

The Vertical Garden City: Towards a New Urban Topology



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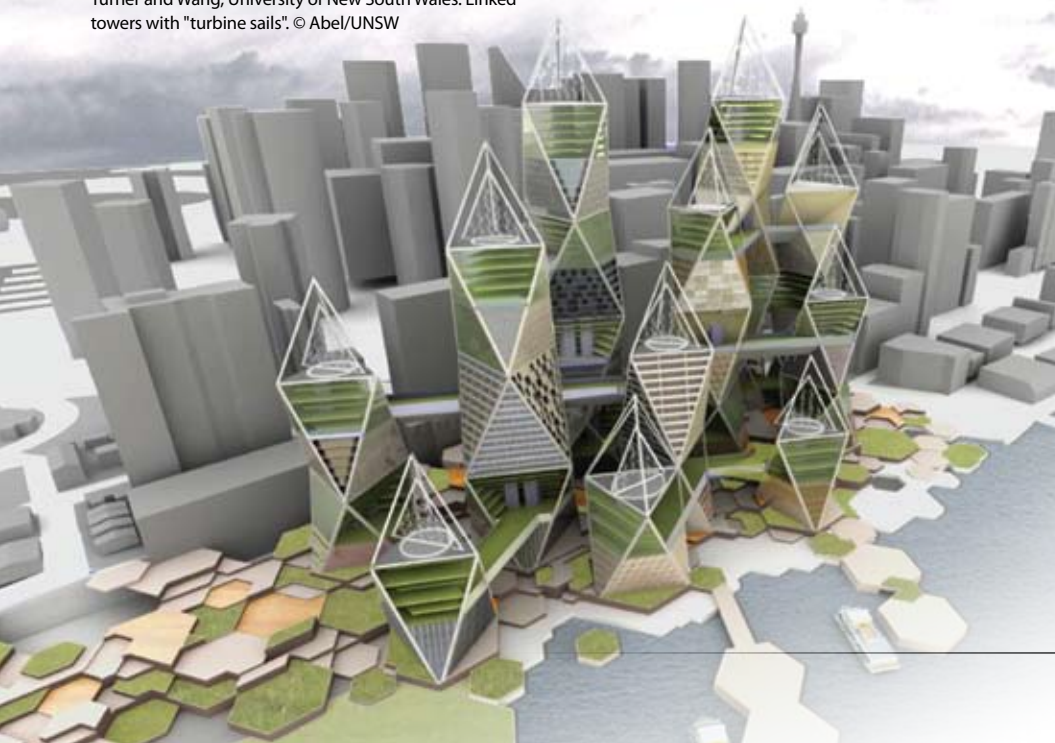
Chris Abel is the author of numerous publications of architectural history, theory and criticism. He has written on leading architects and movements in both the developed and developing world and is a recognized authority on the works of Sir Norman Foster. In 2003 he was co-curator with Foster for an international exhibition at the Royal Academy of Arts in London, *Sky High: Vertical Architecture*, for which he also wrote the book of the same title. He currently teaches at the University of Sydney and the University of New South Wales, where he runs his Vertical Architecture Studio (VAST).

"Understandably, architects have abandoned the flawed urban visions of the past century to focus on the new technologies of production and other more immediate issues. However, having now finally mastered the 'how' of production in the digital age, designers need to refocus on the 'what', and to re-imagine the shape of the modern city to meet the urgent challenges of this century."

The author argues that Ebenezer Howard's original concept of the Garden City has since been stripped of the planner's social agenda and subsequently developed in other ways and at far lower densities than Howard himself intended. The negative consequences of Howard's misinterpreted legacy are evident in the automobile dependent, low-density suburbs of Australia's major cities. Subject to extended droughts, shrinking farmlands and raging

bushfires, the continent is particularly vulnerable to the effects of climate change. In response, most planning authorities in Australia are now implementing strategies of urban consolidation and densification. The author reviews recent innovations in high-rise architecture in search of relevant solutions but finds them still limited by conventional urban typologies. The work of the author's Vertical Architecture Studio © (VAST) is illustrated by selected projects for a prototypical Vertical Garden City produced by students at different universities in Australia and the USA. Examples include designs for integrating food production and power generation within multi-functional complexes. It is suggested that the topological features and qualities of these designs differ significantly from known urban forms and that similar topologies may eventually yield spaces above ground of equivalent character and quality to those found at street level in any great city. In conclusion, the author argues that the future development and success of the Vertical Garden City model ultimately depends on an expansion of the public realm above ground into hitherto wholly private territory – a strategy for which the example of Howard's social agenda may eventually prove to be of more enduring value than the physical plan.

Project for Barangaroo, Sydney, 2009, by Mohd Nor, Turner and Wang, University of New South Wales. Linked towers with "turbine sails". © Abel/UNSW



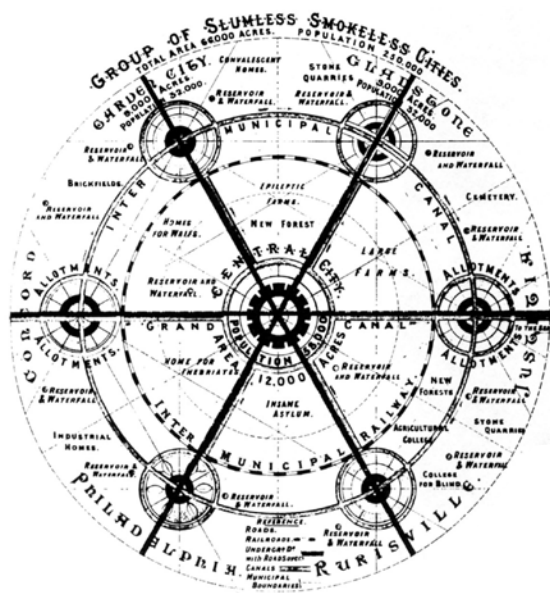


Figure 1. "The Social City", by Ebenezer Howard, 1898. Original diagram. © Fishman, 1982

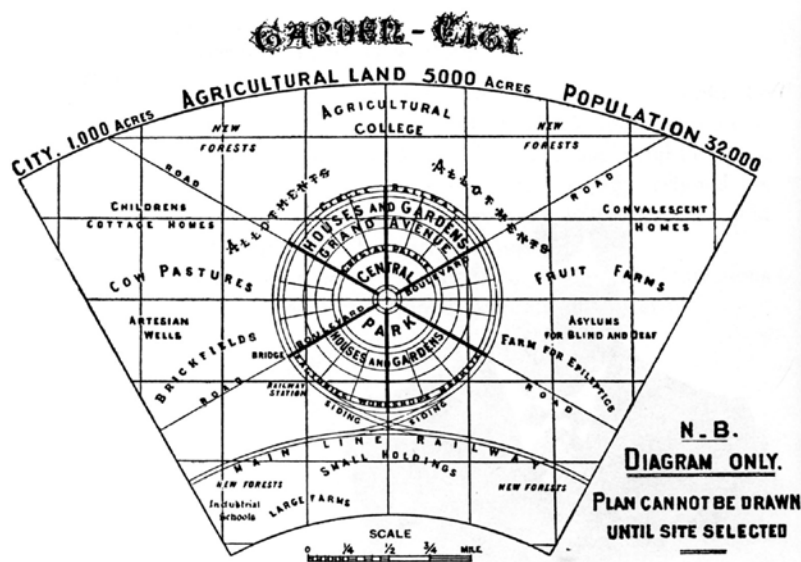


Figure 2. "The Garden City", by Ebenezer Howard, 1902. Segment of plan. © Fishman, 1982

Ebenezer Howard's Legacy

No other concept in architecture or urbanism evokes as powerful a response in the collective imagination as the Garden City (Howard 1898, 1902). Surveying the great figures that have influenced the way we think about urban life and form since the 19th century, the eminent planner Peter Hall (1996) unequivocally nominates Ebenezer Howard as "... the most important single character in this entire tale." However, as Hall explains, despite his fame – or maybe because of it – Howard's ideas have been widely misinterpreted. More than just a physical plan for decentralization, Howard's scheme for relocating industrial production in "Satellite Towns" to be built on cheap farmland well beyond existing urban centers was also a radical blueprint for socio-economic reform, the keynote of which was local management and self-government. As well as owning shares in the land, the increasing value of which would flow back into the community, citizens would build their own homes with capital financed by co-operative societies, unions and similar self-governing bodies, in turn boosting the general economy. As Hall puts it, "... forty years before John Maynard Keynes and Franklin Delano Roosevelt, Howard had arrived at the solution that society could spend its way out of a recession."

It was the famous diagrams of concentric new towns though, which stirred planners' and architects' imaginations, and even these, Hall argues, were mostly misunderstood. The full diagram of Howard's polycentric "Social City" as originally published in the first edition of his work, *Tomorrow: A Peaceful Path to Real Reform*, shows six towns with a population of 32,000 each grouped in circular formation around a Central City of 58,000, all linked together by "inter-municipal" canals, railways and roads across open countryside (see Figure 1). As Howard envisaged it, the whole arrangement of compact new towns and urban core was capable of housing a quarter of a million persons at medium densities. However, the image of the Garden City that imprinted itself upon professional minds was that of an altogether more modest proposal, as pictured in abstracted segments of the plan published in the second and better known title, *Garden Cities of Tomorrow* (see Figure 2). The complete diagram of the polycentric city was generally ignored and was never reproduced again until recently. Howard himself only realized fragments of his scheme at Letchworth and Welwyn Garden Cities near London, the scale and character of which resemble villages more than cities (Fishman 1982).

Presented as a two-dimensional diagram and interpreted ever since by others in its more limited variations as "dormitory" suburbs and semi-autonomous new towns (Choy 1969; Galantay 1975; Hall 1996), the concept of the Garden City was subsequently stripped of Howard's social agenda and developed exclusively as a physical plan. Outdated by the automobile, the networks of railways and canals that were such an important feature of Howard's strategy, suffered the same fate. In their place, Frank Lloyd Wright's own seductive vision of an ultra-low density city criss-crossed by freeways (Fishman 1982; Sergeant 1976), fast became reality, fueled in the post-war years by seemingly endless supplies of cheap land and gasoline. Rejecting low-density models and substituting the communal home for the individual house, Le Corbusier interpreted Howard's vision in his own way, creating a series of projects for a "vertical garden city" comprised of tall buildings set in parkland (Besset 1987). However, Le Corbusier's contrary interpretation failed to stem the general drift towards lower and lower urban densities. What now remains of Howard's legacy has devolved into countless automobile-dependant, repetitive garden suburbs around the world, the growth and maintenance of which are stretching the planet's natural resources to breaking point. ↗

Only Singapore bears any resemblance to the polycentric city Howard planned. With its "constellation" of high-density new towns all linked to the main city by a circular metro system, the city-state combines elements of both Howard's and Le Corbusier's visions together in a rare, infrastructure led urban strategy (Liu 1998), that is now the envy of planners around the world.

End of the Great Australian Dream

Nowhere are the negative aspects of Howard's misunderstood legacy more apparent than in the dispersed, low-density settlement patterns of Australia's cities. Inspired by their own vast landscape, like their fellow immigrants in North America, Australians developed an early passion for the wide-open suburban lifestyle and the individual freedom private automobiles afforded (Forster 1999). Even without the additional and potentially catastrophic effects of climate change, the limitations of a way of life built entirely around finite sources of fossil fuel were already becoming apparent, just as they are now belatedly obvious to most if not all planners in the USA and other parts of the world (Jenks & Burgess 2000; Dodson & Sipe 2008; Duany et al 2000; Newman & Kenworthy 1999).

However, extended droughts, shrinking areas of productive farmland, raging bushfires, fragile, low-lying coastlines and bleached coral reefs have brought home to Australians the particular vulnerability of their continent to global warming (Flannery 1994, 2005; Spratt & Sutton 2008). In many respects, Australia stands in the front line of climate change, for reasons largely of its own making. According to US Department of Energy figures for 2006–07, Australia has the highest per capita rate of carbon dioxide emissions in the world at 20.58 tons per year, overtaking even the US at 19.78 tons (Wilkinson 2009). As the world's largest exporter of coal – much of it to feed China's exponential growth – the Australian economy is also inextricably linked to the basic causes of global warming and continues to resist any significant change (Manning 2009). In his account of the collapse of previous civilizations and the analogous dangers facing the world

today, Jared Diamond (2005) devotes a whole chapter to Australia and the history of environmental degradation that has brought the country to its present precarious state. For all its great size, the area of habitable and productive land in Australia is relatively limited. Close to 60% of the entire population of 22 million lives in just five major cities situated on or close to the coastline where the first settlements were established. Likewise, the richest soils are mostly confined to a few areas, the largest of which is the Murray-Darling Basin in the state of Victoria, from where most of Australia's farm produce originates. Even that is now in danger of literally drying up. The once impressive Murray River is now occasionally reduced to a mere trickle – the combined result of years of drought and over-use of the river's waters to irrigate the increasingly dry land. Plans for increasing water-intensive coal mining operations in the region can only add to the problem (Sheehan 2009). According to Diamond, much the same is happening to Australia's other natural resources:

"Australia has been and still is 'mining' its renewable resources as if they were mined materials. That is, they are being overexploited at rates faster than their renewable rates, with the result that they are declining. At present rates, Australia's forests and fisheries will disappear long before its coal and iron reserves, which is ironic in view of the fact that the former are renewable but the latter aren't."

Paradoxically, while the population is concentrated in a small number of large cities, those same cities also have the lowest densities of any in the urbanized world, the growing extent of which is steadily gobbling up precious farming land and forests (Dodson & Sipe 2008). Irrespective of the environmental costs, the popularity of living in the bush on the urban



Figure 3a. Rouse Hill Town Centre, 2008, by Allen Jack + Cottier. Aerial photo. © GPT Group and Lend Lease.

fringes is sustained by a steady stream of enticing images in both the popular and professional media of architect designed houses shrouded by tall eucalyptus trees. Deceptively blending with the natural surroundings, the pollution from the endless automobile traffic needed to ferry families between scattered homes, schools, shopping malls and distant workplaces, together with the expensive infrastructure needed to support the low densities, are effectively discounted (Abel 2005).

However, for all its popularity, the Great Australian Dream of homes in the countryside is also now under direct threat from the most severe effects of climate change. As with the forest fires which have regularly plagued the dispersed inhabitants of California, bush fires have long been regarded by Australians as an undesirable but tolerably infrequent price to pay for the benefits of living close to nature as well as the city. Rising temperatures and parched lands have changed all that. Far worse than any previous conflagration, the "unstoppable" fires that swept through Victoria in February of last year devastated whole communities in their wake. The deadly fires marked a turning point, not only in the high toll in human life and property (173 died in one day, most of them in their own homes), but also in the public perception of the present and future dangers such fires present. Similar in intensity and speed to the recent so-called "mega-fires" which also devastated large areas



Figure 3b. Rouse Hill Town Centre. Town square. © Brett Boardman

of California, "Black Saturday", as the disaster is known, called into question the very idea of living in the bush. "Life or lifestyle, warns fire chief" was a typical headline in the following days (Stewart & Bitz 2009). Sadly, whatever measures like "fuel reduction" or "controlled burning" may be taken in the future to prevent the reoccurrence of these events, so long as the same worsening climatic conditions prevail and people continue to live in the bush, it seems likely there will be more Black Saturdays to come (Abel 2009a; Wallace 2009).

Constrained Urban Framework

Not all the news from Australia's cities is bad. Motivated by population pressures and environmental concerns, most local planning authorities are now implementing strategies of urban consolidation and densification (McManus 2005). Both Melbourne and Perth have built extensive light rail systems while Sydney recently completed the town center for Rouse Hill (see Figures 3a and 3b), a model compact new town in the northwestern suburbs (Harding 2008). Last year, for the first time, the number of new apartments built in Sydney also exceeded the number of new, detached houses; many of them built within the inner suburbs around existing mass transit systems, where future growth will be concentrated (NSW Government 2005). The city's forward looking mayor, Clover Moore, also recently announced the installation of a trigeneration power plant in the Town Hall, the

first of many localized or "distributed power" plants to supply surrounding buildings planned under the Sustainable Sydney 2030 strategy. While the popular image of Australian architecture abroad remains dominated by single-family dwellings, such as those designed by Glenn Murcutt and

other award-winning architects, a growing number of leading firms are now creating innovative designs across a broad spectrum of building types, using cutting edge technologies of production. The late Harry Seidler was also one of the first major architects in Australia to recognize the need to increase urban densities, leaving an impressive legacy of tall buildings on the skyline of Australia's cities, as well as residential architecture of every scale (Blake 1973; Frampton and Drew 1992; Abel 2003a).

For the most part, however, architecture and urban design in Australia, as in all market economies, continues to evolve within a conventional and highly constrained urban framework mostly shaped by commercial imperatives. While, following recent advances in digital tools of design (Kolarevic 2003; Leach 2002, 2004), there has been an outpouring of new forms and structures of every kind, the basic spatial and land use pattern of separate blocks and buildings of varying size and densities has hardly changed. At the same time, architects and urban designers have been compelled to accept increasingly circumscribed roles and limitations on their ability to influence the shape and quality of urban life as the public realm has shrunk in the face of growing private interests (Cuthbert 2006; Madanipour 2003; Zukin 1996). For all its compact and pedestrian friendly virtues, Rouse Hill, for example,

unlike the earlier new towns of Europe, is a wholly privately owned and managed development – including the "public" open spaces within the town center – while the promised new railway line connecting it with the city network has yet to be built by the state government, typically desperate for public funds.

Innovations in High-rise Architecture

Urban densification is generally best implemented with a wide range of building types and heights, from low to high-rise, depending on location. Mixed-use tall buildings are also increasingly favored over office towers, especially if built close to mass transit hubs, maximizing activity at those junctions and creating vibrant urban centers. Other innovations in high-rise architecture around the world epitomize the problems and shortcomings in the way designers approach the city, as well as their achievements. Generous sky gardens and soaring atria have become a common feature of office towers since SOM (see Figure 4), Norman Foster and Ken Yeang led the way. Raising the ground plane and opening up interiors with semi-public spaces, they transformed the spatial character of the tower type (Abel 1997). ↗

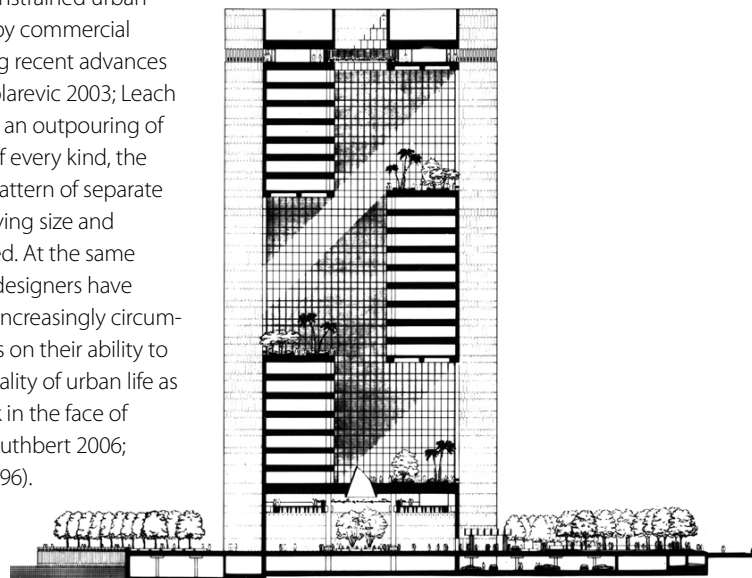


Figure 4. National Commercial Bank, Jeddah, 1989, by Skidmore, Owings and Merrill LLP. Section. © Aga Khan Award for Architecture



Figure 5. Riverside Development, Brisbane, 1986, by Harry Seidler. Aerial photo. © Harry Seidler Associates

Contrary to the stereotypical pictures presented by their critics, both Foster and Seidler also succeeded in extending and enhancing the public realm in high-rise architecture as well as in their civic buildings (see Figure 5), creating popular plazas and "urban rooms" around the base of their office towers, as well as in their upper levels (Abel 2006a, 2009b). Introducing a whole vocabulary for greening skyscrapers, Yeang also argued for "vertical urban design", taking the debate to yet another level (Yeang 2002).

Inventive as these designs are, which often feature linked sky gardens in a spiral or zig-zag formation, as in both Foster's and Yeang's work (see Figure 6), they remain tightly constrained by the vertical dimension and by their limited plot sizes and regulatory envelopes. Echoing the science fiction fantasies of the early twentieth century and the megastructure projects by Archigram and other avant-garde designers in the 1960s, a new tower type emerged at the turn of the millennium in which two or more structures are linked together at their upper levels by bridges and other spatial elements (Wood 2003, Abel 2003b). The first and most familiar of these – the twin Petronas Towers in Kuala Lumpur by Cesar Pelli – are linked by a simple bridge, providing communication and alternative escape routes between the two structures. The more daring designs, like United Architects'



Figure 6. Edge Spire, Gurgaon, India, 2008, by Ken Yeang. Rendering. © Ken Yeang

entry for the World Trade Center competition (see Figure 7), and Steven Holl's Linked Hybrid building in Beijing (see Figure 8), join several tall buildings together with multifunctional public "skyways". The CCTV building in Beijing by OMA and Arup (see Figure 9) also melds both horizontal and vertical elements into one spatial and structural continuum (OMA 2008). Lastly, the Museum Plaza in Louisiana by REX features a raised slab of space housing a complete museum of art supported by several slim towers, arranged much like the seat and legs of a chair (see Figures 10a & 10b).



Figure 8. Linked Hybrid building, Beijing, 2009, by Steven Holl. © Shu He

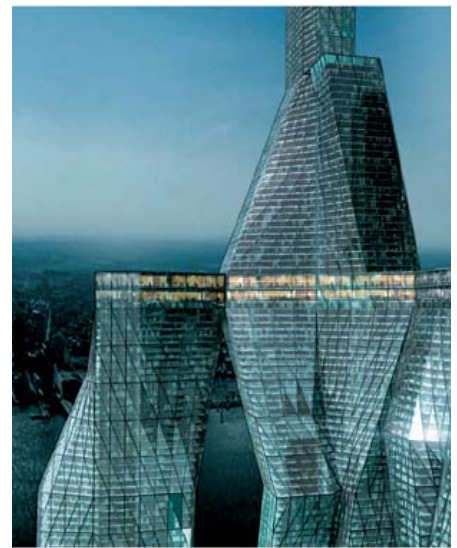


Figure 7. World Trade Center Competition entry, 2002, by United Architects. Rendering. © United Architects

All of these projects, none of which was conceivable without the new digital technologies of production, give new meaning to the horizontal dimension in high-rise architecture. However, for all their innovations, the vision they offer of new urban forms and spaces is at best a partial one. They appear primarily as giant sculptured objects in their urban surroundings, while the external spaces between the different elements of the composition have little or no definition or character of their own. Similarly, attempts to revive the Corbusian idea of a vertical garden



Figure 9. CCTV Building, Beijing, 2009, by Office of Metropolitan Architecture. © OMA



Figure 10a. Museum Plaza, Louisiana, by REX. Montage. © REX

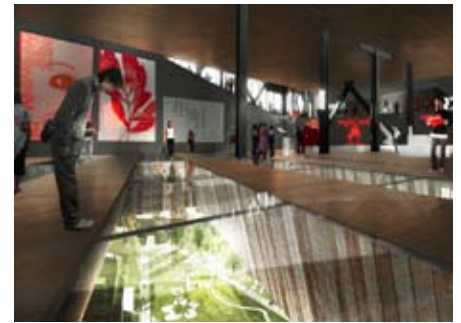


Figure 10b. Museum Plaza. Interior of Museum. Rendering. © REX

city, like Mori's project for Tokyo (Mori 2009), repeat the same tired formula of separate towers set in open parks. The idea of a genuine three-dimensional urban topology, that might create elevated spaces of equivalent character and variety to those found in any great city at street level, remains a compelling but elusive prospect.

The Vertical Architecture Studio

Though Howard's original vision may have been distorted beyond all recognition, the scope of his social agenda and commitment to safeguarding the landscape by concentrating urban growth around mass transportation systems, are, if anything, more relevant today than they were in Howard's own age. Having accepted diminished professional roles and visions for decades in the face of rapacious economic and social forces, it may be time for architects and other designers to readjust their priorities and to broaden their horizons once again. Understandably, architects have abandoned the flawed urban visions of the past century to focus on the new technologies of production and other more immediate issues. However, having now finally mastered the "how" of production in the digital age, designers need to refocus on the "what" and to re-imagine the shape of the modern city to meet the urgent challenges of this century.

With this goal in mind, the Vertical Architecture Studio © (VAST) was conceived by the author as a focus for research in new forms of high-rise architecture and urban design. Beginning in 1994 as a studio project (see Figure 11) at the University of Nottingham, UK, VAST was created in its present itinerant form

in 2006 at the Faculty of Architecture, University of Sydney (USYD). It has since been offered at architecture schools at the University of Lincoln Nebraska (UNL) and the University of New South Wales (UNSW), also in Sydney, where it is presently in the graduate program. In line with current strategies, all of the projects carried out so far within the VAST program have been located on large central urban sites adjacent to or close by railways and other mass transit systems, the size of which demand appropriate large-scale solutions. In all cases, plans for high-density redevelopment on the same sites already exist and may, as in the first project in Sydney, even be under construction at the time, affording valuable sources of information and benchmarks for the students' work without inhibiting their own approaches. Given the complexity of the designs and the fact that most students have little or no prior experience of this scale, teamwork is mandatory for all projects.

Overriding any differences in their location, all VAST programs are rooted in a common set of principles for designing a prototypical Vertical Garden City, as summarized at the end of this essay, based upon a new urban topology. Beyond these principles, generic solutions, structural logic and energy saving features (the Sydney projects have enjoyed the enthusiastic support of engineers from Arup's office in the city) are favored over idiosyncratic form making, though this has not excluded non-orthogonal geometries, or iconic forms. Crucially, depending on the scope offered by site and program, students are encouraged to treat both horizontal and vertical spatial dimensions as having potentially equal significance above ground level. ✎

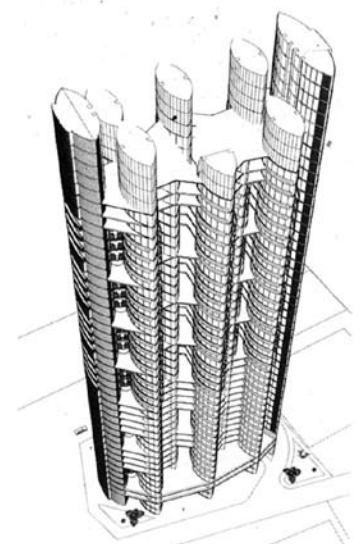


Figure 11. Project for a Tropical Tower, 1994, by Miller, University of Nottingham. Aerial view. © Abel/University of Nottingham

...down cycle

“A correction might give opportunities. I think it's healthy for the city's real estate market to have a down cycle.”

Jonathan Bowles, director of the Center for an Urban Future, referring to the opportunities that investors and businesses could find buying and leasing in Manhattan as a result of lower costs during the current recession. From "Commercial Real Estate Slumps in New York," The New York Times, January 8, 2010

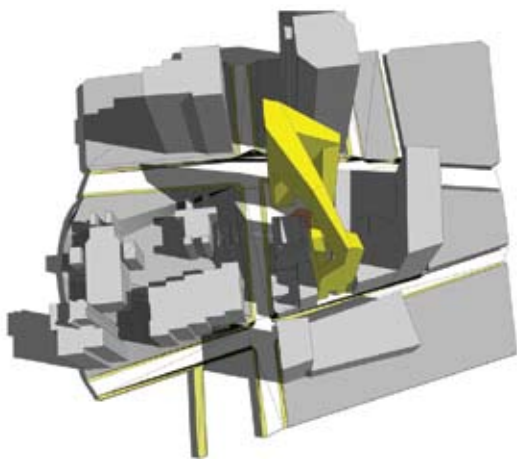


Figure 12. Project for Regents Place, Sydney, 2006, by Marsh, Moussawei and Nguyen, University of Sydney. Digital site model. © Abel/USYD



Figure 13. Project for Regents Place, Sydney, 2006, by Marsh, Moussawei and Nguyen. View upwards from plaza. © Abel/USYD

Similarly, particular attention is directed to the creation of open and enclosed spaces and activities that improve the quality of life at elevated levels as well as on the ground.

Two schemes from the first VAST program at USYD illustrate some of the key issues at stake (Abel 2006b). The oddly shaped site – the smallest of any VAST program to date but by no means the least difficult – consisted of two linked parcels of land on opposite sides of a block in the heart of Sydney's commercial and entertainment centre. Foster + Partners had been commissioned to design a mixed-use scheme for the site comprising two residential towers – one on each parcel – linked at the lower levels and rear of the site by a retail podium. Inspired by the bifurcated shape of the site, one group of students designed two towers asymmetrically joined at their apex, inverting the conventional tower and podium arrangement and opening up a large plaza beneath at street level (see Figures 12 & 13). Another group focused on creating a "secondary ground" at mid-level, carefully arranging adjacent structures so as to create large sheltered open spaces at both upper and lower levels (see Figure 14). While the first scheme derives its form from the unique features of its site and leans towards the sculptured qualities of some of the above precedents, the second scheme yields generic urban solutions indicative of a 3D spatial matrix that can be readily extended and adapted to other, much larger sites.

Since 2008 a substantial level of urban agriculture has also been included in VAST projects. Already threatened by drought and reduced capacity in their own homeland, the effects of global warming on food production around the world are likely to hit Australian consumers especially hard in the future. Higher fuel prices as demand outstrips supply will inevitably raise the cost of importing food from distant sources overseas, which may themselves be sorely stressed by climate change (Vidal 2009). However, as with trigeneration and other forms of distributed energy, the benefits of closing distances between the points of production and consumption are applicable to any part of the world, especially in North America, where great distances typically separate consumers from producers (Despommier 2009; Koc et al 1999; Viljoen 2005). The problem for designers is how to overcome the inertia presented by urban economic and political systems that generally value short-term capital gain over long-term public benefits. Most designs for vertical farms, for example, are developed as special purpose, or at best, mixed-use tall buildings within the same conventional framework of separate blocks and buildings that currently shapes high-rise architecture everywhere (Despommier and Ellingsen 2008; O'Meara 2008). As fuel costs rise and alternative sources shrink, the economics of producing food within cities on expensive sites will doubtless become more favorable in the future.

The growing use of intensive farming techniques such as hydroponics and aeroponics, which greatly increase the efficiency of food production whilst reducing the amount of water and space required, will also ultimately help to lower costs (Herbert & Herbert 2008; RIRDC 2001). However, aside from subsidized or experimental projects, the high capital investment entailed in building purpose-designed structures would appear to limit the development of stand-alone vertical farms in cities for some time to come.

The approach to vertical farming in VAST projects has instead been to create flexible spaces for food production within large scale, mixed-use developments where opportunities



Figure 14. Project for Regents Place, Sydney, 2006, by Renn, Waterman and Wrightson, University of Sydney. Aerial view showing elevated plaza. © Abel/USYD



Figure 15. Project for West Haymarket, Lincoln, 2008, by Brown, Nelson and Patzlaff, University of Nebraska Lincoln. Aerial view showing "wind harps" and elevated plaza. © Abel/UNL



Figure 16. Project for West Haymarket, Lincoln, 2008, by Brodersen, Burke and Stovall, University of Nebraska Lincoln. Aerial view showing integrated wind and farming towers. © Abel/UNL

exist for offsetting the higher costs of providing space for one function against the lower costs of another. This has been combined with on-site systems of water collection and power generation, including, as with some of the UNL and UNSW projects, integrated wind turbines. One team at UNL, for example, capitalized on the favorable conditions in Nebraska for wind power – the state is proudly described locally as the future "Saudi Arabia of wind power" – filling open spaces between the vertical elements of their design with large arrays of vertical axis turbines, or "wind harps" (see Figure 15). Another UNL team proposed a regular infrastructure of farming towers and wind turbines combined with multi-functional blocks of space on the city grid that could be extended throughout Lincoln (see Figure 16).

The most recent VAST program at UNSW was also, in many respects, the most challenging and fruitful of the series (Abel 2009c). The waterfront site in the Barangaroo precinct of Sydney Harbour is the largest brownfield site to be developed in the city since the Olympic Park. The approved plan includes an extensive public park and three large blocks closest to the CBD, designated for high-rise commercial development. Focusing on these blocks, which were treated as one site, students were invited to freely interpret planning guidelines and to explore alternative models for a vertical garden city. The great variety of designs produced not only testifies to the students' ingenuity but also to the open nature of the principles outlined below. Nevertheless, common features run through the schemes, reflecting those principles. In most cases, the horizontal links between the vertical elements of the design acquired an importance and life of their own. In one extreme example, stacks of floors arranged like giant beams – what the designers call a "stackrise" – span between vertical circulation towers in a manner reminiscent of the megastructure projects designed by Japanese metabolists, creating continuous elevated spaces and "streets" throughout the whole complex (see Figure 17). Another team designed a linked series of ultra-slim buildings packed so closely together that the spaces between adjacent slabs, some of which are fully enclosed with glass, merge with the opposite floors (see Figure 18). ↻



Figure 17. Project for Barangaroo, Sydney, 2009, by Ji, Yuen and Zhou, University of New South Wales. Mixed-use "stack-rise". © Abel/UNSW

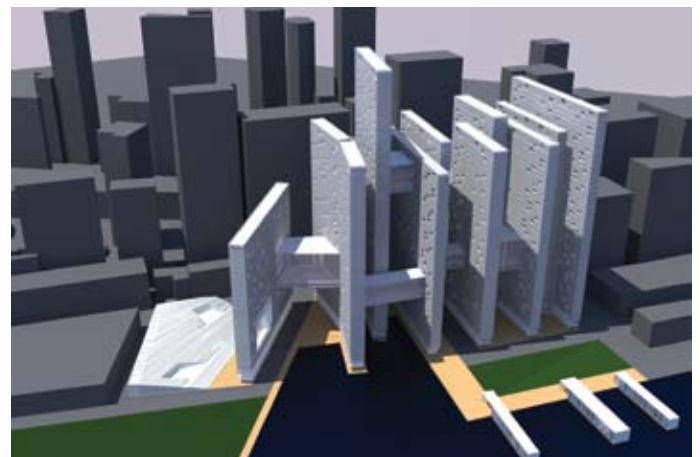


Figure 18. Project for Barangaroo, Sydney, 2009, by Allen, Field and Younan, University of New South Wales. Aerial view showing linked mixed-use slabs. © Abel/UNSW

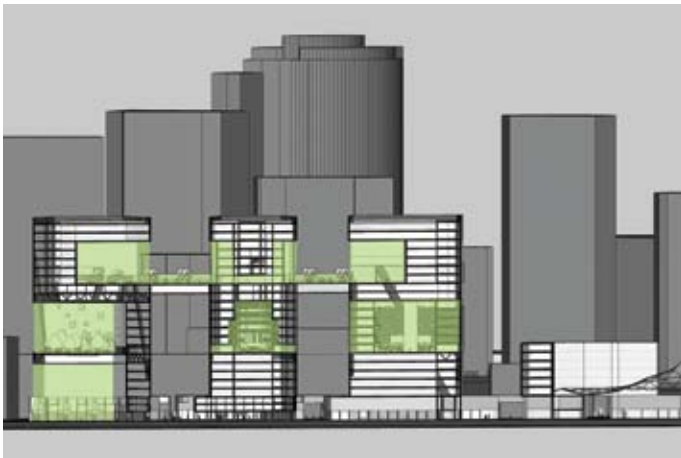


Figure 19. Project for Barangaroo, Sydney, 2009, by Hau, Lin and Tang, University of New South Wales. Section showing open spaces and elevated links. © Abel/UNSW



Figure 20. Project for Barangaroo, Sydney, 2009, by Hau, Lin and Tang, University of New South Wales. Elevated plaza and link between buildings. © Abel/UNSW

In another scheme, large elevated open spaces formed by adjacent buildings are linked together to produce a secondary ground level, similar in character to the earlier project by USYD students (see Figures 19 & 20). Based on a regular hexagonal geometry, another design exploits the close visual and spatial relationships between linked structures to create a rich matrix of elevated spaces (see Figures 21 & 22). All schemes include a generous amount of space for food production, as required in the project guidelines. Some, like the UNL scheme described above, also take advantage of the favorable wind conditions on the exposed waterfront site and include large arrays of integrated wind turbines in their designs.

Shaped like triangular sails, the turbines featured in the last project mimic the metaphorical associations of the Sydney Opera House in another part of the harbor.

Expansion of the Public Realm

The unusual nature of these designs has in turn thrown up new questions concerning the nature and propriety of future urban topologies of this kind. Nollí's famous figure-ground map of Rome, which was such an important influence on designers and theorists like Colin Rowe in prior years (Rowe & Koetter 1978), is an inadequate model for spatial relationships in such cases. What now happens on the ground

plane no longer provides a predictable guide to the spaces above. During the course of the program students struggled to find forms of representation which expressed the quality and complexity of the interlinked spaces and pathways in their schemes. Digital movies proved to be the most, and perhaps only, reliable guide to the intended dynamic spatial experience. Other approaches, like the Japanese concept of "movement space", where the path ahead is obscured from the observer's view and only unfolds as he or she moves through it (Inoue 1985), may also be more relevant than traditional Western spatial concepts. Similarly, moving through a maze of spaces, where each junction or node offers a



Figure 21. Project for Barangaroo, Sydney, 2009, by Mohd Nor, Turner and Wang, University of New South Wales. Linked towers with "turbine sails". © Abel/UNSW

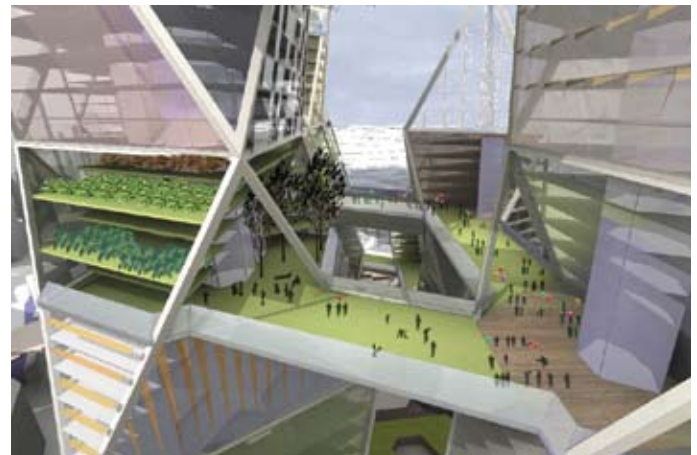


Figure 22. Project for Barangaroo, Sydney, 2009, by Mohd Nor, Turner and Wang. Close-up of elevated open spaces and links between towers. © Abel/UNSW

potential choice of moving up or down as well as in any other direction, may be better likened to negotiating one's way through cyberspace from one multi-choice website to another rather than to any conventional urban experience (Abel 2004).

However, the future development and success of the Vertical Garden City model may ultimately depend on a substantial expansion of the public urban realm above ground into hitherto wholly private territory. Already shrinking fast at ground level, the problem of extending the commons is compounded many times over above ground, where private ownership and control of both habitable spaces and movement systems is generally total.

What chance then, for viable public spaces and amenities within an urban topology extended in all directions, as proposed in the above projects? Unlikely as it might have seemed even just a year ago, the seismic effects of climate change and the global financial crisis have combined to create a potentially new situation. Not only is it now plausible to posit major extensions of public responsibility in all aspects of life, but also to view a major shift in priorities from private to public interests as an urgent necessity, if not a matter of actual survival (Monbiot 2006; Shearman and Smith 2007). It is not unrealistic, therefore, to imagine a vertical garden city in which the responsibility for the construction and maintenance of the infrastructure and shared spaces above ground is retained by public authorities, just as the streets, pavements and buried services at ground level are presently financed and maintained by tax funded bodies and services or subcontracted out as appropriate. In this respect, the effect of food and water shortages on the future growth and form of cities as current sources are impacted by climate change may also turn the economic and political tide decisively in favor of vertical farming. Like it or not, urban authorities could eventually be compelled to make space for and to control food production in cities to ensure adequate supplies. While Australia currently exports more food than it produces (incredibly, the water-challenged country is a

major producer and exporter of field grown rice) the capacity of the land to support an ever-growing population is already in serious doubt (Diamond 2005, O'Conner and Lines 2008). Factories of all kinds have always been accepted as an integral part of urban economies. The recent growth of clean industries has made them even more acceptable as neighbors today. It would seem only a short matter of time before intensive forms of local food production also assume their place at literally all levels in the healthy life and economic wellbeing of cities.

In sum, there has never been a better time to re-evaluate the relevance of Howard's original work and intentions. While the two dimensional physical plan may be outmoded, Howard's assertion of public and professional responsibility for the shape and quality of urban life is as urgently needed now as it ever was.

The Vertical Garden City...

- ... is designed for the post fossil fuel age.
- ... is a low carbon emissions urban habitat.
- ... minimizes the ecological footprint of the city and its inhabitants.
- ... reduces the use of non-renewable sources of energy by the use of passive systems of environmental control and localized systems of power generation.
- ... produces or collects a substantial proportion of its own energy, food and water and reduces the distances between places of production and consumption.
- ... rejects single land use zones in favor of mixed-use zones, both vertical and horizontal, and a more varied choice of environmental opportunities.
- ... reduces automobile dependence by offering alternative systems of public transportation and shortening the distances between workplace, home, education and commerce.
- ... minimizes negative environmental effects, including "urban heat sinks", by providing ample spaces for vertical gardens and farms.

...topping out

“Topping out the core is a major milestone to achieve. We still have challenges to face, but with the meticulous planning and recording that we have implemented throughout the construction, the pathway to successful completion is very much in sight.”

Tony Archibold, Associate Director, RMJM on the topping out of the Capital Gate project in Abu Dhabi. From "Capitol Gate Makes it to the Top", Southeast Asia Building, January/February, 2010, page 12

- ... replaces the area of displaced natural vegetation or productive farmland with an equivalent or increased area of vegetation or urban agriculture.
- ... minimizes any loss of biodiversity and encourages the return and growth of compatible species in appropriate areas.
- ... transforms the experience of living and working in tall buildings with linked open and enclosed public spaces and activities, creating multiple street levels.
- ... maximizes alternative pathways between buildings and escape routes in case of fire or other hazards.
- ... comprises one component in an interconnected system of similar compact, high-density urban nodes called the 'constellation city'.
- ... extends the public urban realm and creates a strong social identity. ➔

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