Environmentalism* (London: Croom Helm, 1984), p.103-4.
17. Eugene Odum, cited in Pepper, *Modern Environmentalism*, p.283-4. Odum's post-war attempts to generate out of ecology a universal systems language paralleled broader attempts to grasp human ecologies, and statistical and conceptual tools migrated between economics, ecology, cybernetics and general systems theory. In several cases architectural thought played important roles in helping to conceive of and represent global systems, with significant contributions from thinkers such as Buckminster Fuller, Doxiades, and Charles and Ray Eames, for example.
18. Gregory Bateson and Mary Catherine Bateson, *Angels Fear - Towards an Epistemology of the Sacred* (Cresskill: Hampton Press, 2005) p.208
19. Gregory Bateson, 'Form, Substance and Difference' in *Steps to an Ecology of Mind* (Chicago: University of Chicago Press, 2000) p.468.
20. Ibid., p.467.
21. Gregory Bateson, 'Pathologies of Epistemology ' in *Steps to an Ecology of Mind,* p.492.
22. David Harvey, 'Marxism, Metaphors, and Ecological Politics' in *Monthly Review*, 49 (11) (1998) at http://www. monthlyreview.org/498harve.htm.
23. David Harvey, *Justice, Nature, and the Geography of Difference* (Malden, MA: Blackwell, 1996), p.198