



Verticality and Urban Mobility : Learning lessons from past visions of elevated transport systems in the post-war city

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Abstract for Above, Degrees of Elevation Workshop, University of Edinburgh, 12 May 2016.

Verticality and urban mobility: Learning lessons from past visions of elevated transport systems in the post-war city

Martin Dodge, Department of Geography, University of Manchester

(email: m.dodge@manchester.ac.uk)

Abstract

The space above crowded city streets has long been alluring to planners as a solution to the problem of urban mobility. In the post-war decades in particular there were many visions propagated for a revolution in transport exploiting verticality to separate out modes of lateral movement. Schemes were proposed for elevated highways carving through city centres, futuristic monorails running overhead and pedestrian decks connecting buildings, along with prospects of helicopters hopping between rooftop landing pads. Using empirical examples from Manchester this talk will consider the potential of some of transport plans, both built and unbuilt, and what lessons might be learnt from their failure to transform urban mobility. What might the modes of failure reveal, in deeper sense, about the possibilities and problems of vertical urbanism in terms of (1) freedom and disconnection, (2) hierarchy and inequality, (3) representation and spectatorship, (4) cost, risks, and environmental externalities?

Biography

Martin Dodge is a Senior Lecturer in Human Geography at the University of Manchester and his current research interests lie in the areas of historical geographies, the social politics of mapping and geographic visualisation, and understanding of urban infrastructures. He has co-authored three books analysing the spatial implications of digital technologies (*Mapping Cyberspace* (Routledge, 2000), *Atlas of Cyberspace* (Addison-Wesley, 2001) and *Code/Space* (MIT Press, 2011)), and co-edited several books on cartographic practice and theory. With Richard Brook, he has curated the *Infra_MANC* exhibition on post-war urban infrastructure for the Manchester Histories Festival in 2012.



THE UNIVERSITY of EDINBURGH

The Institute for Advanced Studies in the Humanities



Above. Degrees of Elevation

One-day workshop – 12 May 2015, IASH Edinburgh

Dreams of reaching the above have animated human beings for millennia, not least showing in the central role of ascension in religious, spiritual and cultural narratives and practices. Next to the continued importance of spiritual and mythological interpretations and connotations of height and elevation, the above has also been connected to ideas of modernity and “progress” in more recent history. Given the significance of non-horizontal spatial dimensions, it is surprising that elevation and verticality have not been a major focus of analysis for scholars working on the construction of space and the urban and rural environment. Only recently have urbanists and geographers begun to break with the dominance of the horizontal and turned to the third dimension of space.

The Workshop “Above. Degrees of Elevation” aims to draw on this recently emerging scholarship on the vertical and to study the relevance of non-horizontal spaces for the constitution of human relations. Bringing together scholars from literature, religious studies, history and urban geography, the workshop particularly stresses the inseparability of material and imaginative aspects of the above and aims to explore the interrelations and the negotiations between them.

Programme

- 9.30 Registration and Coffee
- 10.00 *Welcome* from **Jo Shaw** (Director, IASH)
- 10.20 *Introductory Remarks*
Nicoletta Ascianto, Nina Engelhardt, Susanne Schregel
- 10.30-12.45 *Panel 1: Spiritual Elevation in Religion and Literature*
Chair: Nina Engelhardt
Andrew Hass (Religious Studies, Stirling): “Mystical Ascent: From Above and Beyond to Beyond Above” (10.30–11.15)
Nicoletta Ascianto (Literature, Edinburgh/Durham): “‘Into the heart of light’: Mystical Visions in T. S. Eliot’s Four Quartets” (11.15–12.00)
Adam Shaeffer (Religious Studies, Durham): “Frodo and Saruman: Spiritual Elevation in J. R. R. Tolkien’s *The Lord of the Rings*” (12.00–12.45)
- 12.45-14.00 Lunch
- 14.00-15.30 *Panel 2: Heights Material/Technological*
Chair: Nicoletta Ascianto
Nina Engelhardt (Literature, Edinburgh/Cologne): “Ascent between Explosion and Grace: High Technology and Imaginary Heights in Thomas Pynchon’s Novels” (14.00–14.45)
Lorenzo Tripodi (Urban Studies/Berlin): “Telescoping the City: Technological Urbiquity, or Perceiving Ourselves from the Above” (14.45–15.30)

- 15.30-15.45 Coffee Break
- 15.45-17.15 *Panel 3: Vertical Urbanisms*
Chair: Susanne Schregel
Martin Dodge (Geography/Manchester): “Verticality and Urban Mobility: Learning Lessons from Past Visions of Elevated Transport Systems in the Post-War City” (15.45–16.30)
Sascha Klein (Literature/Cologne): “Frontiers in the Sky – The Skyscraper as Actor-Network” (16.30–17.15)
- 17.15-17.30 Final Discussion
- 18.00 Dinner

There is no conference fee, and guests are warmly invited.

Please register: Nina.Engelhardt@uni-koeln.de by May 5, 2016.

The Venue

The Institute for Advanced Studies in the Humanities
The University of Edinburgh
Hope Park Square
Edinburgh EH8 9NW

The Institute for Advanced Studies in the Humanities was established in 1969 to promote interdisciplinary research in the humanities and social sciences at the University of Edinburgh. It provides an international, interdisciplinary and autonomous space for discussion and debate. This Workshop has been funded as a Royal Society of Edinburgh Susan Manning Workshop, in memory of IASH’s former Director, Susan Manning. For more information, please see <http://www.iash.ed.ac.uk/about/introduction>.



Call for Papers

Above. Degrees of Elevation

One-day workshop – 12 May 2016, IASH Edinburgh

Dreams of reaching the above have animated human beings for millennia, not least showing in the central role of ascension in religious, spiritual and cultural narratives and practices: Icarus's doomed ascent towards the sun, Christ's Ascension, or the levitation of saints, to name but a few. Next to the continued importance of such spiritual and mythological interpretations and connotations of height and elevation, the above has also been connected to ideas of modernity and "progress" in more recent history: genealogical trees reaching towards the realm of God, the history of flight as the conquering of the domain above with ever-improved technological tools, or the emergence of a modern "vertical" city epitomised by the skyscraper.

Reflections on the "vertical" dimension thus shape our understanding of basic human conditions and vice versa. Being always situated in space: "I am not in space and time, nor do I conceive space and time; I belong to them, my body combines with them and includes them." (Merleau-Ponty, *Phenomenology of Perception* 1962: 140), human beings use notions of verticality to reflect their relations, environments and relative positions. In negotiations of the above, spiritual and religious connotations of elevation merge with anticipations of modernity and its implications regarding technology, domination and power. That is, imaginations in Western modernity take place in a domain characterised by interrelations and tensions between the spiritual, the technological and the material. This dynamics for example shows in the development of flying contraptions to aid spiritual with bodily ascent, in the Romantic discovery of the Alps as means of sublime elevation, as well as in Gothic architecture, which provides edificial concretisation of the religious yearning for the above. Not least, the interactions between technological progress and spiritual elevation are apparent when the "giant leap for mankind" (Neil Armstrong) onto the moon in 1969 was answered by a surge in the popularity of Maharishi Mahesh Yogi's "transcendental meditation" with its promises of elevation of body and mind without technological aids.

Given the significance of non-horizontal spatial dimensions, it is surprising that elevation and verticality have not been a major focus of analysis for scholars working on the construction of space and the urban and rural environment. Despite a generally increased interest in aspects of space, place and scale over the last decades, scholars obviously hesitate to include the "above" as an explicit reference point for their analyses. Only recently have urbanists and geographers begun to break with the dominance of the horizontal and turned to the third dimension of space. Some scholars even call for a "vertical turn" in order to highlight the need and value of accounting for the above and its relations (see Graham and Hewitt (2013), "Getting off the Ground: On the Politics of Urban Verticality". *Progress in Human Geography* 37.1: 72-92).

The workshop "Above. Degrees of Elevation" aims to draw on this recently emerging scholarship on the vertical and study the relevance of non-horizontal spaces for the constitution of human relations and connect it with scholarly interests deriving from various disciplines. Not least due to its limited accessibility, the above constitutes a space with specific characteristics, and it has not only been con-

stituted through technology but also, and significantly, through imaginative exploration. Given the inseparability of material and imaginative aspects of the above, the workshop aims to think these together and explore their interrelations and the negotiations between them. Indeed, while scholars from a wide range of fields are concerned with the vertical, more exchange is needed to account for and connect the various aspects that the above and movements of elevation imply. The workshop therefore invites contributions on aspects of degrees of elevation in modern Western society from diverse disciplinary perspectives, including literature, theology, film studies, history and sociology.

The workshop will feature 9 presentations of 20 minutes each, allowing plenty of time for discussion.

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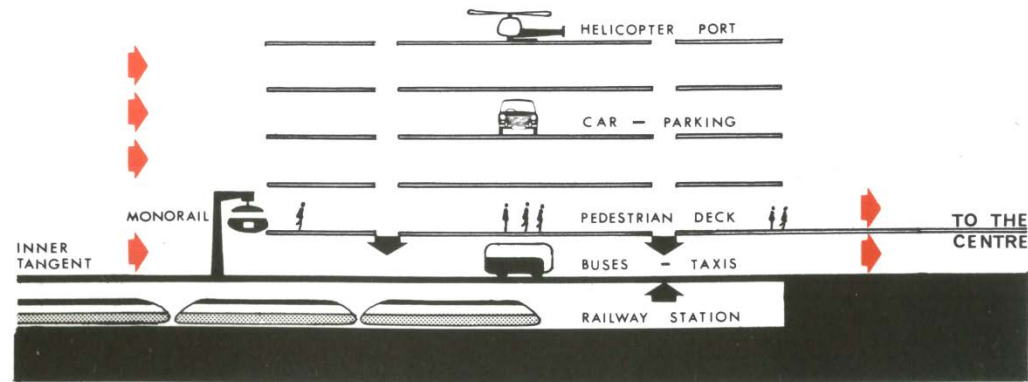
Organisers: Dr Nicoletta Ascianto, Dr Nina Engelhardt, Dr Susanne Schregel

Dr Nicoletta Ascianto is a Postdoctoral Fellow at the Institute for Advanced Studies at the University of Edinburgh. She has recently completed her Ph.D. in English Literature with a thesis on T. S. Eliot's use of light and dark imagery in his poetry and drama at the University of Durham. She also holds an MPhil in Comparative Literature from Trinity College Dublin and a BA in Modern Languages and Literatures from Università Cattolica, Milan, and was a Visiting Fellow at Harvard University.

Dr Nina Engelhardt is a Postdoctoral Fellow at the Institute of Advanced Studies at the University of Edinburgh and in the research group "Transformations of Knowledge" at the University of Cologne. She was awarded a PhD in English Literature from the University of Edinburgh in 2012. Moving on from and building on her research interests in literature and science studies, Nina is now working on a project provisionally entitled "Bodies in Flight", conceptualising texts on flight as sites of interrelation between techniques of the body, technology, and techniques of the imagination.

Dr Susanne Schregel is EURIAS Fellow at the Institute for Advanced Studies in the Humanities at the University of Edinburgh and Postdoctoral Research Fellow in the research lab "Transformations of Knowledge", University of Cologne. She holds a PhD in History from the Technical University of Darmstadt. Her main research interests are in the history of social movements and political protest, the history of spatial-political interrelations and the intersections between social history, political history and the history of knowledge.

Verticality and Urban Mobility

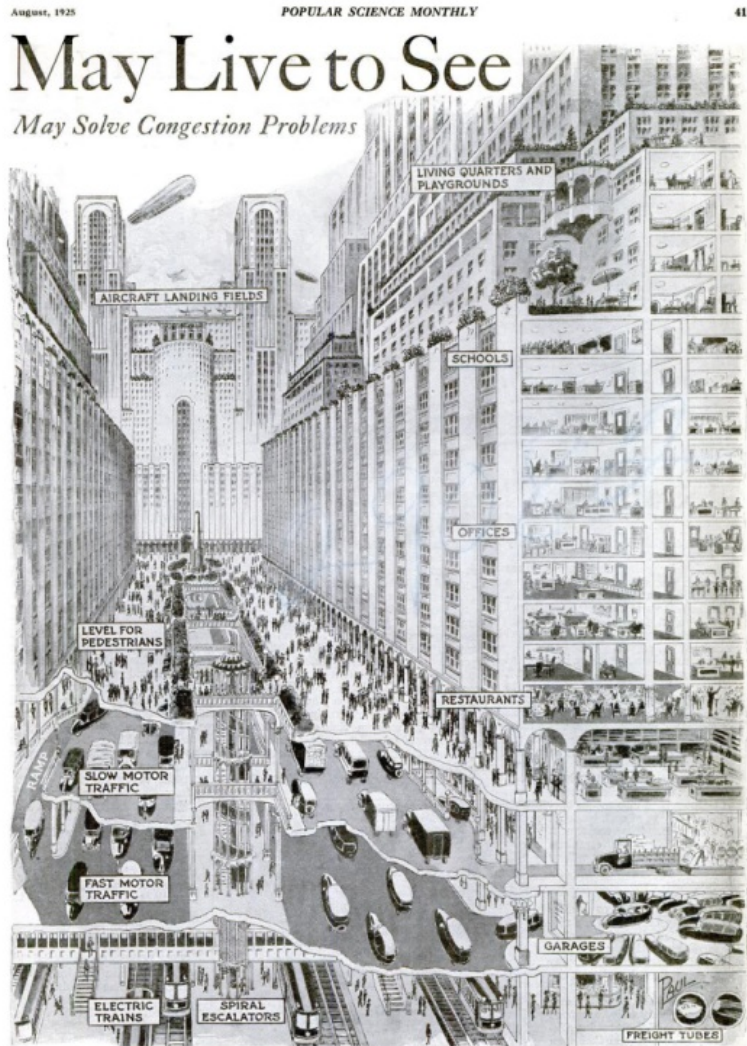


MAJOR TRANSPORT INTERCHANGE

Learning lessons from past visions of elevated transport systems in the post-war city

Martin Dodge, Department of Geography,
University of Manchester (email: m.dodge@manchester.ac.uk)

Urban mobility – 100s, 1000s, millions of bodies in motion...



How You May Live and Travel in the City of 1950

Future city streets, says Mr. Corbett, will be in four levels: The top level for pedestrians; the next lower level for slow motor traffic; the next for fast motor traffic; and the lowest for electric trains. Great blocks of terraced skyscrapers half a mile high will house offices, schools, homes, and playgrounds in successive levels, while the roofs will be aircraft landing-fields, according to the architect's plan

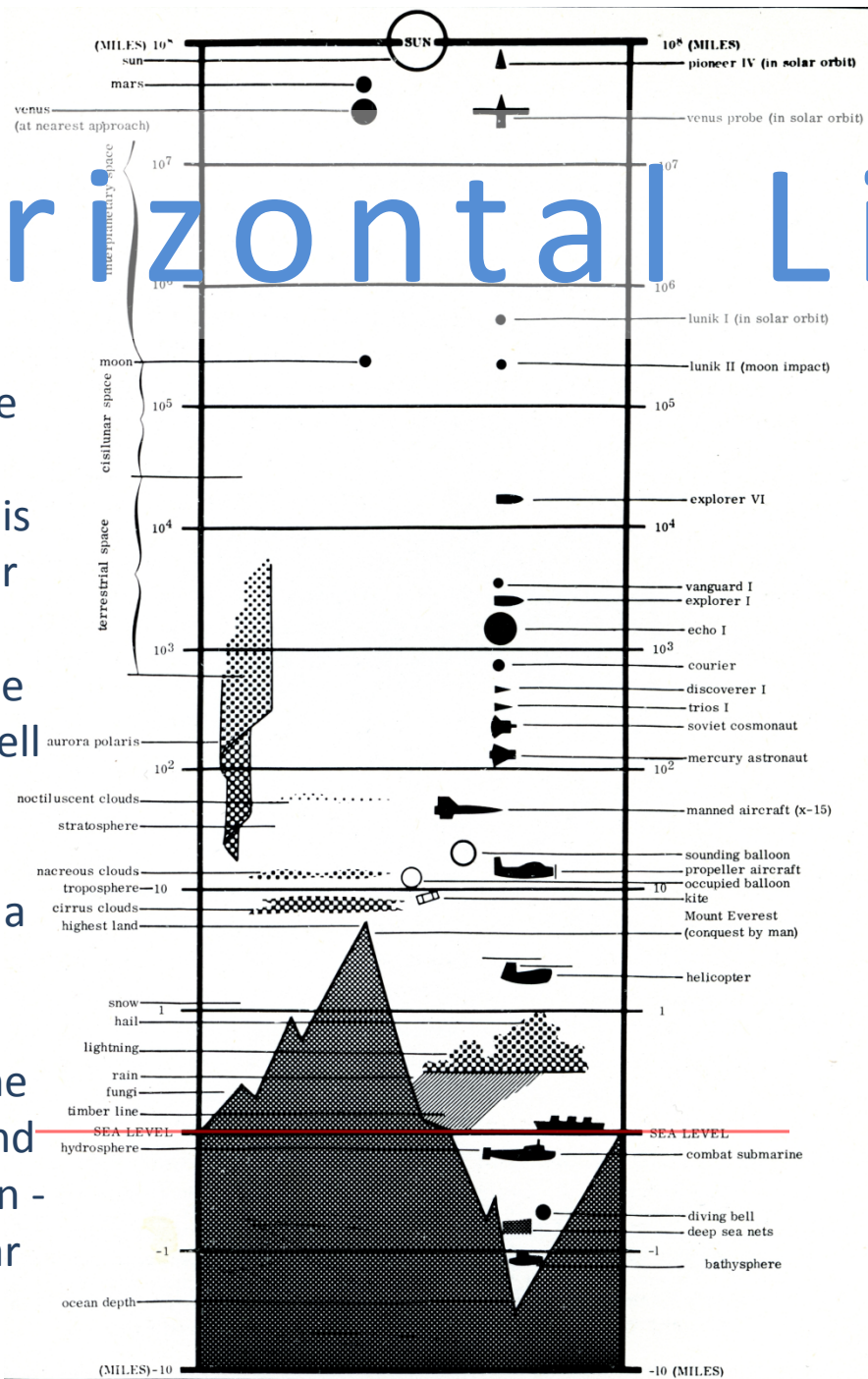
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Cities are machines for mass circulation

- Multi-level urbanism at the start of c20th with steel frame skyscrapers and their fast moving elevators
- Building up and burrowing down, an imaginary layering of transport infrastructure
- The air was going to be buzzing with flying machines and the roofs become landing pads and mooring points for dirigibles
- The buildings would be interconnected at different elevations. Activities happen at many levels. Lessening sense of 'the ground' as singular surface

Horizontal Lives



- Lived experience is tied to ground plane
- Most people's functional territory is narrow surface layer
- Intellectual language tied to ground as well
- Geography – 'earth writing' – has been a surface discipline
- Our primary spatial representations - the topographic map and land-use zoning plan - are resolutely planar perspectives

“We all-too-often think of the spaces of geography as areas, not volumes. Territories are bordered, divided and demarcated, but not understood in terms of height and depth.” (Stuart Elden, 2013)

'Verticality' agenda, by geographers, urbanists

Re-Orientating Vertical Geopolitics

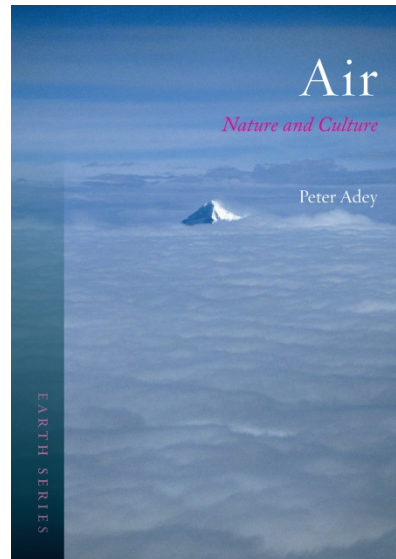
ALISON J. WILLIAMS

School of Geography, Politics and Sociology, Newcastle University, UK

“flattening of discourses and imaginaries
tends still to dominate critical urban
research in the Anglophone world”
(Steve Graham and Lucy Hewitt, 2013)

Geopolitics has a tradition of adopting a downward looking view-from-above, which is imbued with an imperialistic 'god's eye' perspective. Although acknowledged and critiqued, this paper argues that it needs to be actively re-orientated to encompass the discourses and practices of looking up. The paper analyses the practices of looking up and surveilling the sky through which air defence is achieved. It interrogates the ways in which UK air defence is represented in official documents and analyses the activities of the Royal Air Force's Air Surveillance and Control System. The paper argues that this system enacts a vertical geopolitics that goes beyond those understood in other geopolitical literatures and offers suggestions for developing our understandings of a volumetric vertical geopolitics that recognises the aerial view as generated from below as well as from above.

“Geopolitics has a tradition of adopting a downward looking view-from-above ... it needs to be actively re-orientated to encompass the discourses and practices of looking up.” (Alison Williams, 2013, p. 225)



Secure the volume: Vertical geopolitics and the depth of power

Stuart Elden*

Department of Geography, Durham University, Science Road, Durham DH1 3LE, UK

ABSTRACT

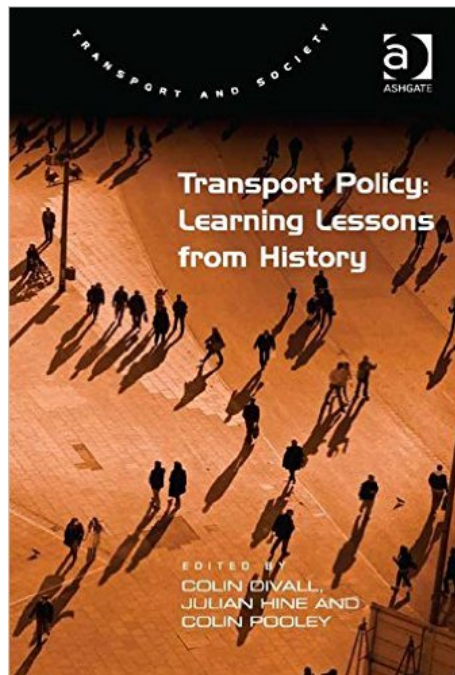
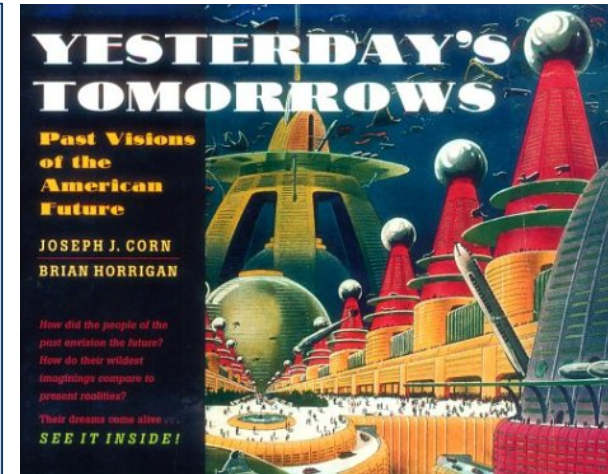
We all-too-often think of the spaces of geography as areas, not volumes. Territories are bordered, divided and demarcated, but not understood in terms of height and depth. 'Secure the area' is a common expression for the military and police, but what happens if another dimension is taken into account and we think what it means to 'secure the volume'? This article draws on the emergent literature on vertical geopolitics and Peter Sloterdijk's work on spheres, but also looks at what happens below the surface, with a particular focus on tunnels. Using Paul Virilio's work, and some examples from the West Bank and Israel's border with Lebanon, it demonstrates how we need to think volume—think about volume, through volume, with volume—rather than simply the vertical to make sense of the complexities of territory today.

Keywords:
Volume
Security
Verticality
Volumetric
Geopolitics

Likes of Steve Graham, Stuart Elden, Alison Williams,
Andrew Harris, Lucy Hewitt, Pete Adey, Pierre Belanger,
Gavin Bridge, Paul Dobraszczyk, Jeremy Crampton







Learning lessons from past visions

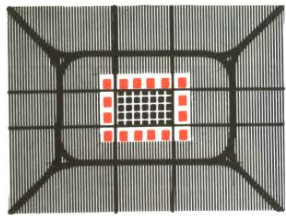
“the 20th century is of great importance in understanding current attitudes to, and patterns of, mobility. Studying the last century enables us to point to historical alternatives to the way that things actually turned out, to help reveal ‘cracks’ in the techno-tales and other structural stories that people tell themselves – ‘It didn’t have to be like that: and it doesn’t now’.” (Colin Divall, 2011, p.312)



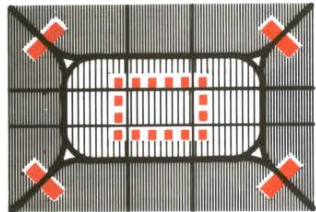
- Good number of vertical urbanism papers on contemporary issues, but value in historical perspective
- Focus on ‘failed’ and ‘unrealised’ transport schemes
- Counterfactual analysis; paths not taken; ‘paleofuturism’
- From forecasting the future, to ‘backcasting’ futures that could have been ...and still might become
- Fascination with the recent past – 1950s/60s as the forgotten decades that forged the cities we all live in today?
- ‘Technical’ visual culture: original plans, 3d models, engineers drawings, sketches, unpublished details from archives
- Materialist reading of cities, infrastructural archaeologies

Elevated transport systems as solution

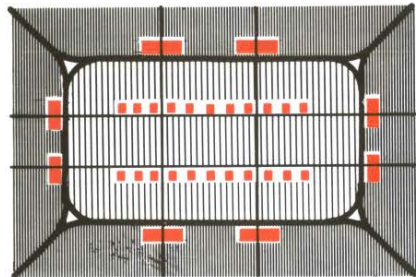
-  INTERCHANGE CAR PARK
-  TERMINAL CAR PARK
-  HIGH CAR PENETRATION
-  LOW CAR PENETRATION
-  PRIMARY NETWORK
-  SHOPPING CORE



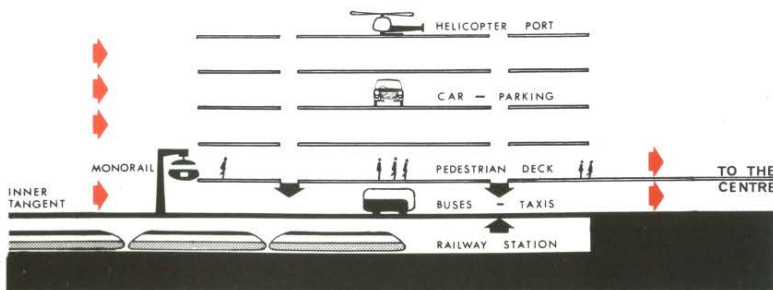
MEDIUM SIZED CITY



LARGE CITY

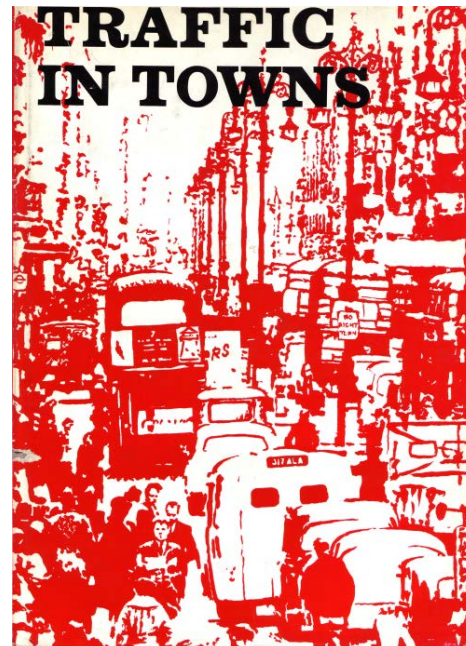


METROPOLIS



MAJOR TRANSPORT INTERCHANGE

- Helicopters and rooftop heliports
- Monorails gliding over city streets
- Pedestrian walkway systems
- Elevated urban motorways



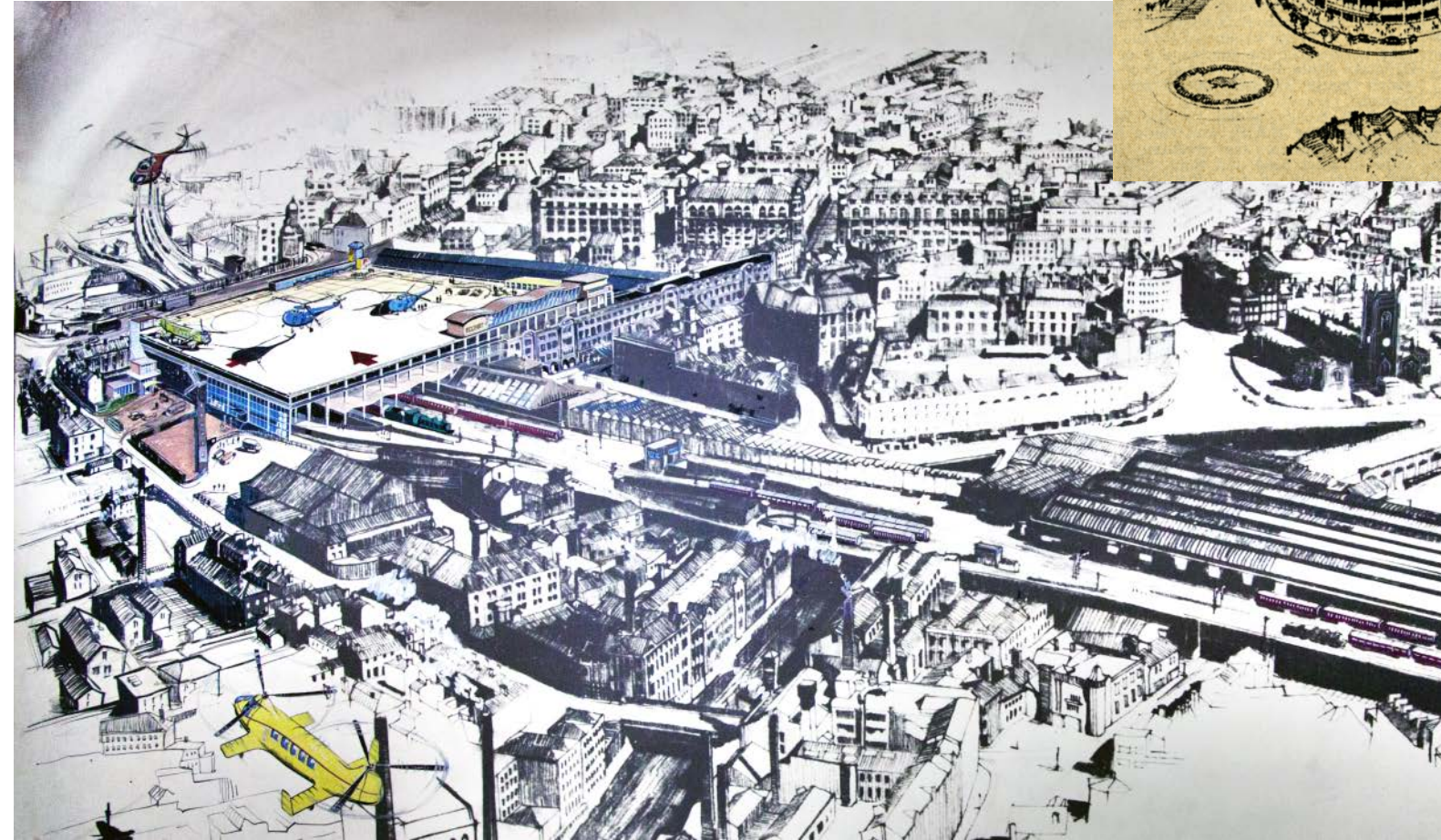
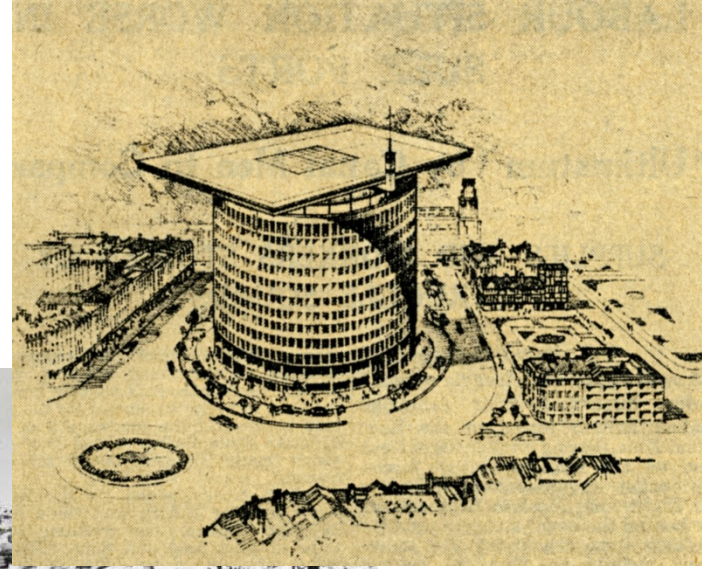
- Post-war period, particularly 1960s, were time major of expansion in new transport, the rise of mass car ownership and speculation regarding future 'layered' mega developments
- Belief in power of highways engineer and the town planner to transform urban mobility for the better

Helicopter travel and rooftop heliports



- Novel and uncertain in 1950s, but belief in many that helicopter was going to be major transport mode by 60s
- Underlying logic + pragmatics:
- “There is, for example, no great advantage in flying from London to Manchester in three quarters of an hour if one has to spend an hour at each end travelling from and to the centres of those cities by airport bus. The answer to this problem will probably be found in the helicopter, but not in its present form. It is as yet too costly and too small. We have to look into the future for some form of air bus which will take us from Waterloo to the Place de la Concorde in an hour or less. The landing places, or heliports, will have to be well above ground level in order to minimize the noise of operations in the centres of cities.”
- (Source: Wade D A L, 1955, “Civil aviation—progress and problems”, *Journal of the Royal United Services Institution*, 100(599): 426-33.

Logic of the rooftop landing!



- Speculation, heliports envisioned and a few sites seriously planned
- But nothing built in Manchester (or almost any city in UK)

Monorail for Manchester...

Study of £21m. monorail's feasibility proposed
16-mile line may follow

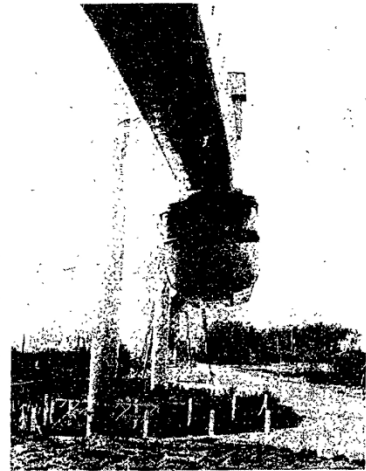
By GEOFFREY WHITELEY

MANCHESTER CITY COUNCIL is to be asked to agree to an intensive feasibility study of a scheme for a £21-million monorail system for the city.

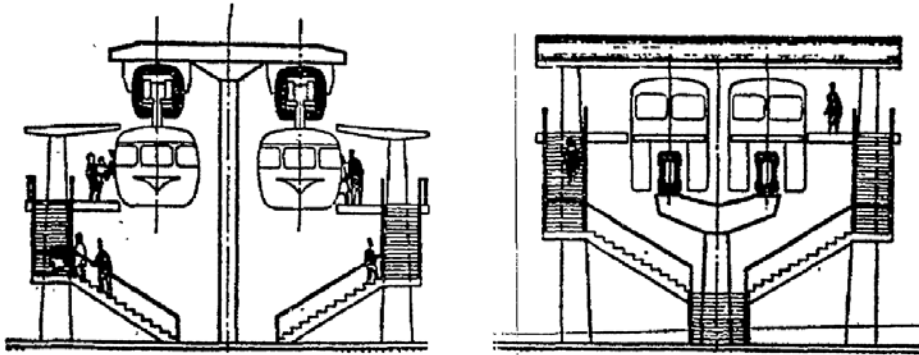
The study, which would itself cost £22,000, would answer the engineering and planning problems involved. The city could then seek substantial Government support for the scheme, which corporation officials believe could solve the problems of public transport in a congested area and could eventually form the hub for a monorail network serving the Greater Manchester area.

Paying third

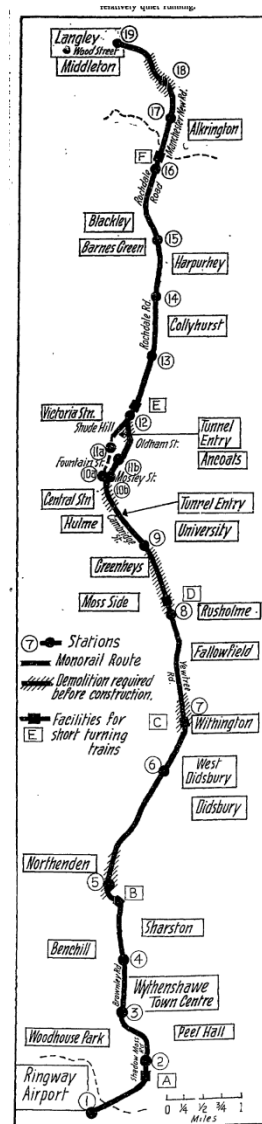
The scheme that would form the subject of the feasibility study is for a 16-mile line extending from Manchester Airport, in the South, through the city



A monorail such as this suspended system developed in France could operate in Manchester. Complete enclosure of tracks and working parts within a hollow gantry allows all-weather operation and the use of rubber tyres means relatively quiet running.



Monorail systems: AMF/Safage and Alweg.



A.5

VIEW OF ELEVATED STRUCTURES

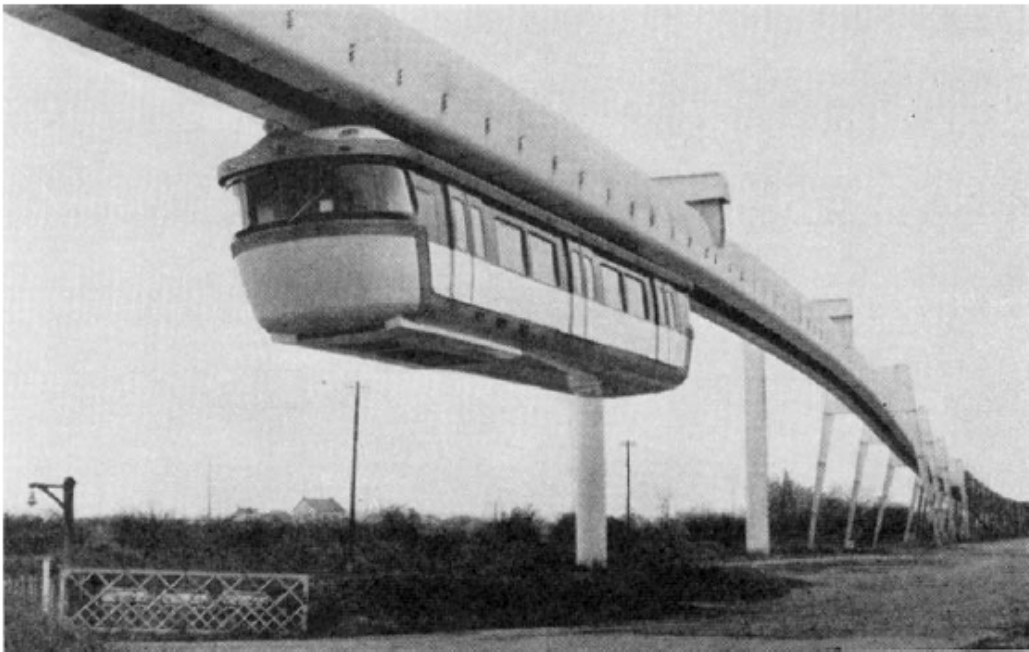
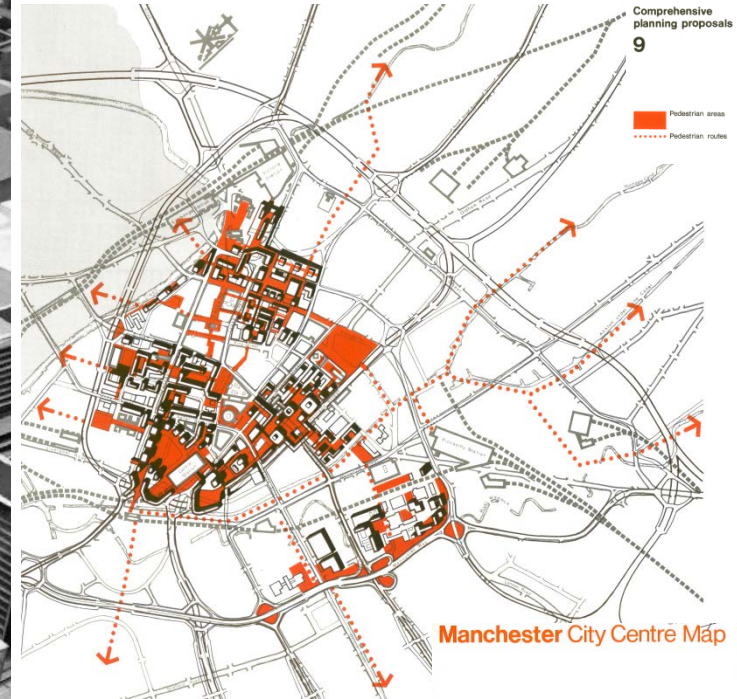
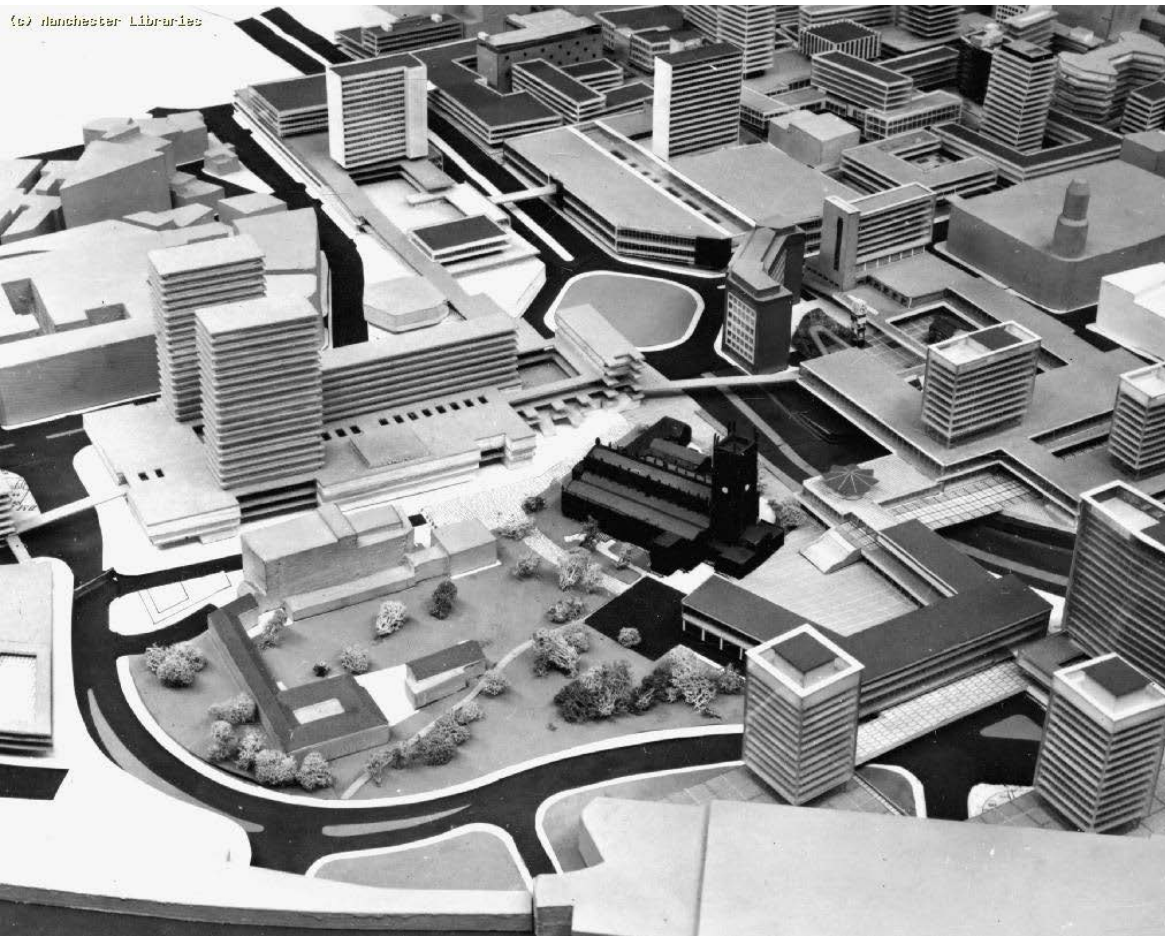


Fig. 2.10. Safage experimental monorail at Chateauneuf

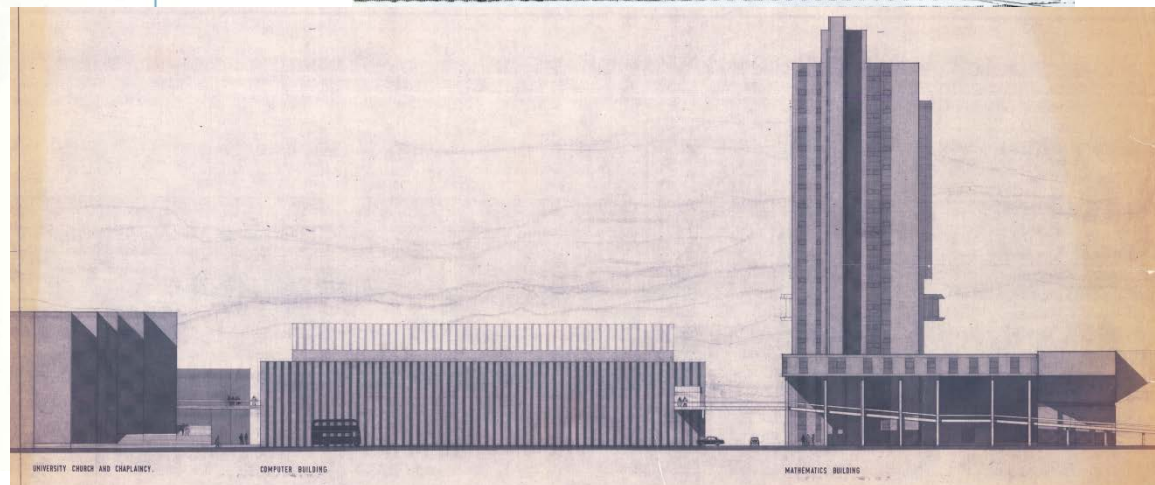
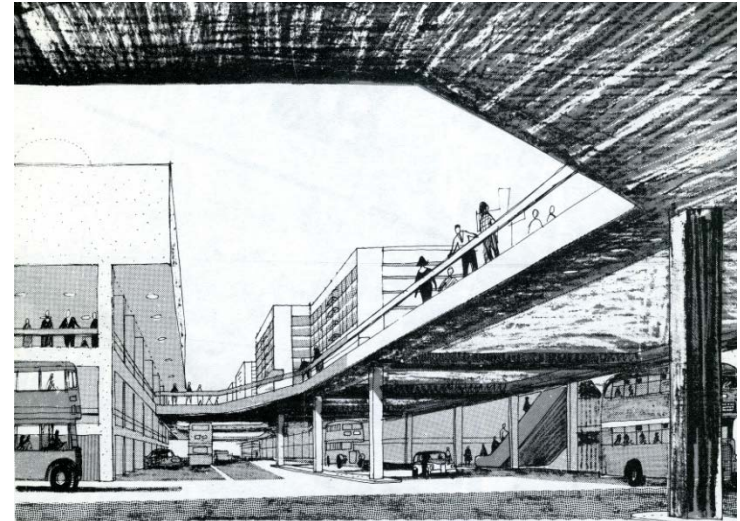
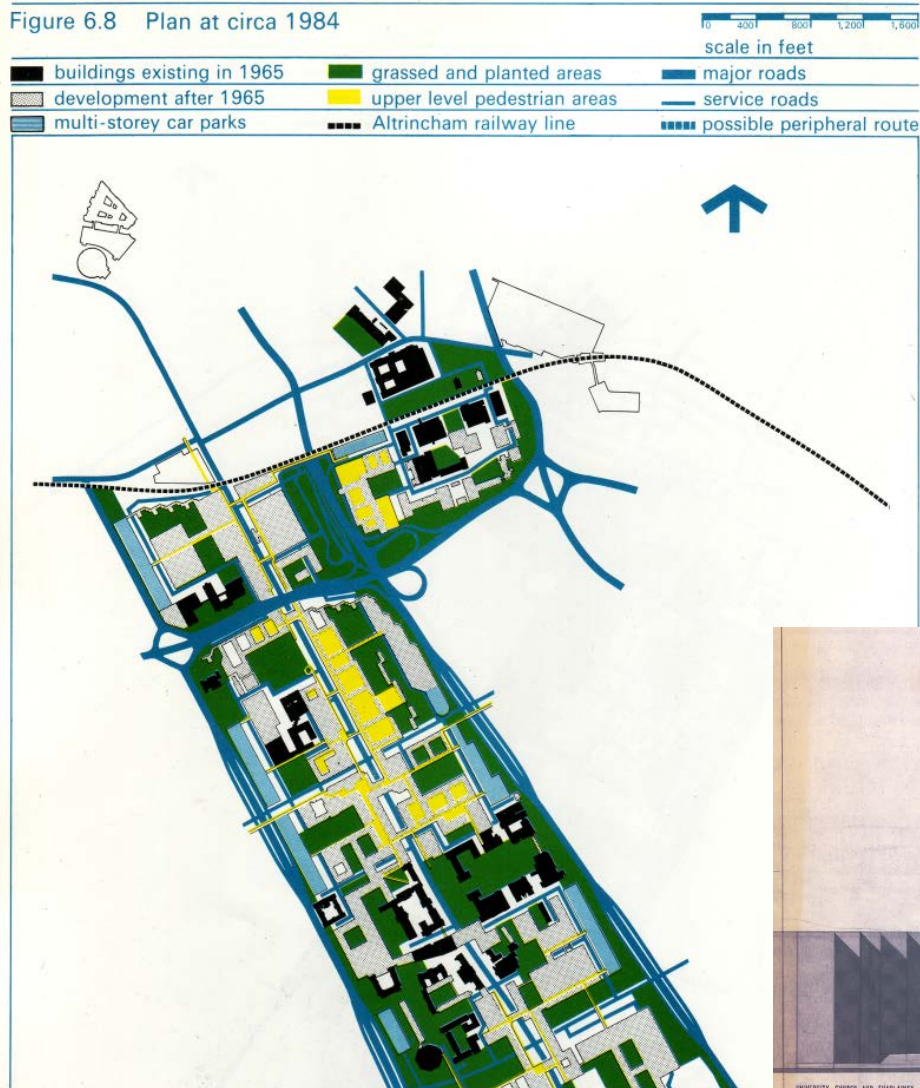
Pedestrian circulation on raised walkway systems



- Separation of people of traffic – vehicles sink, exclusive fast road ‘canyons’
- Seriously planned in Manchester but little realised, although some buildings were designed in relation to anticipated connections to pedestrian decks

Manchester Education Precinct, an ambitious walkway system all along Oxford Rd

Figure 6.8 Plan at circa 1984

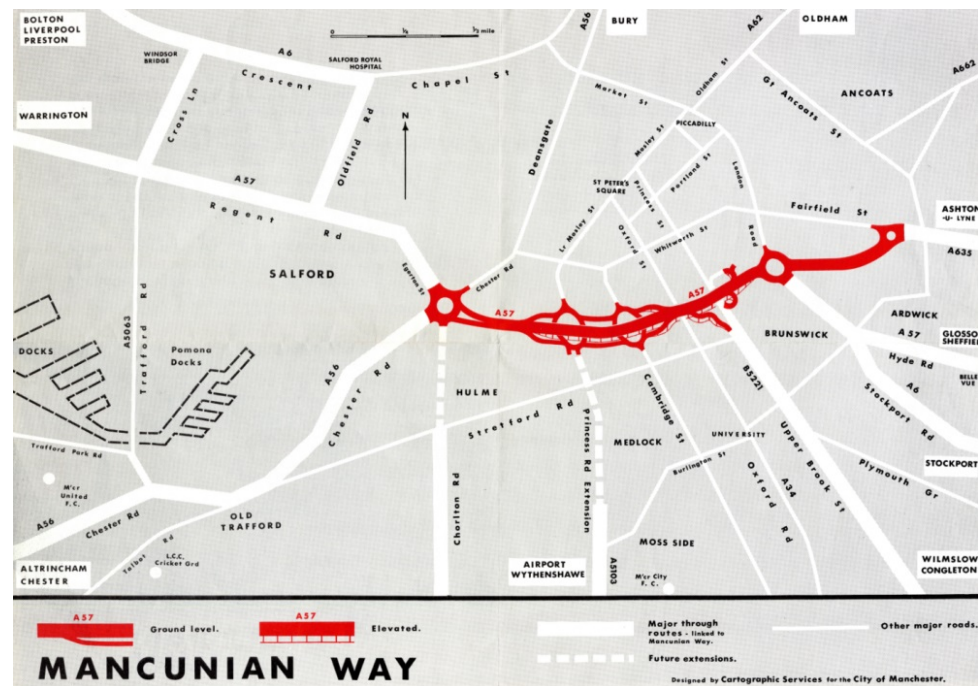


- A few of late 1960s University buildings were linked, but no wider system realised



Elevated urban motorways

- Seen as engineering triumphs, soaring overhead
- Amazing light looking structures – smooth concrete, slender skeletal supporting legs and bare steel; speeding vehicles
- Part of 1960s enthusiasm for highway lead solutions and wholesale urban renewal / slum clearance (Hulme in Manchester)





- “Elevated motorways were meant to symbolise the pure clean path of traffic flow and circulation over and above the dense city. The modernist dream was to clear the messy nature of cities and replace it with rational and efficient paths of circulation. Yet it seems that the shortness of the Mancunian Way only allows this experience to be relatively temporary and limited: the driver and passenger are soon returned to the dense and complicated nature of city life. The limits to this modernist project are clearly symbolised by the unfinished spur – it literally is a spur to nowhere.” (Julian Holloway, 2009, p.4)

Interpretations – lessons to be learnt?

- Failures of elevated transport systems envisioned in the 1960s. Mostly unrealised, and what was built did not really work
- **(1) freedom / disconnection:**
- E.g. Pedestrian walkways : Promise freedom from traffic and ability to wander and linger in peace
- Perception of wasted effort going up a level and unnecessarily diverted from desired path
- All or nothing. Partial links were physically isolated and socially disconnecting
- Hard to create living, vibrant streets-in-the-sky from scratch! (Lonely walkways and wind-swept plazas)

Interpretations – lessons to be learnt?

- **(2) hierarchy / inequality:**
- Motorways or monorails raised over heads of those left behind on the ground. Privileges car drivers and business commuters, from affluent suburbs, who sweep over the poorer residents in the inner city
- Few points to gain access for those living underneath
- Real human impacts on thousands of residents. Closing streets, cognitive barrier, sonic blockage. Permanently severed communities
- None built since 1970s, ‘highways in the sky’ came to symbolise hubris of transport planners’ ‘solutions’



- Lasting consequences of Mancunian Way, not least the space underneath. ‘unprogrammed’ wasted space, graffiti, vagrants, perceptions as risky places

Interpretations – lessons to be learnt?

- **(3) representation / spectatorship**
 - Moving above - new viewpoints, visual experience over space, looking out and across. Changing perceptions from hovering helicopter....
 - Drivers perspective accelerating up the ramp, helicopter passenger climbing vertically off rooftop pad, seeing a different wider vista of urbanity, but rapidity of change. Buildings and barriers create cuts in scenes through the windscreen
 - Cinematic experience of cityscape (Sue Robertson, 2007). [although Mancunian Way is only 1.75 miles long, with just 900m is elevated !]

Interpretations – lessons to be learnt?

- **(4) cost, risks, and environmental externalities**
- Could economics of elevated solutions be justified? Staying on the ground is easier to build and cheaper to operate and to maintain
- Safety – perception, reality in relation to elevated transport as more risky. Helicopter still seen as dangerous
- Going up means wider dispersal of noise and pollution, more people are impacted
- Helicopters were, and remain, a distinctive and distractingly loud noise in the air above cities

Elevated transport is less efficient?

- Why monorails never got off the ground....

Table 2.2. Comparison of various types of transit systems

	Top-supported (or suspended) vehicle (Safege system)	Bottom- supported vehicle on beam (Alweg system)	Bottom- supported pneumatic-tyre vehicle (Paris Metro system)	Conventional railway
Safety record	Limited experience	Limited experience	Adequate experience	Long record of safety
Speed capability (80 mile/h)	Unproved in operation	Unproved in operation	Unproved in operation	Proved
Noise	Satisfactory	Satisfactory	Satisfactory	Satisfactory*
Adaptability to subway, aerial, and surface construction	Poor	Poor	Good	Good
Flexibility	Poor	Poor	Satisfactory	Excellent
Efficiency of switching	Poor	Poor	Satisfactory†	Excellent
Construction costs	Higher	Higher	Higher	Most economical
Operating costs	Higher	Higher	Higher	Most economical

* Based on incorporation of features now under development.

† Unproved at high speeds.

Conclusion



- Linking past and present through focus on the 1960s and planning of elevated transport solutions can contribute something to concept of ‘verticality’
- City as a volume – seen clearly in helicopters, monorails, raised walkways and elevated motorways – their hoped for application and their failed histories
- Help to think critically about the use (misuse) of space above our heads today and in near future
- Air beginning to buzz with machines and we maybe at cusp of major change, with autonomous delivery drones, perhaps personal air taxis for affluent...

Image sources and references

- Slide 1
 - Image: Author scanned extract from Smigielski W K, 1964, *Leicester Traffic Plan: Report on Traffic and Urban Policy* (Leicester City Council).
- Slide 2
 - Left image: “*May Live to See*”, *Popular Science Monthly*, August 1925, p.41. Illustration by Frank R. Paul to accompany an article by architect Harvey W. Corbett. Source: Google Books, <https://books.google.co.uk/books?id=YScDAAAAMBAJ&pg=PA41>
 - Right image: “*Future New York , ‘The city of Skyscrapers’*”. Illustration by Harry Pettit for *King's Dream of New York* (1908), by Moses King. Source: <http://stuffnobodycaresabout.com/2015/01/26/old-new-york-in-postcards-11/>
- Slide 3
 - Image: Author scan from McHale J, 1969 *The Future of the Future* (George Braziller, New York), p. 69. [Original title ‘Vertical mobility’].
 - Quote from Elden S, 2013, “Secure the volume: Vertical geopolitics and the depth of power”, *Political Geography*, 34: 35-51.
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 - Quotes from Graham S, Hewitt L, 2013, “Getting off the ground: On the politics of urban verticality”, *Progress in Human Geography*, 37(1): 72-92. Williams A J, 2013, “Re-orientating verical geopolitics”, *Geopolitics*, 18: 225-246.
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 - Quote from Divall C, 2011, "Transport history, the usable past and the future of mobility", in Grieco M, Urry J (eds.) *Mobilities: New Perspectives on Transport and Society* (Ashgate), p.312.

- Slide 6
 - Left image: Author extract scanned from Smigielski W K, 1964, *Leicester Traffic Plan: Report on Traffic and Urban Policy* (Leicester City Council).
 - Centre image: Author scan of cover of the “Traffic in Towns” report, 1963 (HMSO, London).
- Slide 7
 - Rotodyne advertisement, 1959. Source: <http://www.aviationancestry.co.uk/?advert/&advertId=4660>
 - Quote: Wade D A L, 1955, “Civil aviation—progress and problems”, *Journal of the Royal United Services Institution*, 100(599): 426-33. <http://dx.doi.org/10.1080/03071845509422855>
- Slide 8
 - Main image: Perspective render of the proposed heliport on the roof of Victoria Station, Manchester, 1956. Source: Manchester City Archives, ref. M723/81.
 - Inset image: Heliport proposal in Manchester by J J Spyra, 1951. Source: *Manchester Guardian*, 1 November 1951, p.8.
- Slide 9
 - Left hand images: Author extracts from Wheatcroft ELE, Woodhouse LC, 1966, “Monorails”, *Proceedings of Institute of Mechanical Engineers*, 181(3): 62-75.
 - Centre and top right images: Whiteley G, 1966, "Study of £21m. monorail's feasibility proposed“, *Guardian*, 21 January, p.20.
 - Bottom right image: Author extract from *Manchester Rapid Transit Study, Volume 2 Study of rapid transit systems and concepts*, 1967, p.189. Source: www.mappingmanchester.org/plans
- Slide 10
 - Left hand image: Planning model for Manchester city centre, 1960. Source: Manchester Local Image Collection, ref. m58799.
 - Right hand image: Author extracts from *Manchester City Centre Map, 1967* (Manchester City Council). Source: www.mappingmanchester.org/plans

- Slide 11
 - Left hand image: Source: *Manchester Education Precinct, 1967*. (Corporation of Manchester for Hugh Wilson and Lewis Womersley), plan 6.8, p. 30.
 - Top right image: Sketch by Peter Wright. Author extract from *Manchester Education Precinct: Interim Report of the Planning Consultant*. (Hugh Wilson and Lewis Womersley, Manchester, September 1964), plate 16.
 - Bottom right image: Architectural elevation. Source: Estates Department drawing, University of Manchester.
- Slide 12
 - Source: Andrew Brooks photographer. University of Manchester, www.manchester.ac.uk/discover/news/bridge-demolition
- Slide 13
 - Top right image: Mancunian Way opening brochure, 1967 (Manchester City Council).
 - Bottom right image: Postcard view of the Mancunian Way. Author collection.
- Slide 14:
 - Image: Source not know.
 - Quote from Holloway J, 2010, “The Mancunian Way”, *Urbis Research Forum*, 1(1): 4-9. https://urbisresearchforum.files.wordpress.com/2010/02/urfreview_vol1_issue1.pdf
- Slide 17:
 - Image: Courtesy of James Thorp, www.jamesthorp.com/pdfs/highwayinthesky.pdf
- Slide 20:
 - Author extract from Wheatcroft ELE, Woodhouse LC, 1966, “Monorails”, *Proceedings of Institute of Mechanical Engineers*, 181(3): 62-75.
- Slide 21:
 - Amazon PrimeAir image, www.amazon.com/b?node=8037720011