Talk to 2nd Year UG Bartlett Planning Students Thursday, 25 November 2010

Darwinism, Evolution and the Development of Cities

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Essential Tensions: Top Down v Bottom Up

The key theme that runs through this talk is the shift from the idea that systems and society might be both understood and planned for from the *top down* to the notion that such systems emerge spontaneously from the *bottom up* with the implication that they must be planned in a similar way.

This is the age-old distinction between centralised and decentralised, homogeneous and heterogeneous, between the collective and the individual …

It is a distinction between the few and the many, between command and control, and the idea that coordination needs to be achieved in the same spontaneous way that many systems appear to develop in society and nature. It reflects the difference between the city viewed as a *machine* and an *organism.* This will dominate our talk as it has the history of cities and planning for the last 100 years.

A related distinction is between *cities* and *city planning*, and how closely or not the knowledge needed for one must be reflected in the other.

Institutional Origins

Before the late 19th century, few people articulated the meaning of cities with respect to the distinction between naturally or organically growing cities and planned cities.

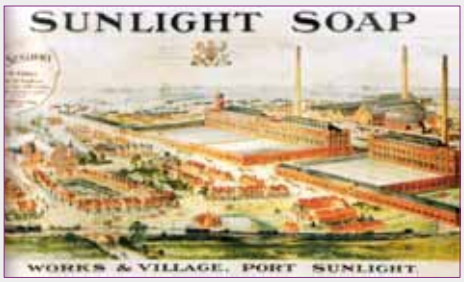
From classical times, there was a sense in which cities were manufactured rather than grown; with the rise of the industrial city, there was a universal reaction that their uncontrolled 'growth' needed to be stopped. The only way was by centralised planning.

Planning – town planning – emerged in the late 19thC as a response to the evils of the industrial city. The prevailing view was one of philanthropy and in Britain, mixed with notions about an emerging welfare state

Despite the philanthropy , the spirit of those times was about the institutionalisation of top-down controls, master plans, ideal cities, to create a merger of the best of the country and the town.

This meeting will be full of pictures of these types of top down plan. Here are some examples …

The philanthropy of the industrial rich: Lord Lever and Port Sunlight.



The ***Garden Cities*** Movement pioneered by Ebenezer Howard led to classic strategies of top down planning. Greenbelts around cities to control growth. New Towns to take growth elsewhere

The Organic Analogy

You can go back to the beginnings of recorded history and find people making analogies between organisms and societies – between tracks in the landscape, trees in the same landscape and the veins in one's hand.

However there is nothing about the analogy that implies an evolutionary perspective for most early analogies which are picked up by people as diverse as Le Corbusier and Lewis Mumford, assume the organism – the city – is completely formed.

A typical statement is by the architect Jose Luis Sert, one of the key spokesmen for the Congrés Internationaux d'Architecture Moderne. (CIAM) who in 1942 said:

> *"Cities [are] living organisms; [they] are born and … develop, disintegrate and die … In its academic and traditional sense, city planning has become obsolete. In its place must be substituted urban biology" (quoted in* ***Time Magazine****, November 30, 1942).*

There are many such quotes

It is essential to make the distinction then between organisms seen through a *developmental paradigm* and those seen as in modern biology dating from Darwin through an *evolutionary paradigm.*

The former implies, to an extent, that we can know the future while the latter strikes at the heart of predictability in that the evolution is predicated on the idea that the future is unknowable.

The former is largely predicated on the basis of *form* while the latter on *function*, the former on *structure* and the latter on *process*

Darwin's Heritage: Enter Patrick Geddes

I do not have time to tell you the detail of Darwin but suffice it to say that when he wrote his famous book, the world was waiting for it. So many anomalies were resolved by the notion of evolution that despite the religious furore, the world was prepared.

In one sense, evolution was buried in our psyche and was explicit certainly from the time of the Greeks and for a century or more before, versions of it without Darwin's mechanism were accepted: e.g. Lamark

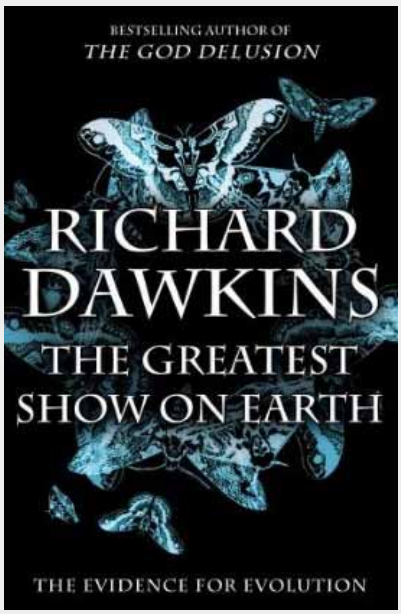
What do I mean by Darwin's mechanism: I mean reproduction genetically with all the consequences of random selection, mutation and survival of the fittest.

He said back in 1859, that " … this principle by which each slight variation, if useful, is preserved, …" led directly to the notion that the fittest would survive but it did and does not imply any sense in which evolution is progressive.

And since Darwin, the notion of co-evolution, cooperation and competition would now appear to complicate evolution in ways then unanticipated.

In fact, Darwin's theory was elaborated and distorted in many ways in his lifetime and beyond and in one sense, it was only rescued when Mendel quite independently revealed the power of genetics, and Fisher demonstrated how evolution could be treated formally. This led to the modern evolutionary synthesis and thence to the dominance that the theory has today.

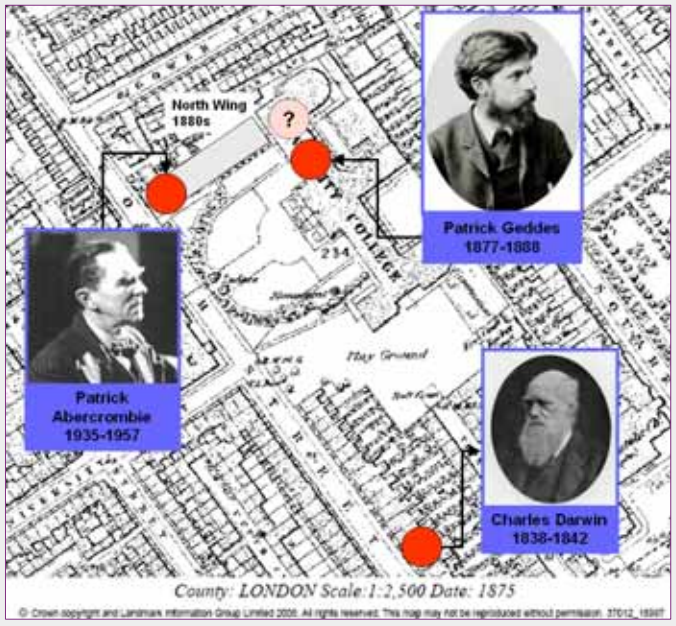
If you want to see the power of Darwinism, then look no further than Richard Dawkins whose 'in your face' style is reflected in the titles of his books.



In a sense, in planning we have been here before because into this fray in the 1870s came a one Patrick Geddes, who learnt his biology in the most unconventional way at the feet of Darwin's great populariser, Thomas Huxley.

There is much we can say about Geddes. He never got a degree, and he learnt not only biology as young man in London but everything else.

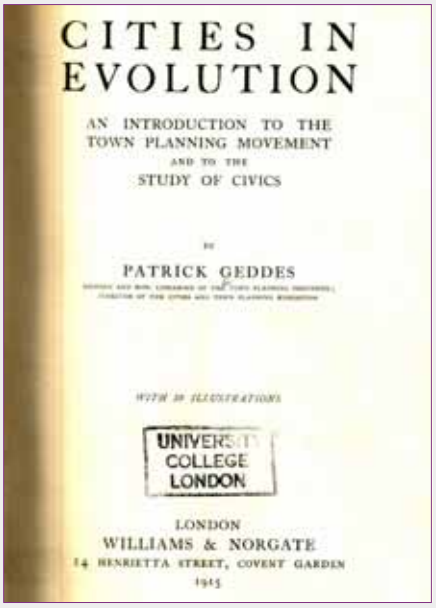
He was a maverick in everyway and in 1879 he met Darwin and if you forgive our indulgence I will show you were he met him …..



Darwin when in London in his later life always met with Burden-Sanderson whose lab Geddes worked in for one year in 1879

Abercrombie enters the story later

Geddes moved back to his native Scotland and spent most of his life until 1914 working on the reconstruction of Edinburgh Old Town, inventing sociology of a fashion, and doing very little biology but publishing in 1915 ……..


CITIES IN EVOLUTION

AN INTRODUCTION TO THE TOWN PLANNING MOVEMENT AND TO THE STUDY OF CIVICS

PATRICK GEDDES

WITH 20 ILLUSTRATIONS

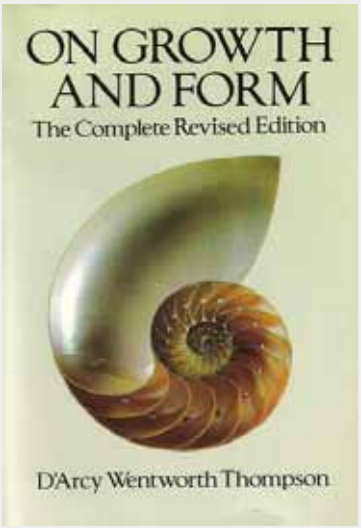
UNIVERSITY COLLEGE LONDON

LONDON
WILLIAMS & NORGATE
14 HENRIETTA STREET, COVENT GARDEN
1915

This book had enormous impact on town planning; it established a rudimentary planning method: Survey then Plan, it argued for 'regional planning', it introduced terms like local-global, conurbation and so on.

But it was badly written, published 10 years after it was written, did not prosecute the notion that Darwin popularised as survival of the fittest, and tended to veer towards creative evolutionism advocated by Spencer, Bergson and others. In short Geddes was a maverick and that is being kind to him.

I could spend the rest of this talk telling you about Geddes but let me only indulge in one more thing: this photo



So Geddes from diverse sources was fashioning a theory of cities and city planning in his own style of evolution, drawing a little on Darwin and a lot on himself.

In this, he presented a real challenge to the top down logic which was widely accepted and strengthening all the time.

But his message was confused and confusing – although his early years in Edinburgh were based on a a bottom up incremental style of community action and planning – his 'conservative surgery' so he called it – yet his later work was very much in the spirit of top down centralised plan making.

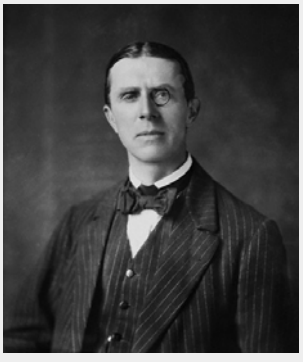
My/our own view is that Geddes was a bundle of contradictions that even he could not resolve.

In fact he was mildly critical of Darwin, he was rather against formal science despite his early wanderings with accounting models of the economy (!) as reflected in his scorn for mathematical morphology and eventually allometry, and he was silent on many political issues, despite his leanings towards anarchism.

Not a good recipe for becoming the guru of planning method and yet ….. civic survey (Survey, then Plan) megapolis, conurbation, local-global, regional planning, the valley section … You name it, he did it ..

Abercrombie and the Mid Century Consensus

Ok let us retack and put the boat back on course.



Abercrombie was in some sense Geddes' great translator of ideas into practice just as Mumford was his great translator into theory

They probably knew each other at UCL despite the generation gap and Abercrombie was a young man when he first met Geddes at the Town Planning Exhibition at Burlington House in 1910. Geddes sat in the midst of his paraphernalia that dominated his exhibitions … and Abercrombie said:

"Within this den sat Geddes, a most unsettling person, talking, talking, talking – about everything and anything. The visitors could criticize his show – the merest hotchpotch – picture postcards – newspaper cuttings – crude old woodcuts – strange diagrams –archaeological reconstructions; these things, they said, were unworthy of the Royal Academy – many of them were not even framed – shocking want of respect; but if they chanced within the range of Geddes' talk, henceforth nothing could medicine them to the sweet sleep which yesterday they owned. There was something more in town planning than met the eye!" (pages 128-129, 3rd edition, 1959).

Abercrombie referred to Geddes later in life as his 'Master' but it was not the idea of evolution that Abercrombie popularised – this was lost by the time Geddes died in 1931 for by then the top down model was in full swing. Abercrombie was the great populariser of regional planning and Survey, then Plan.

Indeed in his inaugural lecture at UCL in 1935 he expressed great distaste at the notion that the idea of Adam Smith's hidden hand, invisible hand might have anything to do with planning. He said

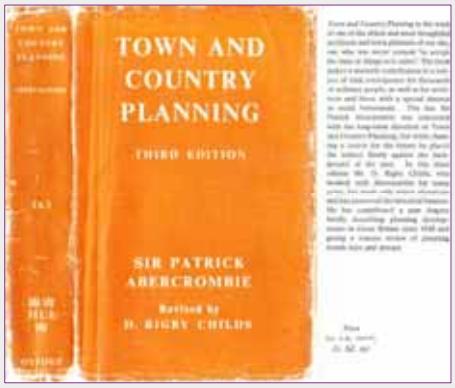
"… I would like to remark that we are (it is assumed) agreed upon certain fundamentals such : the necessity of planning as compared with a reliance upon the evolutionary chaos, with Adam Smith's invisible guiding hand behind the clouds – an ancient fallacy this, which still has its votaries … " (Abercrombie, 1937, p.16).

It is also strange perhaps that both men said a lot about the organic analogy but never really impressed this through visual analogies. They said however ….

"Towns must cease to spread like expanding inkspots and grease stains: once in true development, they will repeat the star-like opening of the flower, with green leaves set in alternation with its golden rays" (Geddes, 1915, p.97).

Abercrombie defined planning as seeking

" … to proffer a guiding hand to the trend of natural evolution as a result of careful study of the place itself, and its external relationships. The result is more than a piece of skilful engineering or satisfactory hygiene or successful economics: it should be a social organism and a work of art" (Abercrombie, 1933; quoted in Hall, 1995, and in Dix, 1978).



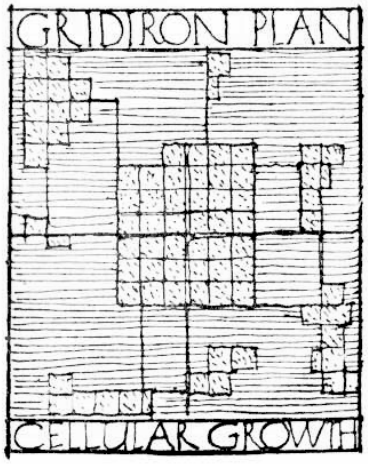


FIG. 1.

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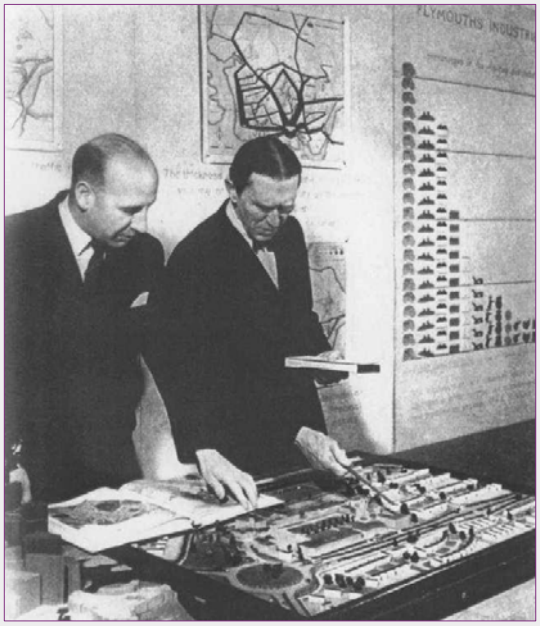
Creeping Scientism: The Systems Approach

OK, this has been a long talk and I want to begin to converge on the current ideas of complexity, evolution, and morphology .

The top down model was entirely consistent – indeed it drove the move to making analogies between cities and their planning as machines and their control.

This lead to the systems approach. Abercrombie was entirely sympathetic as this photo of him standing by his plan for the reconstruction of Plymouth shows



Note the flow of traffic and the pictogram – or histogram of employment.

Essential science supporting the physical plan

In fact, one could say that the systems approach was the last great wave of the top down model. It treated cities not as evolving structures but as being in equilibrium.

It treated planning as a matter of control and optimisation in analogy to engineering

It did not last for the world changed at the end of the long boom and by the 1970s, the subject had begun to fragment and for the last 40 years, ever more and ever different theories of cities and practices of planning have been proposed

The New Science of Cities: Energy, Allometry and Morphology

Now we cannot bring you up to date that quickly and we should not. Many other people at this meeting will be filling in the picture. But the organic analogy through the evolutionary paradigm has been impressed strongly on the way we should look at cities.

In a minute, I will show some pictures of what this means and we should say something of what this implies in terms of a new theory of cities .

What happened was that the notion of equilibrium slowly fell into disrepute but a concern for temporal dynamics was present from the beginning.

In the 1970s, this was manifested in catastrophe theory based on embedding spatial interaction models in logistic style equations as in Wilson's work.

Similar work on bifurcation theory by Allen based on Prigogine's ideas.

And of course Hermann Haken's synergetics as he has illustrated already to us this morning

Essentially the drift in the 1980s was to articulating systems in terms of a micro, not a macro dynamics where the focus was on cells, agents, individual processes of change and mobility that led to emergent structures represented as morphologies. This was Peter's focus in the previous talk.

Time entered the picture but the small scale, the micro in Darwin's characterisation, has only really reasserted itself in the last 15 years, through ideas about cells, and agents and so forth, metaphorically of course in their applications to cities.

This concern for detail at the micro scale has come from a sea change in the way we look at the world - from an ordered equilibrium world to one which is full of pulsating change driven from the bottom up

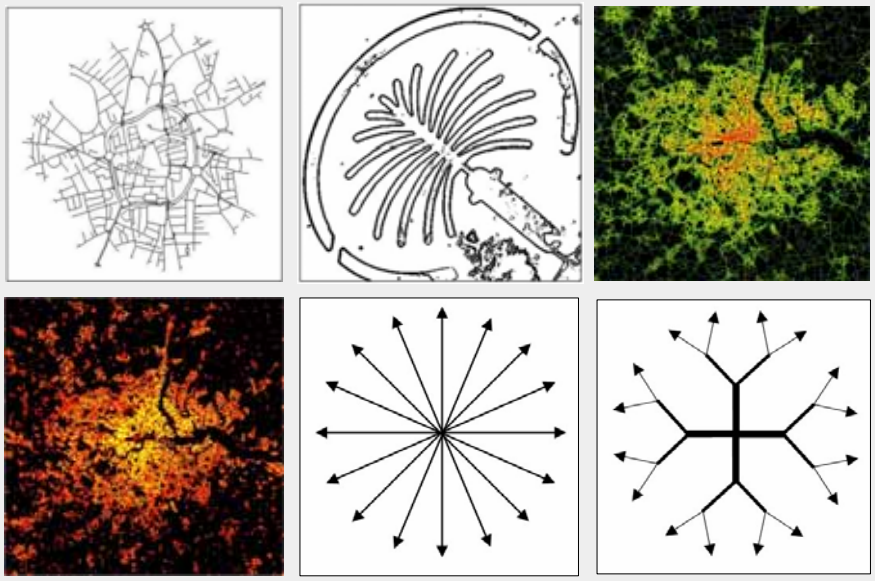
Why did we never think that way in the first place? I am not going to answer that question – at one level it can't be answered but it is having dramatic effects.

Here are some reasons – first the focus on bottom up, second time/evolution – far from equilibrium, third better data, better computers, fourth heterogeneity not homogeneity, fifth neutral representation - GIS

The elements of complexity theory are key to the new modes of representation which focuses on emergence

This quest began with cellular automata models as key examples of emergence which were methods to generate fractal morphologies. Recently the idea of mobile cells or agents has come onto the agenda

The biggest problems of these class of models is that they are far richer than any of their predecessors and they break the rule of parsimony – they are hard if not impossible to calibrate in their pure form.



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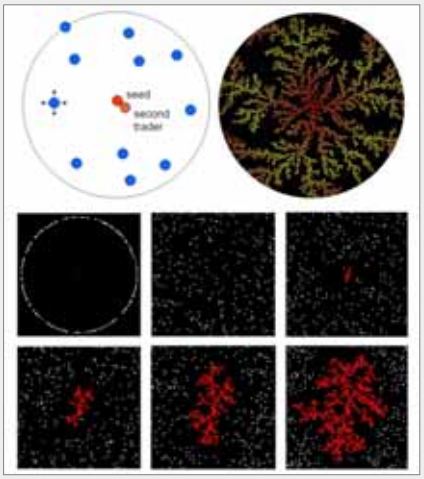
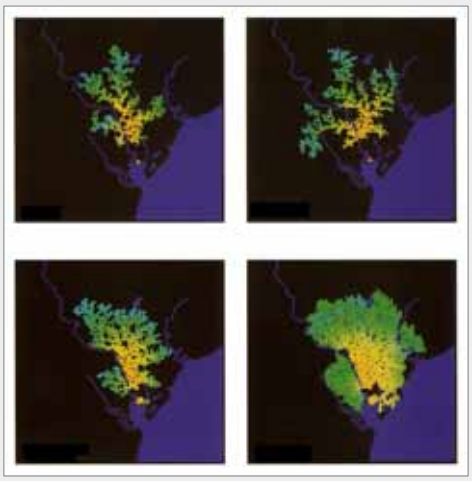
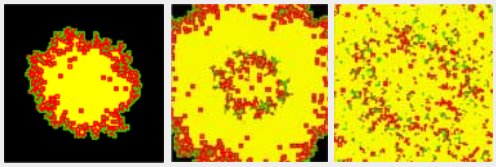


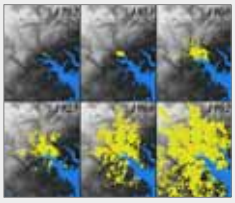


Simple models embodying key processes as in DLA which reflect the need to stay connected to the city or growing cluster and the need to get as much space as possible

There are many ideas that spin off from these simple models: theoretical ideas about diffusion and mixing of development in cities



Empirical applications based on cellular automata



Generalisations to many kinds of bottom-up style models, reflecting complexity science and new forms of agent-based modelling

Essential Tensions Once More: What Should Complexity Science Imply for Planning

We could go on at length but let us wrap up. What does all this mean for our understanding of cities and for planning.

The evolutionary paradigm is still only a metaphor although it is gaining ground. We need to fashion a science of cities that is based on how they grow from the bottom up but also work planning from the top down into this, theoretically.

The key thing we want to stress in this talk is that this essential tension between top down and bottom up is in no way resolvable by thinking in evolutionary or Darwinian terms.

Geddes could not resolve, not could Abercrombie who avoided it.

Christopher Alexander and Jane Jacobs avoided it by arguing acting as protagonists for the bottom up, by fighting against modern and machine architecture and against bureaucratic planning

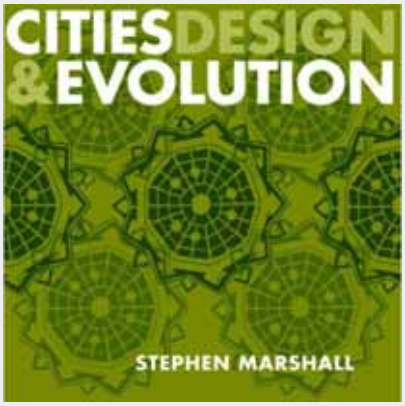
Planning needs both and is both as are cities

In impressionistic histories like this one, conclusions are often passé. But one thing which dominates from all of this is the degree of unpredictability that characterises the world of cities and evolution impresses this on us forcefully.

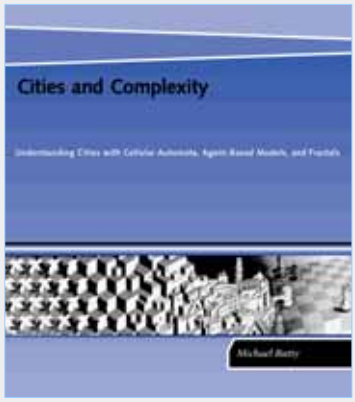
It is this in view – that the future is unknowable – that is the more important issue in all this, rather than top down versus bottom up.

To deal with this is both a major philosophic and practical challenge and we hope this meeting will engage the critique. We know it will.

Quite unashamedly …. This is what has been written about this in various related senses ….



Routledge, 2009



MIT Press, 2005

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