Diagrams and their Future in Urban Design

Peter A Hall

In this new essay on diagrams in urban design, Professor Peter A Hall (University of Texas) traces a theoretical arc of projects and theories that begins, at one pole, with the literally overarching global, top-down, synechdotal, prescriptive, militaristic, idealistic, totalising, aerial, inhuman, viewpoint of the city. This is symbolised by Buckminster Fuller's Geoscope, probably the largest and most ambitious diagram ever imagined. Hall's analysis ends at another pole, with the bottom-up, anecdotal, ground-level, microscopic, individual, partial and experiential views of the city exemplified by the diagrams of (among others) Raoul Bunschoten (CHORA), Atelier Liu Yuyang, James Corner, Natalie Jeremijenko, the Waag Society and Esther Polak, and Damon Rich and CUP. He covers a broad spectrum of work on diagrams in the visualisation of urban knowledge, data and flows, and outlines the strengths and weaknesses, the opportunities and threats, of each. Hall's conclusion on the recent history of the diagram focuses on the criticism that the initial emancipatory, public and non-reductive potential of the diagram has, as yet, not been fully realised and has resulted in little more than iconic, alienating, private, expensive and monumentalising architectures. He proceeds to examine how new technologies and high-tech projects (such as GPRS, GIS, GPS, Google Earth and WikiCity) enable the diagrams that drive a set of innovative, recent design projects, but his focus is also on the economic, anthropological, social, cultural and political impacts of these diagrams. Referencing a broad, multidisciplinary spectrum of theoretical work that includes Claude Lévi-Strauss, Bruno Latour, Guy Debord, Michel de Certeau, Kevin Lynch, Deleuze and Guattari, and Frederic Jameson to support his points, he delineates a series of arguments and problems relating to these new scales and types of urban and high-tech diagrams. He maps out the new experiences of complex and dynamic diagrams of power, globalisation, exploitation, finance, information, people, cities, and their movements and forces, and he cites less well-known examples of practical, collectivist, small-scale, activist projects that use diagrams for catalysing different forms of intelligent, sustainable and environmentally and socially engaged change. He ends this text by moving towards a more futurological, projective position on the post-Deleuzian diagram and, closing his theoretical arc, brings together his contrasting sets of diagrams and theories by finding common ground in the use of the diagram for the reallocation of resources, pushing it to work beyond merely expensive, formalist, private buildings and city spaces. He concludes by calling for the imagination and realisation of diagrams that map and construct a new urban, sustainable and public reality.

163 Diagrams and their Future in Urban Design

Buckminster Fuller's Geoscope, a 61-metre (200-foot) diameter geodesic globe he proposed suspending over the river opposite the United Nations in Manhattan, was the closest the inventor-architect came to designing a kind of energy diagram of the world. Accessed via elevators and underwater tunnel, the Geoscope suggested a kind of public enlightenment by immersion, whereby gazing up at an animated surface graphically representing an inventory of the earth's resources and developmental trends would inspire people, notably architects, to take action. Promoting the scheme in 1961, Fuller told the International Union of Architects in London that it would be the job of architects, inventors and scientists/artists' to accomplish a 'boldly accelerated design evolution' aimed at 'making the world's totally available resources serve 100% of an exploding population'. As Mark Wigley has noted, Fuller's emphasis was on the power of the image, on the imagined revolutionary effect of visualising the earth and its flows: 'Constant observation of these patterns will supposedly enable a more equitable distribution of resources.'¹

In the last decade, architecture has embraced diagramming as a means to negotiate the complex phenomena of urban design. The diagram has been described as 'mediator between object and subject',² as a means of researching and visualising flows – of people, their needs, traffic, goods, weather, construction processes – and as an essential part of the design process. Yet for all its potential, the diagram frequently slips into a familiar role in the architect's rhetorical armoury, fetishised and lending lip service to a process that promised to accommodate stakeholders, yet delivered another monumental structure that alienated them. To imagine a less reductive diagram requires some unpacking of its potency.

Most crucial is an acknowledgment of the situatedness of any diagram, particularly given prevailing myths about the 'truth' of data-gathering and imaging technologies; the way, as Bruno Latour has noted, humans tend to ascribe more truth to machine-made images than to human-made ones.³ Fuller imagined an image resolution that would allow a viewer to pick out a dot representing his own house inside the Geoscope.⁴ But a dot on a map is the very embodiment of insignificance. It is easy to forget that the aerial view is just one perspective, and one with a militaristic genealogy. As Wigley notes, Fuller's embrace of the globe-as-diagram was informed by his personal experience of developing an illuminated globe-data-display system for the situation room of joint chiefs of staff during the Second World War. The aerial view may in fact be better suited to routing, spying and bombing than to urban planning.

The problem is famously articulated in Michel de Certeau's passage written from the top of the World Trade Center in 1984, where he contrasts the top-down view, which 'makes the complexity of the city readable and immobilises its opaque mobility in a transparent text' with the everyday practices of those on the ground, those who

hand and developed of shares and and shares in the

'actually compose the city'.⁵ 'These practitioners make use of spaces that cannot be seen; their knowledge of them is as blind as that of lovers in each other's arms ... it is as though the practices organizing a bustling city were characterized by their blindness.' Yet the diagrammatic counterpart to de Certeau's street-level view, the psychogeographic map of a nocturnal wandering composed by Guy Debord and friends from cut-up maps of Paris, has yet to find its way into a city planning meeting. It is one thing to register the subconscious pushes and pulls of a city, to present the city-asocean in opposition to the harsh segregation of the Corbusian urbanism being proposed as a solution to slums, but turning that opposition into a planning tool has defied the most ambitious urbanists.

One problem unforeseen by Fuller and his contemporaries was that the comprehensive display of information can overwhelm as well as liberate. As post-war idealism faded, Fuller's overburdened earth-diagram was succeeded by the comprehensive map of networks, of the 'great global multinational and decentered communicational network in which we find ourselves caught as individual subjects', as Fredric Jameson argued in 1988.⁶ Jameson called for a cognitive mapping, as a necessary step to make sense of the landscapes of late capitalism, drawing from Kevin Lynch's idea that urban alienation is directly proportionate to the mental unmappability of local cityscapes: 'The incapacity to map socially is as crippling to political experience as the analogous incapacity to map spatially is for urban experience.'⁷

While Jameson's use of an urban metaphor emphasised the importance of lived space and a street-level (or node-level) perspective, the proliferation of maps of the internet that emerged at the turn of the millennium revealed the predominance of the aerial perspective. Barrett Lyon's 2003 'Map of the Internet', a colour-coded array of IP space sprouting outwards in coral-like branches to form an exquisite bauble, served to elicit, primarily, awe. A 2003 Cooperative Association for Internet Data Analysis (CAIDA) map geographically arraying two weeks' activity among 1.2 million IP addresses showed, as Brian Holmes astutely noted, the dominance of the US, Europe and parts of Asia, almost as explicitly as economist Francois Chesnais' 1994 diagram linking the US, Western Europe and Japan in circuits of industrial and financial exchange. But what action might ensue from witnessing a diagram of what Holmes calls the 'near-perfect correlation between the graph of virtual flows and the geography of human exploitation'?⁸ He answers by way of the dazzlingly complex power maps of globalisation networks such as 'Influence Networks/World Governance' by activist group Bureau d'etudés (2003): the aim is 'to act as subjective shocks, energy potentials'. Yet as JJ King notes, the Bureau d'etudes maps ultimately show the impossibility of making visible contemporary institutional relationships in a traditional cartographic form.⁹ If Fuller's globe-as-datamachine aimed to inspire misplaced hopefulness, viewing these latter-day Geoscopes seems more designed to inspire feelings of powerlessness.

The flurry of artistic projects that followed the Clinton administration's decision to expand civilian use of global positioning systems in 2000 revealed a similar paradox, of the urge to map the flows of people through a city countered by the illegibility of the resulting synoptic diagram. The Waag Society and Esther Polak's spectacular Amsterdam Real Time project of 2002 equipped 60 Amsterdam residents with GPS tracking devices for 40 days; the traces of the residents' movements through the city were transmitted via general packet radio service (GPRS) to a central server which compiled images as sinewy traces on a black screen on display at an exhibition. If the resulting 'live map' of the city as its inhabitants simultaneously created it was compelling, it also served to reinforce the power of the military surveillance technology that relayed it. The aerial view did render the city mobile but it also flattened, decolourised and summarised it. Only the frozen images of individual itineraries, as annotated by their makers, gave a sense of street life, the content of the information on the urban network.

Nevertheless, Amsterdam Real Time was an important precursor for WikiCity, a GIS-based tool for tracking urban street life and traffic flows currently in development at Massachusetts Institutue of Technology's SENSEable City Lab. Described as a planning tool based on actual behaviour, the system was pioneered in Rome in 2007, compiling live city diagrams based on the density of cell phone use patterns (provided by Telecom Italia) and GPS data taken from the positions of city buses. Rome's transportation agency is exploring the use of the resulting data to improve routes and scheduling, while MIT plans to build a wiki-based platform so that citizens and organisations can upload the kind of local information that creates space in the city yet generally remains invisible to satellites: jogging paths, cultural events, environmental conditions and parking spots.

For the human-made wiki-view to become the dominant view requires a conceptual shift. A key tactic is offered by anthropologist Claude Lévi-Strauss: 'To understand a real thing in its totality we always tend to work from its parts. The resistance it offers us is overcome by dividing it.'¹⁰ In design theorist Richard Buchanan's discussion of systems, the shift is seen in phenomenological terms: 'human beings can never see or experience a system, yet we know that our lives are strongly influenced by systems and environments of our own making and by those that nature provides ... We can only experience our personal pathway through a system.'11 Transferred to the terms of the network, the idea can be rephrased in King's term as 'the node knows - that is knows its own reasons for taking part in the network, with whom it interacts and why, and in what modality'.¹²

Bringing to the foreground the meaning and nature of information moving on a network seems to anticipate new kinds of diagram that explore anecdotal rather than synoptic views. Polak's recent MILK project tracked one movement of the international food trade, in this case, milk produced by Latvian farmers for cheese sold in the Netherlands, 'from the udder of the cow to the plate of the consumer'. The map of the 'MilkLine' is a revealing but relatively small part of a larger mapping project that prioritises narrative accounts of the players involved in this particular flow of resources. Similarly, Polak's 'Nomadic MILK' project, an ongoing project with philosopher of technology Michiel de Lange and cultural anthropologist Ab Drent, aims to trace in a sand painting the GPSrelayed routes taken by nomadic herdsmen and their cattle in Nigeria. One aim of the project is to explore how this mobility, this production of space 'plays a role in the (economic) identities of the participants'.¹³

The significance of the anecdotal, ground-level view to city planning is not as a negotiatory device or a case study 'brought to the table', but what its behaviour tells us about the nature of a self-organising system like a city. In a recently published essay advocating the use of geospatial analysis and technologies in city planning, three researchers - Pietro Pagliardini, Sergio Porta and Nikos Salingaros - characterise the alternative, top-down approach to planning embraced in the 20th century as the prime culprit in bringing about 'inhuman' buildings, 'useless' urban space, and with it the 'failure of an entire discipline'. In place of the separation advocated by Modernist-era planning and the priority it gave to the fastest automotive traffic, Pagliardini et al advocate a strategy they call 'urban seeding'. This would include the use of GIS technology to help enhance our understanding of the 'structural dynamics of change that characterise the evolution of self-organized urban settlements', according to which 'proper policies' can be put in place.¹⁴

The challenge is in redefining 'proper policy' in terms of the diagram. Pagliardini, Porta and Salingaros align themselves with a prescription for urban morphology closely aligned with the New Urbanist approach - while admitting that is 'unfortunately considered "out of fashion".¹⁵ But alongside their case for demolition of the most 'inhuman' structures is a more compelling argument for 'urban seeding' based on 'cheaper interventions on the existing urban fabric'. This seems to pave the way for adaptive reuse, material resourcefulness and the embrace of existing conditions in planning. Again, the diagram, as well as representing existing infrastructure, ground conditions, social and cultural forces, anecdotal views and network behaviour, has potential as a device for constructing a future: a 'real that is yet to come', as Gilles Deleuze and Félix Guattari argue in A Thousand Plateaus.¹⁶

In his seminal essay 'The Agency of Mapping', landscape architect James Corner sets out a number of experimental strategies for a form of urban planning and design that embody the active diagram, concluding with what he called the 'game board' strategy practised by Raoul Bunschoten of the London-based group CHORA. The game board functions as a means of bringing stakeholders to the planning table, writes Corner: 'These are conceived as shared working surfaces upon which various competing constituencies are invited to meet to work out their differences.'17

A provocative enactment of this strategy was Damon Rich and the Center for Urban Pedagogy (CUP)'s 1999 'Governor's Island Redevelopment Plan', an exhibition recounting the social processes that accompanied the federal government's recent sale of the East River island to New York State, and the accompanying flurry of proposals for this piece of prime real estate off Manhattan. The centrepiece of the exhibition was a model of the island with movable pieces: visitors were encouraged to make their own proposals for the site.

A further development of the game board idea is currently being explored by CHORA and Shanghai-based Atelier Liu Yuyang Architects, who are part of a consortium pitching to make the Chinese city of Xiamen a 'climate change incubator' using a series of renewable energy and energy efficiency installations funded by the Kyoto Protocol's clean development mechanism (CDM). Traditionally, CDM funding is for large-scale projects such as wind farms, but alternative methods permit the 'bundling' and aggregation of small-scale urban initiatives (such as the distribution of photovoltaic kits in Morocco). Both CHORA's founder Raoul Bunschoten and Liu Yuyang consider it the future work of architects and urbanists to enable and initiate larger development mechanisms rather than respond to pre-established programs. Liu Yuyang characterises the task as something that architects do well: 'realization of a built structure and environment by integrating different needs, desires and constraints'.¹⁸ According to Bunschoten, the projects will be networked with others in the region and tracked in a 'Taiwan Strait Atlas' charting cross-strait renewable energy developments.

Finally, the engineer-artist Natalie Jeremijenko has developed a number of projects that stretch the notion of the diagram as a means to represent traditionally unrepresented stakeholders, be they animal, vegetable or mineral. With OneTrees, Jeremijenko worked with the Bay Area activist group Pond to plant a network of paired, genetically cloned trees that, as they grow, aim to function as 'instruments' registering the social and environmental microclimates of the region.¹⁹ A paper map was produced of the project, but as Jeremijenko argued, 'the whole project is a map - the trees themselves and the way they undergo ongoing growth and change'. A more recent project, OOZ, establishes a network of polycarbonate buoys in the Hudson River that light up when fish are near, encouraging human spectators to feed them food treated with chelating agents that encourage the digestive systems of the fish to cleanse PCBs from their blood. In this instance, as with the Xiamen and OneTrees projects, the map becomes an active network of change, an energy diagram.

Deleuze and Guattari's highly influential concept of the diagram as an 'abstract machine ... a map of relations between forces' has inspired countless interpretations of the concept in architecture, yet which ultimately tend to subordinate the study of relational forces to the generation of intriguing form. On the opposite end of the spectrum, Fuller's Geoscope tended towards the prescriptive, militaristic and idealistic.

9

10

11

15

16

Yet its premise, that architecture needed to concern itself with the reallocation of resources, has an urgency that the post-Deleuzian concept of the architectural diagram seems to have missed in its desire to ossify into iconic, expensive, private buildings. As a diagram, Fuller's Geoscope fell short of detail and complexity. But it is surely possible to imagine a diagram that maps the relations between forces and constructs a new reality that is urban, sustainable and public.

Notes

Mark Wigley, 'Planetary Homeboy', ANY (New York), vol 17, 1997, p 16.

- Ben van Berkel, quoted in J Thackara, 'Situation' in In the Bubble: Designing in a Complex World, MIT Press (Cambridge, MA), 2006, p 108.
- Bruno Latour, Iconoclash: Beyond the Image Wars in Science, Religion and Art, MIT Press (Cambridge, MA), 2002.

Wigley, 'Planetary Homeboy', p 18.

Michel de Certeau, 'Walking in the City' in The Practice of Everyday Life, University of California Press, (Berkeley), 1984, p 92.

6 Frederic Jameson, 'Cognitive Mapping' in Cary Nelson and Lawrence Grossber (eds), Marxism and the Interpretation of Culture, University of Illinois (Chicago), 1988, pp 347-57. Jameson, 'Cognitive Mapping', p 353.

8 Brian Holmes, 'Counter Cartographies' in Janet Abrams and Peter Hall (eds), Else/Where: Mapping

- New Cartographies of Networks and Territories, University of Minnesota Design Institute (Minneapolis, MN), 2006, p 21.

JJ King, 'The Node Knows', Else/Where: Mapping, pp 44-9.

Claude Lévi-Strauss, The Savage Mind, University of Chicago Press (Chicago), 1966, p 23. Quoted in Brian Holmes, 'Counter Cartographies', Else/Where: Mapping, p 23.

Richard Buchanan, 'Design Research and the New Learning', Design Issues (Cambridge, MA), vol 17 no 4, Autumn 2001, p 12.

King, 'The Node Knows', p 49.

13 Michiel de Lange, 'Chapter for Co-ops Book', http://www.nomadicmilk.net/

14 Pietro Pagliardini, Sergio Porta and Nikos A Salingaros, 'Geospatial analysis and living urban geometry' in Bin Jiang and Xiaobai Angela Yao (eds), Geospatial Analysis and Modeling of Urban Environments: Structure and Dynamics, Springer (New York), forthcoming, p 5.

Pagliardini, Porta and Salingaros, 'Geospatial analysis and living urban geometry', p 1.

Gilles Deleuze and Félix Guattari, A Thousand Plateaus: Capitalism and Schizophrenia, University of Minnesota Press (Minneapolis, MN), 1987, p 142.

17 James Corner, 'The Agency of Mapping' in Denis Cosgrove (ed), Mappings, Reaktion Books (London), 1999, p 40.

18 Quoted by Julian Wong in greenleapforward.com

18http://greenleapforward.com/2008/05/31/xiamen-city-urban-planning-for-climate-change/ (accessed 18 January 2009).

19 Alice Twemlow, 'From Bark to Bytes' in Else/Where: Mapping pp 254-6.

© 2009 John Wiley & Sons Ltd.