

# From urban ecology to ecological urbanism: an ambiguous trajectory

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*The term 'ecology', which first emerged in relation to the biological sciences in the 19th century, has subsequently undergone a series of conceptual permutations in an urban context. Existing tensions around the definition of 'the city' as an object of analysis have become further complicated by the increasing deployment of ecological metaphors in urban design and related fields. It is suggested that the limitations of urban ecology, as a coherent approach for urban analysis or intervention, stem from the dynamic, interdependent and historically contested characteristics of urban nature and the ambiguous dimensions to ecology as a leitmotif for urban politics.*

**Key words:** urban sustainability, urban ecology, ecological urbanism

For the city of the future, the concept of the balanced, stable and diverse city ecosystem needs to be recognized as a goal and planned in both strategic and detailed policies.

Ian Laurie<sup>1</sup>

For the Manchester-based landscape planner Ian Laurie, writing in the 1970s, the presence of nature in cities was an untrammelled good for a combination of aesthetic, psychological and bio-physical reasons. Laurie formed part of a wider circle of writers and practitioners in the 1960s and 1970s who sought to redefine the scope of nature in urban design as a challenge to the perceived failures and limitations of technocratic planning and as a practical response to the material conditions of post-industrial cities and landscapes. Underpinning the thinking of Laurie and his contemporaries was a close engagement with the emerging scientific field of urban ecology as an opportunity to rethink the role of urban design in enhancing the liveability and long-term viability of cities. The term 'ecology' is now almost ubiquitous in urban environmental discourse, especially in the post-Rio context, with different elements of ecological thinking now woven into a wide range of public policy concerns ranging from the protection of biodiversity to the shaping of more energy-efficient urban form. The conceptualisation of urban space as an interdependent set of socio-ecological relationships has now permeated a broad spectrum of professional and scientific domains.

The origins of the modern term 'ecology' lie within the work of the German zoologist Ernst Haeckel (1834–1919), who first used the word in 1866 to refer to environmental influences on the development of individual organisms. Yet Haeckel's interest in the interaction between organisms and their environment certainly has earlier roots, especially in the pattern-oriented botanical studies of Alexander von Humboldt and the transformation of natural history into what would become the natural sciences (see Dettelbach 1996; Krause 1987). Humboldt's interest in 'plant sociology', later elaborated by the Swiss botanist Josias Braun-Blanquet and others, provides an intellectual lineage between cartographic techniques such as isometric mapping and the eventual emergence of urban ecology as a distinctive sub-field within both the biological and social sciences. During the 20th century, the scope of ecology within the biological sciences expanded to acquire a more clearly defined spatial connotation through related terms such as ecosystem, ecotope and ecological zone. Under the influence of Frederic Clements, Charles Elton and more recently Edward O. Wilson, the focus of ecology gradually moved towards various forms of 'human ecology', including distinctive fields of 'applied biology' such as ethology and sociobiology.

The use of ecology as an analytical tool for understanding capitalist urbanisation was extended significantly through the influential essays of Robert E. Park,

Ernest W. Burgess and Roderick D. McKenzie, whose work contributed towards the formation of the Chicago School of Urban Sociology before its gradual demise after the late 1930s (see Berry and Kasarda 1977; Duncan 1961; Gaziano 1996). Insights drawn from vegetation dynamics, and in particular the emphasis on processes of plant invasion and succession, were used to develop a neo-Darwinian model of urban change driven by the competitive outcomes of individual decisionmaking. The concept of ecology utilised by the Chicago School rested on a dualistic distinction between society and nature within which models of 'nature' and the presence of 'natural areas' originated outside the urban process as part of a naturalistic framework of analysis (see Wolch *et al.* 2002). By the 1960s and 1970s the emergence of the term 'ecological studies', though related to the Chicago School, marked a more elaborate engagement with quantifiable variables that could be correlated across urban space in an attempt to resuscitate an ecological paradigm that was divested of its earlier neo-Darwinian analogies (see Berry and Kasarda 1977). The cartographic impetus behind the modification of ecological approaches within spatial science began to edge closer towards incipient trends within urban ecology as an emerging sub-field within the biological sciences, focused on the spatial and ecological dynamics of non-human nature in cities. The growing interest in population dynamics rather than crudely atomistic interpretations of human behaviour also connected with emerging interest in human ecology, self-regulatory homeostatic systems and attempts to develop more sophisticated models for the analysis of urban environmental change.

From the 1930s onwards a distinctive field of 'urban botany' began to develop that differed from the emphasis of 'plant sociology' on native ecological assemblages or more narrowly defined types of cultural landscapes. In the post-war era the study of urban ecology was given added impetus by the presence of numerous ruderal spaces, especially in the war-damaged cities of Europe, which served as a myriad of scientific laboratories for the study of novel or unusual biotopes (see, for example, Fitter 1945; Lachmund 2003). The study of cities through the lens of plant sociology was adopted as an analytical model by urban botanists to produce a distinctive scientific field concerned with the material characteristics of urban environments. The botanist Paul Duvigneaud, for example, shifted his focus from tropical ecology to the city of Brussels and investigated phenomena such as the urban heat island effect (see Duvigneaud 1974). While Herbert Sukopp, working within the island city of West Berlin, challenged the existing limitations of plant sociology by exploring the full complexity of urban nature including the presence of 'weeds' and non-native species. The emphasis of Sukopp and others on what we might

term 'cosmopolitan ecology' even became influential within the politics of land use planning in West Berlin during the 1980s. The brief impact of what Jens Lachmund (2013) has referred to as a 'biotope-protection regime' in West Berlin marks a unique conjunction between urban ecology, as a methodologically distinct branch of the biological sciences, and a wider grassroots challenge towards technocratic or narrowly utilitarian forms of urban policy making. At an ideological level this applied strand of urban ecology posed significant questions about the nature of landscape authenticity and the scope of nature conservation against a background of growing environmental consciousness in German cities.

Despite the direct engagement of botanists and other scientists with land use planning, however, this phase of urban ecology faced a number of methodological and political uncertainties. The ecological models never strayed far from a largely positivist conception of socio-ecological relations within which the political context for environmental degradation and the role of human agency in the production of space remained ill-defined. Furthermore, the expert-led vision for urban nature, albeit in opposition to dominant modes of urban policymaking, rested on a limited conception of the public realm that did not fully reflect the social complexity of the city or the potential impediments to democratic participation in environmental policymaking.

An interesting contrast with what we might term the 'Berlin-Brussels School' of urban ecology begins to appear from the early 1990s onwards with the development of 'urban political ecology', which initially emerged out of the predominantly rural emphasis of work associated with 'political ecology' concentrated particularly within the global South. In essence, the combination of ecological insights with political economy, pioneered by Piers Blaikie, Harold Brookfield, Michael Watts and others during the 1980s, was extended into the urban arena (see Zimmer 2010). The emergence of urban political ecology marked a widening of the empirical scope of political ecology and a degree of conceptual convergence with existing strands of critical environmental thought including Frankfurt School-inspired critiques of bourgeois environmentalism and the destruction of nature (see, for example, Görg 1999 2011; Trepl 1996). This broadly neo-Marxian approach adopted within urban political ecology emphasised the socio-ecological interdependencies of urban space and the co-evolutionary dynamics of capital circulation and the production of the built environment. In an influential essay collection published in 2006, for example, the editors set out a 'manifesto' for urban political ecology comprising several key elements: an emphasis on the co-determination of social and environmental change; a relational conception of nature that drew in particular from Donna Haraway's critique of

nature–culture dualisms; an expanded conception of urban metabolism and the circulatory dynamics of urban space; an emphasis on the intersections between power and social difference within the urban arena, including connections with issues of social and environmental justice; an expanded critique of scientism and the putative impartiality of technocratic policy discourse; and the centrality of democratic deliberation to any meaningful conception of urban sustainability (see Heynen *et al.* 2006). Yet what is striking about this summary definition, published almost a decade ago, is that the science of ecology itself plays a relatively minor role (see also Walker 2005). The emphasis of urban political ecology on the socio-ecological dynamics of urban space has consequently adopted a somewhat narrow conception of ecology and the epistemological complexities of non-human nature (see also Robbins and Sharp 2006). In essence, the implicit interdisciplinary agenda, as set out in the 1990s, has yet to be fully developed even though empirical domains such as urban epidemiology, nested conceptions of socio-ecological scale or neo-vitalist accounts of nature could provide fruitful fields for further investigation.

An additional area of uncertainty facing urban political ecology is what constitutes the city or the urban process as a focus of analysis. Recent critiques of ‘methodological cityism’ call for a reconnection with the ‘Lefebvrian promise’ of earlier studies (see Angelo and Wachsmuth 2014). The idea of ‘the city’ as a bounded material entity is recognised as merely one facet of a broader shift towards what has been termed ‘planetary urbanisation’ in a contemporary elaboration of Henri Lefebvre’s original distinction between cities and urbanisation (see Brenner 2014). An expanded conception of what constitutes ‘the urban’ now encompasses various types of ‘ecological frontiers’ or ‘operational landscapes’ within which cities represent concentrated nodes of global consumption.

An interest in questions of scale, as well as methodological diversification, is also evident in the recent emergence of ‘ecological urbanism’ rooted in the radical extension of ecological metaphors within urban design discourse. Perhaps the most influential recent definition of ecological urbanism is set out in an essay collection that emerged from a conference held at Harvard University’s Graduate School of Design in 2009 (see Mostafavi and Doherty 2010). At a conceptual level the intellectual framing of ecological urbanism marks an engagement with the ‘ecosophic problematic’ of Félix Guattari (2000 [1989]) and his elaboration of Gregory Bateson’s critique of neo-Darwinian thinking. The conceptual agenda for ‘ecological urbanism’ also shares significant conceptual and institutional continuities with the earlier emergence of ‘landscape urbanism’ as a synthesis between landscape and urban design (see Mostafavi 2010; Steiner 2011; Waldheim 2010). A more loosely defined conception of

ecology is evident that draws on influences such as Reyner Banham’s upbeat conception of ‘human ecology’ in Los Angeles or the ‘adaptive urbanism’ of Andrea Branzi and the Archizoom architectural collective. There is an acknowledgement of urban density as ‘a determining criterion of ecological urbanism’, along with a shift of emphasis from ‘the technical performance of individual buildings’ towards a regional or even global scale (Mostafavi 2010, 32). In practice, however, most spatial manifestations of ecological design remain little more than eco-enclaves within the wider urban fabric (see Caprotti and Romanowicz 2013; Ross 2011). If ecological urbanism is about an expanded presence of nature within cities, then its most obvious lineage to urban ecology as a scientific discourse lies in the field of ‘ecosystem services’ or other utilitarian responses to the biological sciences.

The contemporary emphasis on the ‘greening’ of cities ranges from spontaneous manifestations of ‘wild urban nature’ to manufactured landscapes that form an integral dimension to the ‘recapitalisation’ of post-industrial sites, disused waterfronts and other ostensibly ‘empty’ spaces (see, for example, Blanc 2012; Gandy 2013b). There is a clear tension between new forms of ecological design and the emerging focus on ‘urban ecological security’ as a systems-oriented response to future uncertainty (see Hodson and Marvin 2010). The related concept of ‘ecological resilience’ has also filtered through aspects of strategic planning and social policy as an extension to earlier urban models now augmented through the enhanced possibilities for using ‘big data’ and other empirical tools (see, for example, Alberti and Marzluff 2004; Pickett *et al.* 2004).

In some cases ecological design draws on discourses of ‘ecological restoration’ and other types of historically framed cultural landscapes to imply a sense of continuity with the past (see Higgs 2003). Yet even the most elaborate applications of ecological urbanism remain essentially islands within the wider dynamics of capitalist urbanisation (see Gandy 2013a). As Andrew Ross (2011, 250) suggests in relation to his study of Phoenix – arguably the least sustainable city in the world – the push for greater sustainability without equity merely produces various forms of ‘eco-apartheid’ or ‘showpiece pockets of green living’.<sup>2</sup> And beyond the more rarefied realm of the global North, ecological metaphors can easily acquire an even more sinister hue as the cultural adjunct to neo-Haussmannite programmes of environmental improvement that rest on the removal of ‘unsightly’ slum settlements from more lucrative locations.

The emerging emphasis on eco-cities, resilient cities, smart cities, zero carbon cities and other ecologically inflected types of urban form has emerged out of attempts to rework both the environmental and socio-technical characteristics of capitalist urbanisation. The difficulty,

however, is that in the period since the Brundtland Report, and the landmark Rio conference of 1992, the pace of environmental degradation has markedly worsened. An increasing number of scientists now suggest that we have effectively entered a new geological epoch – the Anthropocene – in which an array of indicators from weather instability to bio-diversity decline exhibit dramatic and unprecedented rates of change (Steffen *et al.* 2011). As the political scientist Elmar Altvater points out, however, the term Anthropocene effectively obscures existing conceptions of historical periodicity within which the emergence of global capitalism has played a pivotal role in contemporary environmental change (Altvater 2014).<sup>3</sup> The rhetorical parallels between the Anthropocene and other all-encompassing environmental concepts such as ‘Gaia’, as recently deployed by Bruno Latour (2013), also indicate a clear point of divergence between different strands of critical environmental thought.<sup>4</sup> The assumed conceptual affinity between urban political ecology and Latourian understandings of agency and hybridity now seems far less convincing than it did in the 1990s (see Zimmer 2010).

Urban environmental discourse is marked by a series of tensions. The more pessimistic neo-Malthusian scenarios effectively foreclose possibilities for progressive political change by shifting emphasis from development issues toward concerns with resilience, security and dystopian demographic projections. Yet much of the emphasis of sustainable development rests on various forms of behavioural, organisational or technological change that effectively obscures the underlying dynamics of environmental degradation. If urban sustainability remains a somewhat fragmentary and ineffectual field of policymaking then that is merely a reflection of the diffuse character of environmental politics itself (see Jachnow 2013). Urban ecology provides an ambiguous yet recurring connection between disparate fields of analysis and intervention: it remains a sub-field of the biological sciences; it serves as a metaphor for political mobilisation; and it presents an ontology of interconnectedness that routinely overlooks its own historiography.

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### Notes

- 1 Laurie (1979, xviii). On the scope and development of urban ecology see also Endlicher (2012), Leser and Conradin (2008) and Sukopp (1990).
- 2 Although the term ‘sustainability’ is notoriously difficult to pin down, we can trace its contemporary salience to the

institutionalisation of global environmental policy during the 1980s in which an emphasis on ‘sustainable development’ partially displaced earlier neo-Malthusian preoccupations with limits, ‘carrying capacity’ and the unreflective deployment of scientific metaphors in the political arena. In a sense, therefore, the sustainability debate emerges directly from a critique of scientism, and by extension ecological metaphors, applied in a social context.

- 3 The shift away from identifiable periodicities towards multiple transitions under the Anthropocene can also be read as a movement away from modernity as an analytical focal point for urban research (see Otter 2014).
- 4 The term Gaia, for example, coined by the reactionary environmentalist James Lovelock, denotes a cultural landscape writ large in which an omniscient analytical vantage point corresponds with the post-Apollo landing vision of earth at a distance (see, for example, Cosgrove 2001).

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