

from darwinism to planning – through geddes and back

One hundred and fifty years after the publication of *On the Origin of Species*, urban theorists are giving renewed attention to Darwinian interpretations of urban change, beyond those pioneered by Patrick Geddes over a century ago. **Stephen Marshall and **Michael Batty** suggest some implications for urbanism and planning**

Since the publication of *On the Origin of Species* 150 years ago this month,¹ Darwin's theory of evolution has not only had a revolutionary impact on natural history and the life sciences, but has also helped to prompt the emergence of disciplines such as ecology, sociobiology and evolutionary psychology. It has also given rise to evolutionary interpretations of topics as diverse as linguistics, economics and the history of technology. Evolutionary theory has even had an impact on the field of town planning, principally through the pioneering work of Patrick Geddes.

However, while Geddes' planning ideas are well known, his biological theories are much less well understood. In fact, Geddes' view of biological evolution differed substantially from Darwin's, and planning theories based on Geddes' ideas are to some extent based on his particular brand of evolutionism, rather than on classic Darwinism. Conversely, more recent urban theory has revisited evolutionary interpretations of cities that depart from Geddesian evolution and are more akin to Darwinian evolution. This could be said to bring town planning and urban theory more firmly into the field of Darwinian evolutionary applications. This article briefly outlines Patrick Geddes' evolutionary ideas as applied to town planning, and then reports on recent research that relates urban theory more directly to Darwinism.

Patrick Geddes – biologist turned town planner

Geddes originally trained as a biologist, somewhat unconventionally under the tutelage of his mentor Thomas Huxley in the 1870s in London, where he also met Darwin. Although his interests in civics and sociology dominated his working life, his belief in evolution as the underpinning science of cities culminated in his book *Cities in Evolution*, published in 1915.²

Yet Geddes' own ideology of planning was fraught with tensions, apparent in the conflict between solving social problems collectively from the top down and the workings of evolutionary processes which suggest that fitness for purpose emerges from the bottom up. Combined with his interests in vitalism and holism, Geddes' message often appears as a bundle of contradictions. In fact, he is best known for the study of 'civics', his quest for regional planning, the local-global conundrum, terms such as 'conurbation' and 'megalopolis', and much else besides – but less well known are his particular views on evolution and how they might inform urban planning.

It has taken a hundred years for Geddes' message, built on his understanding of Darwinism, to begin to penetrate our theories about how cities grow and change and how we might develop

planning much more effectively as an evolutionary process. Although wilfully ranged across conventional disciplinary boundaries, Geddes' ideas were underpinned by a coherent philosophy based on *Homo sapiens* being contiguous with nature, with human needs and behaviour rooted in our biology and evolutionary history.

Geddes saw the division of labour in ants as analogous to that in human economies, and to this biological perspective he added an ecological one. He saw cities as built environments, inextricable from the societies they housed and the wider natural environment that they were rooted in. In planning terms, this meant that a town was not a purely manufactured artefact that could be arbitrarily imposed on a particular location, like the design of a building, but was a product of its environment, to be studied as part of that environment, and to be planned in sympathy with it.²

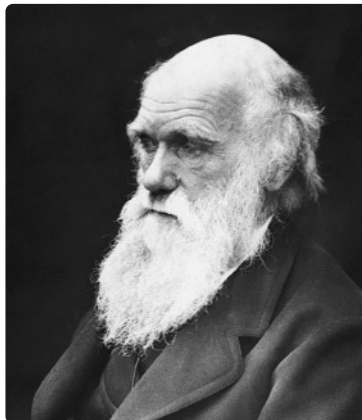
Geddesian evolution

For decades, Geddes' work has stood as the classic treatment of evolution as interpreted in town planning, but it is little remarked that his theories were based on his own version of evolution, which departed considerably from Darwin's paradigm. While Geddes accepted Darwin's general theory up

was hardly accepted by mainstream biologists; on the other hand, urban theorists have tended to overlook the distinctions between Geddesian and Darwinian evolution. As a result, the application of evolutionary concepts within urban planning theory has largely remained a curious mix of generalisations, metaphors and the vestigial remnants of Geddesian evolution – at least, until recently.

Recent developments in urban theory

Urban theorists are increasingly turning to contemporary science – complexity science, and theories of self-organisation and emergence – to interpret urban change. The long-standing focus on nonlinearity has thrown into question the extent to which we can expect any longer the kinds of predictability that have dominated classical science. These include the ideas that cities are emergent and adaptive; and that we cannot expect them to exist in a state of equilibrium, as they are intrinsically unstable, always in flux and thus far from equilibrium.^{4,5} This fits well with contemporary interpretations of evolution (or Darwinian processes) in areas such as technology, archaeology and architecture,^{6,7} and paves the way for recent research that is leading to fresh perspectives on evolutionary interpretations of urbanism and planning.⁸



Above

Geddes (1854-1932) and Darwin (1809-1882) – 'Geddes' view of biological evolution differed from Darwin's, and planning theories based on Geddes' ideas are to some extent based on his particular brand of evolutionism, rather than on classic Darwinism'

to a point, he believed that too much emphasis was given to natural selection and the 'struggle for existence'. He saw evolution happening despite natural selection, not primarily because of it; and, rather than competition, he emphasised co-operation and the long history of life that brought us a succession of synergistic unions, from cells and multi-cellular organisms to complex modern societies.³

Geddes' biological ideas have tended to remain obscure. On the one hand, his version of evolution

'Whereas Geddesian evolution emphasises synergy and co-operation, when striving to make cities better, a more Darwinian interpretation would also be alive to the full influence of competition and the struggle for existence'

Darwin versus Geddes

There are some fundamental similarities between our contemporary interpretations of evolution and what Geddes believed, when applied to urban theory. We take for granted that humans are part of a natural system, where human behaviour is significantly influenced by our evolutionary history. Moreover, cities are complex products of their circumstances; urban components may be adaptive, synergistic and co-evolve in a way that is not completely in the control

of the planners. Cities are themselves environments, that influence the activities and quality of life of their inhabitants – and can feed back to influence social and cultural evolution; hence providing the prerogative for positive urban design and planning.

But there are also clear differences in emphasis, on at least three significant fronts. First, whereas Geddesian evolution emphasises synergy and co-operation, when striving to make cities better, a more Darwinian interpretation would also be alive to the full influence of competition and the 'struggle for existence'. Second, Geddesian evolution implies that cities somehow evolve of their own accord. However, a more Darwinian interpretation implies that change is driven by a combination of random or 'blind' variations plus feedback from the environment. And third, Geddes' philosophy seems to imply urban evolution as a sort of gradual unfolding, almost as if cities emerged and grew according to some kind of developmental programme. But Darwinian evolution offers no such programme: evolution is fundamentally unpredictable; change can go in any direction; today's model may well be obsolete tomorrow; and everything in the city system – businesses, technologies, land uses, building types – must be prepared to innovate and adapt to survive.

Implications

Evolutionary theory thus provides a robust and clear framework for interpreting urban change, and one which also accommodates evolutionary theories of cultural, economic and technological change. Moreover, a Darwinian perspective liberates us from being locked into the singular idiosyncracies of Patrick Geddes' evolutionary interpretation of a century ago. A Darwinian perspective allows us instead to draw from a raft of contemporary scientific theories compatible with mainstream evolutionary and ecological theories – as well as evolutionary economics and sociology – without of course rejecting (but rather reinforcing) those insights that Geddes took from Darwin.

What are the implications for planning? We can suggest three lessons, for starters:

- First, an evolutionary perspective implies that a city has no knowable optimal future form. A city is not so much like a growing organism, where the mature adult form is roughly knowable in advance, and deviations from which are assumed to be harmful. Rather, urban change is more akin to an unpredictable evolution, with the city a system of co-evolving components. So the role of the planner is not to 'design' a city as if there could be an optimal target form which is knowable; rather the planner must rather get to grips with steering urban change adaptively, amid the complex dynamic that relates all its parts.
- Second, urban evolution is influenced by all aspects of society, technology and the built

environment acting together in complex ways. Urban change is not in the hands of any one agency or profession, but is subject to the actions of all citizens. Every time we shop online or work from home, rather than going downtown, we imperceptibly influence the changing function and structure of cities.

- Third, urban evolution is not just something that happened long ago, in traditional societies, supplanted by modern professional planning. Rather, evolution is something happening here and now. Evolution essentially implies a combination of tradition and innovation – or, if you like, embraces aspects of both traditional urbanism and Modernism. Planning must simultaneously learn from and build from existing successful models (contemporary best practice), while being open to new models of urban form that may depart from our conventional ideas of what a town or city 'should' be like.^{8,9}

The evolutionary perspective discussed here affirms (perhaps belatedly) the applicability of Darwinian evolution to cities and urbanism, in a way that was partly obscured or ossified by its association with Geddes. On the one hand, it brings Geddes' theories under fresh scrutiny, but on the other hand is likely to suggest a shift more towards the application of Darwinian evolution to planning, rather than Geddesian evolution. So perhaps, 150 years after the publication of *Origin of Species*, Darwinism is more than ever embracing the science and art of city planning.

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Notes

- 1 C. Darwin: *On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life*. John Murray, Nov. 1859
- 2 P. Geddes: *Cities in Evolution: An Introduction to the Town Planning Movement and to the Study of Civics*. Williams & Norgate, 1915
- 3 P. Geddes and J.A. Thomson: *The Evolution of Sex*. Walter Scott, 1889
- 4 M. Batty: *Cities and Complexity. Understanding Cities with Cellular Automata, Agent-based Models, and Fractals*. MIT Press, 2005
- 5 M. Batty: 'The size, scale, and shape of cities'. *Science*, 2008, Vol. 319, 769-71
- 6 J. Ziman (Ed.): *Technological Innovation as an Evolutionary Process*. Cambridge University Press, 2000
- 7 P. Steadman: *The Evolution of Designs. Biological Analogy in Architecture and the Applied Arts*. Routledge, 2008
- 8 S. Marshall: *Cities, Design and Evolution*. Routledge, 2009
- 9 M. Batty and S. Marshall: 'The evolution of cities and planning: Geddes, Abercrombie, and the New Physicalism'. *Town Planning Review*, 2009, Vol. 80 (in press)