Designing the Future

an introduction to rurban design

Part 1
designing to live within carrying capacity limits

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Designers have skills to conjure dreams and make them come true. Such skills can wield immense power – for better or worse. With the powerful design combination of television and satellite, a designer's dream manifested today can quickly become a global dream. The world's vast cornucopia of design dreams can be transmitted into every home on the planet. Fuelled by commercial advertisers, the media industry is systematically tantalising the world's children with the extravagantly wasteful and unsustainable dream of the Hollywood lifestyle. The influential power of this irresponsible industry must be apprehended. It has the power to awaken the world from this endangering dream and inspire it with a new and different one – a dream both ecologically sustainable *and* more attractive. The world now urgently needs ethically oriented designers and artisans to conjure such a dream and make it come true. This introduction to rurban design is a contribution to the dreaming process.

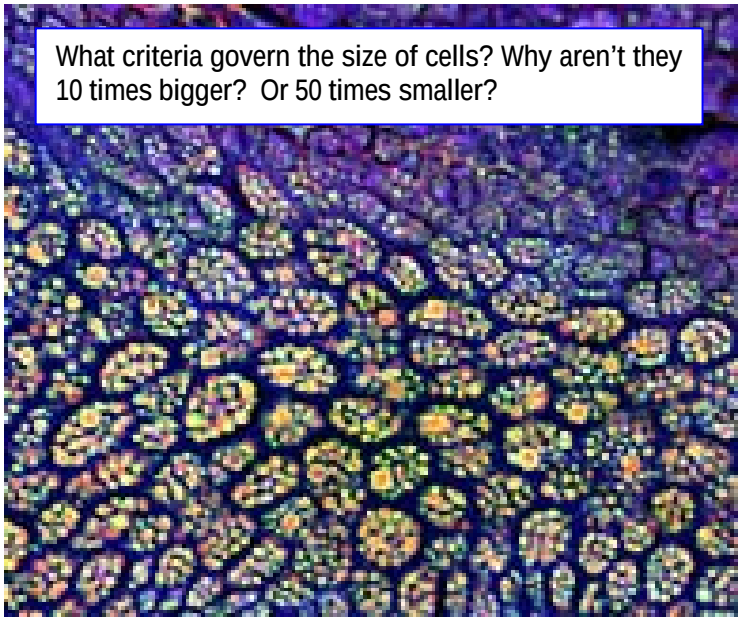
Infected by the mindless Hollywood dream, the world's massive and growing population want what the privileged have, and are hell bent, competing to achieve what cannot be possible for all. People are demanding more and bigger cars and bigger air-conditioned homes filled with the most recently advertised designer fittings, furnishings and appliances. Already congested with cars and trucks, large cities are growing larger, becoming ever more horrid and unsafe places for children. Roads, bridges, sewerage systems, energy systems and transport systems become overloaded, as do hospitals, courts and prisons. Unaffordable housing is driving renters and mortgagees to their sacrificial limits, while demand for more housing is producing sprawling development over the best farmland.

What everyone desires, not everyone can have. If all continue working hard to buy what designers are designing and sellers are advertising, a tragedy of the commons is inevitable. Distracted by our work, we may be oblivious to reports of drying rivers, water starved crops, depleting fish stocks, vanishing forests, climate warming, increased flood and fire events and the end of oil abundance. The lesson in the book Limits to Growth (1972) continues to be ignored. Political leadership is hell bent on continuing growth to keep people at work. Now doubling every 50 years, the world's population is accelerating towards collapse.

Inevitably our global classroom will learn the limits lesson. If we continue believing the business-as-usual growth mythology, we will suffer the distressing consequences. To avoid those consequences we need to turn sharply onto the ethical correctives path. This implies changing our habitual attitudes, behaviours, life plans and living environments. This and subsequent articles will explore the ethics pathway and the design implications. While the ethics pathway requires adoption of new constraints, regarding them as the protective walls and roof of a well designed home allows us to envision unprecedented new freedom possibilities – a far more attainable and sustainable dream than offered by business-as-usual.

The first challenge on the ethics path will be to persuade aspiring parents to take responsibility for the population problem, limit their plans of bringing more children into the world, and care more for children who are deprived of care. And we need to persuade each other to live within the human carrying capacity limits of our regions without depriving other species of ample habitat for their needs. We must surely come to understand that there are limits. The problem is how can we know and agree on what the limits are? How do we assess a region's population carrying capacity? There are no ready answers. The assessment task calls for new theory and practice beyond the training of today's planning professionals and their educators. On first sight the task appears impossible. The task will require considerable resources. And gaining those resources will, in the first instance, require getting ***in-principle*** ethical commitment from community and education leaders to the carrying capacity imperative. Understanding the ethical and sustainability lessons conveyed by living systems, by organisms – the silent teachers that surround us – may be a key learning step.

With aeons of life experience, organisms (complex cellular societies) have much to teach about living sustainably within the environment. That they grow and then stop growing is a primary lesson, one that economists and urban planners have yet to learn. Size limitation is designed into every cell. The organism expands or shrinks in adaptive response to its nutrient environment, but once grown to maturity does not continue to grow and double in size. Cells are entire living systems, holons, as Arthur Koestler called them, containing a variety of living systems or holons within them – information and communication systems, food and energy production systems, transport systems, waste handling systems, and so forth.


What criteria govern the size of cells? Why aren't they 10 times bigger? Or 50 times smaller?

Compact design is key to maintaining optimal proximity between all the system elements. But how is overall size determined? Why isn't the cell many times larger, or smaller? Size is clearly related to energy use. Presumably, the cell is the size it is, because it is the most energy efficient size. The challenge remains to apply this to the human scale and to figure out the optimum size for a human cellular precinct.

Given this century's challenge of sustaining 9 billion people in a climate changing world with diminishing energy reserves, we are unlikely to do better than accept the well-tested principles that living systems convey. Acceptance of these principles will have transformative implications for the design of our urban and rural environments, our economic and governance systems and our education systems. Acceptance by educational leadership in particular will be crucial. Schools and community engagement programs worldwide will need to ensure that everyone is ethically committed to the principle of growth limitation, to constraining their demand for energy and resources, and to learning and comprehending the important environmental and social system design implications. Without doubt, the best way to comprehend the system design implications of the carrying capacity principle, for example, is experientially, through participation in whole system design. Indeed, it should be a basic tenet of democratic education that all be enabled to co-create their future, to engage with others worldwide to design and build mutually protective, social and physical arrangements in response to global threats and challenges. Such education would engage us in the all-subject-integrating discipline of 'living systems design'. I refer to such integrative design subject as ***rurban design.***

The term rurban (integrating the words rural and urban) has been used since the 1940's to connote the peri-urban area, the rapidly changing urban-rural edge where suburban tentacles spread into food growing areas. A multidisciplinary group of Indian planners, Goa 2100, appropriated the word to signify a whole systems design approach to planning, and put it on the map through their award winning submission for an international systems design competition in 2003.

I have similarly appropriated the term rurban to refer to the cellular, livings systems approach discussed here. A key feature that distinguishes this urban design approach from current urban planning is the fundamental planning unit, the starting point of rurban design – the river basin – the water catchment area, water being the most vital element in sustaining human life. Each sub catchment is viewed as a life-sustaining leaf within a branching river valley. The

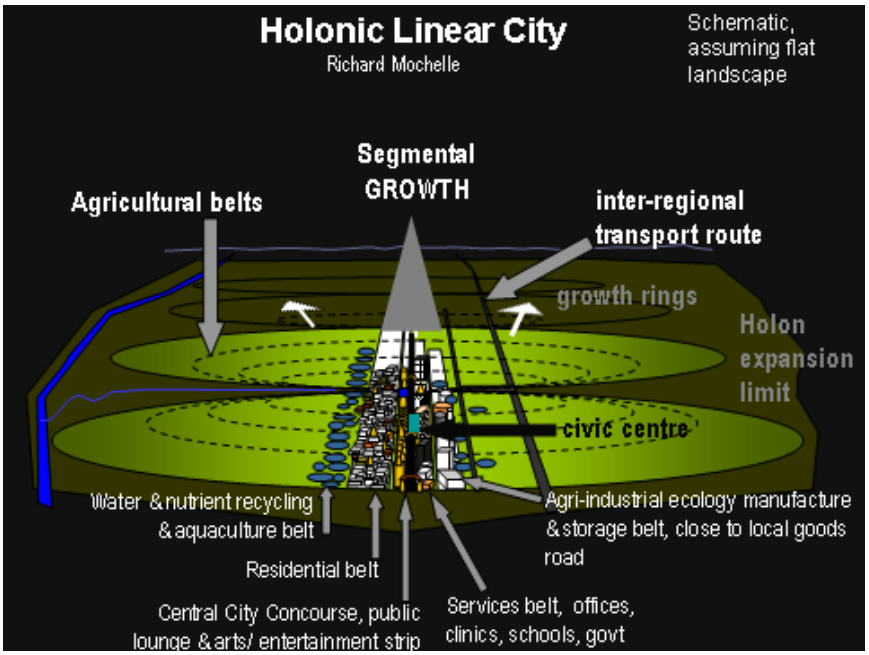
boundaries of each sub-catchment serve to define the basic rurban precinct and the local self-governing area. As natural boundaries, they remain relatively fixed despite the changes of political wind.

The rurban design process begins with an examination of the 'site'. The human carrying capacity of each 'leaf' or sub-catchment in the whole river basin must be assessed, and this only after sufficient habitat for other species is securely reserved. This first step calls for a vanguard of ecologists, geologists, hydrologists, agronomists, etcetera, to investigate potentially suitable catchment areas for rurban development, mark out riparian reserves, habitat corridors, scenic vistas, natural resource capacities, and only then to optimally locate urban and agricultural zones. Given what land remains for human habitat, the second step requires assessing the optimal population (including visitors) that can be carried safely in view of rainfall, soil quality, and their potential dietary and bio-energy needs. The methods for assessing carrying capacity are in their infancy and call for substantial resources to develop and apply them. From these steps proceeds the emerging discipline of rurban design.

As discussed, the challenge of the new discipline is to grasp the lessons of the living system. How to bring all or most of the essential living functions that sustain human technological life within walking proximity, within a 'cell', a rurban precinct? How to integrate architecture, agriculture and industry into an attractive, compact whole? How to design water and nutrient recycling infrastructure between the rurban architecture and food-producing areas? How to minimize everyday food and fertiliser transport?

The whole rurban precinct would be designed comprehensively, as a sustainable living and learning system, an exemplar learning setting. With experiential learning opportunities distributed and accessible, the traditional concept of compulsory school, as a non-experiential, detention and control environment, could be rendered largely obsolete. Self-directed learning programs served by home and mobile computers and multi-purpose meeting rooms aligned with the precinct's diverse learning settings could with the cooperation of parents as mentors provide quality learning outcomes for the young. Being largely car-free, rurban precincts would enable children safely to walk about, explore, experience and learn from the interconnected systems that sustain their lives – ecosystems, agricultural systems, water and nutrient recycling systems, energy systems, building systems, transport systems, industrial ecology systems, governance systems and so forth.

As living cells, rurban precincts may be arranged close to each other in long chains, or chain loops, to become regional 'holarchies' of walkable, linear cities that follow the upper contours of water catchment basins, leaving the lower areas for agriculture.



The Spanish engineer, Arturo Soria, first introduced the linear city idea in the late 1800's. Appalled by the uncontrolled growth of the cities and the ruination of the surrounding landscape, he upheld the linear city as the way to "ruralise the city and urbanise the countryside". In effect, he wanted to see the world 'rurbanised'.

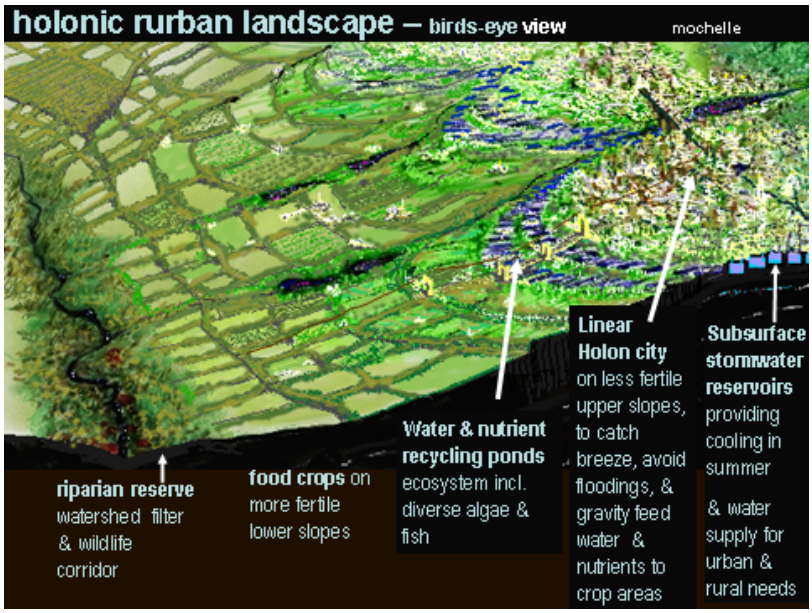
The sprawling metropolis of the twentieth century is a legacy of car-loving planners who thought it rational in an era of oil abundance to carve the landscape into large housing estates, distance them from industrial zones and shopping centres, and separate them with freeways. Freeways offered a freedom we now regret. We now have little choice but to drive from one zone to another. It is not easy to see how the giant metropolis can be transformed into a rurban landscape. In the first instance, rurban precincts will need to be developed outside the sprawling metropolis, ideally beginning near villages and small towns to employ their populations.

Mimicking the intertwined sinews of neuronal, circulatory, muscular systems, and the structure of DNA in organisms, rurban linear development would see ribbons of housing and home-based workplaces knitted closely to civic and

entertainment ribbons and these in turn to warehouses and industrial-ecology clusters. By restricting the lateral growth of these ribbon zones, proximity between them is maintained, allowing people to walk easily from one to the next. Main connective promenades and streets should be designed to follow the contours to facilitate walking and cycling as well as cart pushing and trolley pulling. By positioning the factory and warehouse ribbon along the edge of the city to be serviced by a peripheral goods road (see diagram), the entire urban centre can be kept truck-free and safe for children.

A brief note about industrial-ecology. It is a newly developing design field that seeks to integrate small industries and micro factories into synergic clusters in which the output and waste from one factory is used as the input for adjacent factories. This minimizes inter-factory transport, energy usage and wastage.

Linear growth of rurban cells could wind worm-like through the countryside enriching the soils as they reach into remote and deprived rural areas, offering currently isolated folk the opportunity to enjoy the best of urban and rural living.



The progress of soil enrichment should go hand in hand with aesthetic enrichment. If people are to be lured from the aesthetic deprivations of the world's suburban wastelands, slum cities and dustbowl townships, artistic design will be critical. By involving artists and sculptors in the design and building process, rurban design could see central promenades meandering for kilometers as continuous architectural galleries offering surprise, charm and delight to rival the world's most loved town heritage.

Community identity and interaction will be enhanced by locating central squares, gardens, or piazzas in each cell. Articulating and enriching their edges with formal and informal meetings places, civic buildings, services and transport stations would increase the magnetic attraction of these centres and enliven the theatre of community. Processional archways at cell boundaries could on one hand provide a sense of local community enclosure, and on the other signify inter-cell connectedness and welcome to neighbours and travellers. While they might share such 'pattern language' features, precincts would not be identical. The combined effects of maximising opportunity for artistic involvement, use of local materials, climate appropriate and landscape sensitive design would ensure that rurban precincts would be creatively diverse.

Such aesthetic outcome will be hard to achieve through business-as-usual property development approaches. The current property system presents one of the biggest barriers to realization of the rurban dream. A key ingredient for the success of rurban development will be the design and social entrepreneuring of a new kind of global Community Property Trust system and Trusteeship. As will be elaborated in Part 2, rurban design is as much about social/economic systems design and innovation as it is about physical design. Rural areas are fragmented by freehold titles whose boundary fences cut across the landscape arbitrarily with little regard to contours and natural landscape features. If rurban development is to occur, the landscape must be defragmented. This will require attracting rural landholders to become part of the rurban dream by transferring their titles into the property trust and gain the multiple rights and benefits of trusteeship. This is unlikely to happen on a significantly large scale unless and until the Trust is seen as ethically and organizationally trustworthy. The design of ethical gateways and development of trusteeship integrity – implying education system design – must therefore be primary considerations in rurban design.

A paramount ethical responsibility invoking the discipline of rurban design is to create new transport, water and nutrient recycling infrastructure through the rural areas that will serve future generations in the renewable energy world. Minimising dependence on transport fuel will require creating environments in which need for the private motor vehicle is minimised, and energy efficient public transport is accessible to all, including those now living in remoter areas. The compact linear city is ideally suited to the economic provision public transport. Light rail or rapid transit vehicle routes suspended over or submerged under the central avenues could provide rurbanites with ready access to larger urban centres at the intersection of rurban ribbons where would be found hospitals, cultural centres, large industrial complexes, warehouses and stadiums. Were stations sited no more than say 500 metres apart and the width of the urban band to say 1km, everyone could be within 500m walking distance to a station. Electric vehicle pools, sited in the warehouse ribbon alongside the goods road, could provide rurbanites with the option of occasional cross-country travel excursions that depart from public transport routes. Biofuel plantations and solar power stations arrayed in fields alongside the rurban ribbons could provide fuelling for both public transport and private vehicles. Apart from furniture removal and emergency vehicle access, the network of lanes and avenues within the rurban built-up areas would be treated as the public lounge area – as malls today are treated – where motor vehicle access is prohibited in favour of skates, bicycles, shopping trolleys and prams.

While doing whatever we can non-violently to cease world population growth, we must also do what we can to house, feed and uplift the millions who are living in desolate, desertified, floodprone, overcrowded and unsustaining areas, who have as much right as anyone else to a life without economic and experiential deprivation. Rurbanisation offers a way to breathe new life into remote rural areas and reverse the drift to the cities. Just as worms enrich soils, so could rurban 'worm cities' nourish the countryside and restore natural habitats. We can feed the world, not by transporting food from vast monocultural farms to the cities and destitute villages, but by allowing rurban development to bring people close to their source of food. What about water scarcity? Just as desert dwellers in the Middle East built large underground cisterns two thousands years ago to capture occasional floodwater, buildings today can be designed with reservoirs under them – in place of underground carparks – to provide for adjacent agricultural needs and help cool the buildings in hotter parts of the world.

Planners need to be persuaded that 'smart growth' strategies aimed at cramming more people into cities reduces carrying capacity. Each person added to the growing city requires finding an added area of watered and fertilized land further out in the countryside to feed them. This increases our reliance on energy consuming, long haul food and fertilizer transport, and requires ever larger highways and trucks and industrial infrastructure to maintain the haulage. Increasing the distance between the urban dweller and their food source also amplifies the cost of recycling water and nutrients from the individual back to the land that sustains them. This is not smart growth management.

By contrast, the growth management strategy offered by rurban systems design will not only ease congestion and pressure on the cities, but by attracting population growth back toward remote and under-productive rural areas, it will also increase the population carrying capacity of the world and its regions.

This introductory article has focussed primarily on the physical design aspects of rurban design. The social design aspects are no less important. Indeed, the social design aspects must be realised in order to manifest the physical design aspects. In Part 2 of this series the social side of rurban design will be introduced. Again we will draw on nature for inspiration and find ourselves gazing at a conceptual design horizon radically different from our current social norms and arrangements.

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