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THE NEXT FIFTY YEARS: ECO-CYBORG CHANDIGARH

There are good and bad things about Le Corbusier's plans and designs for Chandigarh. As we face the environmental and social uncertainties of the 21st century, it may be more productive to focus at the good things.

The good things are: a well-intended utopian social vision, trust in the power of technology to make life better on mass scale, an understanding of the critical relationship between human and environmental health, and faith in the capacity of good design and planning to bring all these together.

The paper proposes, that 50 years later, Chandigarh - and Indian urbanism altogether - need vision and optimism more then ever. Urban problems in India are somewhat different in nature, and certainly larger in scale. The issue of ecological sustainability of cities is pressing at all levels - Chandigarh, India, world. Urban sustainability is bound to become one of the key planetary issues in the next century. The encouraging side of this prospect is that the knowledge and the technological means to deal with urban ecology are abundant. There is hardly a better place in all of India than the existing Corbusian matrix of Chandigarh to start a pilot project on ecologically sound urban development.

Corb's model of the city as a machine, just as his analogy with human organism, may be obsolete and crude, but they are not totally misplaced. The latest in the theory of sustainable urban development suggests that cities should indeed be viewed as organisms, with their metabolism integrated with the surrounding ecosystem. The latest in design theory suggests that architecture, and technology in general, are moving towards artificially intelligent and ecologically benign solutions.

Cities of the 21st century will be neither machines, nor organisms. They will be ecologically friendly cyborgs. The urban eco-cyborg idea implies not only the mix of the electronic (digital) with the organic (biological), but also a peculiar mix of high-tech with low-tech. The India that is nearing year 2000 has both. Here lies another great historical chance for Chandigarh...
THE NEXT FIFTY YEARS: ECO-CYBORG CHANDIGARH

Paper presented at the conference
Chandigarh - Celebrating 50 Years of the Idea
held in Chandigarh, 8 - 11 January 1999

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"Not in pursuit of an architectural idea, but simply by the results of calculation (derived from the principles which govern our universe) and the conception of A LIVING ORGANISM, the ENGINEERS of to-day make use of the primary elements and, by co-ordinating them in accordance with the rules, provoke in us architectural emotions and thus make the work of man ring in unison with universal order."

TOWARDS A NEW ARCHITECTURE
Le Corbusier, 1927
(capitals are LC's)

Introduction: The Next 50 Years

There are various ways to celebrate an idea. One of them is to reinvent it.

This paper proposes that India's course of urban development is at a crossroads and that the environmental problems its cities face at the onset of the 21st century can be resolved experimentally in Chandigarh better than anywhere else. One of the greatest episodes of urbanism of all the times, which took place at this site half a century ago, should be used as a historical precedent for yet another great urbanistic endeavour.

No doubt, circumstances have changed; the site now accommodates a full-grown city, and the brief would be rather different from the one 50 years ago. Nevertheless, the same basic characteristics of the state of mind which produced the Chandigarh Plan - social optimism, visionary design, heroic scale, monumental expression - are very close to what we need today.

The essence of Chandigarh is the Think Big attitude. If we want to preserve the soul of this city (never mind that so many critics have said that this city does not have one!), then we must maintain the Think Big approach. This way we will not
only preserve the soul of this exquisite city, but will also recover Chandigarh's rightful role as the avant garde of global urbanism. (1)

It is nowhere near exciting to think about what and how happened in Chandigarh between 1950 and today, as it is to think about where Chandigarh might be around year 2050.

Assessment: The Four Sound Foundations

The discussion of the pros and the cons of the original Le Corbusier's Master Plan concept in the light of the reality that has emerged on the site has been going on for more than three decades. It may never cease. Chandigarh's critics are unlikely to ever reach a consensus and arrive at a convincing, widely accepted final assessment. The central question, 'was this a good, or a bad idea?', will haunt us for years to come.

My personal position on this question is that we are dealing here with a paradox; thus a straightforward answer is not possible. It is some of the best aspects of the Chandigarh Plan that have led to some of the worst misses and excesses. (2) There is, obviously, a huge lesson to be learned here.

I will list here the four aspects of the Chandigarh Plan which in my opinion constitute the four pillars of the philosophy on which the whole idea rests, and which - by the nature of anything standing on pillars rather than lying firmly and comfortably on the ground itself - are the very aspects of the whole Grand Project which have threatened all the time to crumble down.

First, Chandigarh was a political project. It was born out of necessity in the aftermath of a war, amidst ambitions to prove the economic and cultural independence of a newborn nation, and in order to show the way towards progress and modernisation. There was a well-intended, utopian vision of social and cultural transformation driving the whole idea. In a practical sense, the project succeeded in many ways. In a wider, historical sense, this city continues to figure as a proof that utopian ideas and realisations have their role in the betterment of the human condition.

At the same time, this very dimension of the utopian has led to a degree of disappointment with the concrete result. Such is the unavoidable fate of grand ideas. Once they leave the Platonic heights of human genius and descend into the messy reality of the ordinary world, they are bound to lose the aura of perfection.

Second, the Master Plan was an uncompromising product of the Modernist-Urbanist ideas of the CIAM circle. Laden with the European preoccupation in the 19th and early 20th century with remedying the ecological situation in the dense, overgrown, congested, and polluted cities, the Plan was an expression of the idea
that human health and environmental health are very closely correlated. If you want a healthy urban population, you must provide a spacious, sunny, green city.

There is hardly anything wrong with this assumption in principle and I am sure that Chandigarh’s health statistics are well above India’s averages and could be linked with the quality of the city’s physical environment. However, we also know that the modernist-functionalist notion of human health is somewhat banal. It tends to focus on the health of the human body primarily, while forgetting some of the more subtle, psychic, social and spiritual aspects of human wellbeing, which a sunny and airy urban environment does not necessarily provide.

Third, the Master Plan is a strong statement of trust in the power of technology to make conditions for human life better on a mass scale. Whether we see Chandigarh as a work of city planning, or infrastructural engineering, or architectural and horticultural design (it obviously is all of this), it strikes us that it is huge in scale, that it was built in an uncommonly short period of time, and that its daily functioning heavily depends on technological means and supports.

That technology can do bad things to the environment and to humans directly, we know all too well. But we also know that to blame technology per se for various ecological, social, and psychic impacts, is a form of myopia. Seeing technology as a force on its own reflects our inability to see the social causes of its abuse.

Fourth - and perhaps most fascinating for those of us who earn for living by designing and planning the physical environment - Le Corbusier and his team strongly believed that all those grand things mentioned above could be brought together by the magic of design. Design, in its disciplinary manifestations as architecture, landscape architecture, urban design, and civil and environmental engineering, was seen as the alchemy that was capable of a synthesising all those noble and abstract ideas into a concrete, livable, and better reality.

After a century or so of the Modern experiment, we know better. Architecture, engineering, and urbanism are rather limited in their rationalist endeavours to engender a fair society and happy humans. There are too many other factors and ingredients in play. But, that fact that we, as planners and designers, now have a much humbler perception of our role in the betterment of the human condition does not lead towards an attitude of cynicism and a feeling of hopelessness. As planners and designers of the physical environment we still command major forces in making the growing urban populations of this world more happy or more miserable.

Based on the above discussion, I want to assert two things:
a) the overall Chandigarh Plan rests on four major assumptions;
b) 50 years later, there is nothing fundamentally wrong with any one of them.
In summary, the four assumptions - or perhaps they deserve to be called 'axioms'? - which have defined Chandigarh's past, but might as well define its future, are:

1) utopian ideas and visions have generally served us well; in particular, when and where they dealt with the form of cities, they have been of enormous and mostly positive influence on the creation and development of urban civilisations;

2) our health does depend on our physical environment; in fact, nowadays more then ever, our entire survival depends heavily on our ability to build cities which are healthy for their citizen and which are in harmony with the natural ecosystem;

3) technology can do good things both for us and for other forms of life; cities as we know them, and where we obviously prefer to live, would not be possible without technology; in addition, many of the urban health and ecological problems can be efficiently resolved only with the help of technology;

4) urban design is an important factor in creating a less or more harmonious society, and less or more happy individuals; in their efforts to create a better society, nations and communities should continue to breed and heed the relevant forms of professional expertise.

As we approach a new millennium, these four fundamentals in the conception and creation of Chandigarh are as sound as they were in the 1950's. Actually, I see them even more relevant than they were ever before.

**The Challenge: Ecourbanism**

India will be one of the most important countries in the world in the next century. The basic reason is simple and obvious: sometime in the next two decades it will emerge as the most populous nation in the world. To understand the full impact of the demographic figures however, we also have to take into account the current political changes and economic reforms. By the mid 21st century, the combination is likely to make India a new world economic and military superpower.

Simultaneously, India may be expected to regain its long lost role as world cultural superpower. Its history as one of the oldest civilisations, combined with its unique geographic position (which is also a mental one!), half way between the East and the West, will make it a very strong contender to lead the world towards a 'global cultural synthesis', if anything like that is ever to emerge on this planet...

All that said, it does not follow that India’s future is entirely bright. A host of
social and environmental problems will continue to haunt this great nation. Many of them will be related to India's ongoing mega-scale urbanisation. Urban poverty and environmental conditions have been, and are likely to continue being, one of India's greatest woes.

It is significant that the accomplishments that India has made on the economic front during the last decade of the 20th century are essentially city-based. The role of Bombay, Calcutta, New Delhi, Chennai, Bangalore, Hyderabad, and other Indian cities in the further growth and development is crucial. Consequently, the future prosperity of the nation depends on the living and working conditions in its cities. The trouble is that these conditions are not getting better. On the contrary, they are getting worse. (3)

The concept of 'sustainable urban development', widely promoted by various international forums and institutions (particularly UN agencies, and UN-sponsored documents such as Agenda 21), thus stands as one of the most basic preconditions for a better future for India. (4)

In the context of this paper, 'sustainability' primarily refers to ecological, or environmental, sustainability, and it is posited as a goal, or a norm. Thus the term 'ecourbanism' appears more adequate. (5)

'Ecourbanism' is then the name for the challenge that awaits India on the threshold of the 12st century.

This is what makes the precedent and the example of Chandigarh so relevant today. In tackling the ecological crisis of Indian cities we need a similar level of optimism, and the same utopian spirit that have inspired the political and the professional leaders 50 years ago, when Chandigarh was begotten.

The know-how is only a secondary problem. Most of the knowledge, including the necessary technological solutions and products, needed to redevelop and develop cities in the direction of ecological sustainability already exists. Still, we know very well from historical experience that theory is one thing, practical application is another. To arrive at positively relevant and reliable knowledge of building and running sustainable cities, and to provide particularly successful cases as templates for others, we need experimentation. We need working models. We need pilot projects.

There is hardly a better place in India to experiment, model, and demonstrate new ideas in urbanism, than Chandigarh. No matter how big reservations we may hold about how some assumptions and some solutions have turned out in this recent experiment, and no matter how atypical this city still is in the context of the Indian urban scene - Chandigarh, from its very inception, has been what we need again today: an experiment, a pilot project, a demonstration.

Our proposal then is that Chandigarh revives its model role, and reinvents its brief.
Things have obviously changed since 1940’s and 1950’s. The brief this time would be ecological sustainability, coupled with a vision of socioeconomic development based on information and knowledge. The site today is occupied by a city of 700,000 people, still growing fast, and already turning into a mini-conurbation of about 1 million people. The task thus encompasses both development of new urban areas, and redevelopment and retrofitting of the existing urbanised areas.

What that really means in terms of an urbanistic paradigm adequate for this site in particular, and for the emergent post-industrial society in general, is a question of great theoretical interest.

The Solution: Urban Cyborgs

The question hinted above is not much different from the question Le Corbusier faced almost a century ago: What should the form of the contemporary city be like?

Le Corbusier’s famous metaphor for the house of the Modern era was the machine. Correspondingly, his concept of the city was a mega-machine. His famous theoretical projects, *La Ville Contemporaine* (Plan de la ville de 3 millions d’habitants, 1992) and *La Ville Radieuse* (1935), are convincing and monumental illustrations of a radically new urban form. They express a design style that befits the new technological era of a highly mobile and efficient industrial society.

But there was a side in Le Corbusier’s ideas which understood that machine is a crude metaphor and that the complexities of urban life could only be compared to the complexities of living matter. In the case of Chandigarh, he explicitly used the organic paradigm. As is well known, besides the iron grid of efficient seven-tiers transportation network, there is the overall layout of the Master Plan which resembles the different parts of the human body (e.g. the Capitol as ‘the head’) and the basic structure of the city is a cellular one (with superblocks, or sectors, as self-sufficient units).

We know that the result turned out neither perfect, nor elegant. From todays perspective, the combined deployment of the machine/organism paradigm on the Chandigarh Master Plan appears rather naive, crude, and simplistic.

But there are ways to view this clumsy hybrid in a more sympathetic manner. We might as well recognise that the whole idea was a typical product of a genius who was all the time ahead of his time. LC’s phenomenal intuition - vaguely stating that a city should be viewed both as a machine and an organism - was fundamentally correct. His tragedy, for all his wholehearted acceptance of modern technology and his familiarity with it, was that what he needed for a complete fulfilment of his ideas was simply not available at that time.
50 years later things are different. What LC vaguely recognised as the convergence of the world of the mechanical with the world of the biological is unravelling nowadays in front of us. The age of the bio-mechanic synthesis - or techno-organic, whichever way you like it better - has arrived.

Examples of the merger of biological and ecological principles with technology and engineering, and vice versa, are all around us. Genetic engineering, biotechnology, nanotechnology, robotics, prosthetics, and remote surgery are some of the better known, or more spectacular or controversial examples. (6)

But we need not look into other disciplines or professions. These trends are equally affecting the professions which deal with urbanism, architecture and landscape.

The current theory in the domains of urban ecology and sustainable urban development recognises that biological and ecological concepts like ‘ecosystem’ and ‘metabolism’ make a lot of sense in matters of urban planning and design. Contemporary authors, both theoreticians and practitioners, are increasingly referring to the city as an ecosystem, or a superorganism, which should be integrated with the larger ecosystem of the nature (7). The prescription for achieving urban ecological sustainability, when put into ecological jargon, is simple and clear: ‘urban metabolism must be tamed’ (the metaphoric use of the terms ‘metabolism’ and ‘tame’ is obvious). This is just a compact way of saying, in the jargon of biology and thermodynamics, that the overall throughput of matter and energy in the city must be reduced in order to fit the carrying capacity of the local and the regional environment, and that the flows of matter and energy must be circular rather than linear as much as possible in order to integrated urban processes with the larger natural processes.

We are witnessing the emergence of whole new language of urban planning; this language is heavily borrowing from the disciplines of biology and ecology.

Similar things are happening in the design field. In the general design theory, experts in diverse fields like engineering, product design, graphic design, architecture, and landscape architecture jointly advocate widespread adoption of the ‘ecodesign’ paradigm and the life-cycle analysis methodology. In the environmental design professions, we increasingly talk about ‘green buildings’, ‘eco-cities’, and ‘sustainable landscapes’.

But the ‘eco-speak’ is not the whole story. As all these designers pursue the goals of eco-design and sustainable products and environments, they are increasingly harnessing new technologies. The technologies range from the relatively traditional domains of building and construction, and civil and environmental engineering, to the relative newcomers like information and telecommunications technologies. What is happening in the process is that not only environmental designers and planners are discovering that technology is quite helpful in the pursuit of ecological sustainability, but also that ‘intelligent
solutions' (solutions based on technologies which process and relay information and knowledge) are particularly eco-effective and eco-efficient (8). They are also discovering that the price of these solutions keeps going down, in line with the general trend in computer and telecommunication hardware and software.


The summary of all this is that design solutions are not only getting ever 'greener'; they are also getting ever 'smarter'.

These are rather convincing signs for me that the most important trend in the fields of architecture, landscape architecture, and urban design at the end of the 20th century is a simultaneous shift towards artificially intelligent and ecologically benign solutions. (9)

If this impression is correct, than it sheds a new light at the mechanical and the organic in LC's plan for Chandigarh, the two concept that have not been integrated, or reconciled, in the Plan.

They should have been thought of as one.

But this was too hard at the time. Earlier this century, the 'machine' and the 'organism' were the two rigidly opposed categories.

We are certainly in a better situation today to comprehend what LC could only intuit 50 years ago. We live at a time when it is beginning to dawn on us that evolution of everything is going in the direction of a merger of the natural and the artificial, of the biological and the technological, of the born and the made.

The divide between the mechanical and the organic is disappearing. The electronic has stepped in. It is now building bridges between the two. It is making the machines not only strong, tireless, or fast, but also intelligent. This makes them capable of self-regulation, self-organisation, even self-replication. To such machines we refer as 'cybernetic' (kíbernetes=steer, in ancient Greek). The hybrid entities which combine organic body with artificial attachments or replacements are called cyborgs. (10)

Cyborg should be our new paradigm in urban design, planning, and engineering (11). It should not be too difficult to think of a building in a landscape as a cyborg. Isn't a house 'a machine for living' plugged into a piece of living land? And, extending the analogy, isn't a whole city, sitting in a regional landscape, vitally plugged into the regional ecosystem - isn't that a cyborg too?

Unfortunately, the answer these days is closer to a 'no', than to a 'yes'. While it is
possible to imagine that city is a ‘machine’, and that its supporting region (ecosystem) is an ‘organism’, we all know that this is not a case of a balanced, harmonious symbiosis. The way the cities are today, it is more a case of merciless parasitism. Therefore a ‘no’ is a more realistic answer. The city we have today is not really ‘cyber’, at least not in the sense of an ecologically sensible, intelligent relationship with the ecosystem on which it depends.

It is therefore more appropriate to take the cyborg metaphor as a symbol of what we want to achieve with our cities, rather than what they are today.

In other words, if we want to pursue seriously the goal of sustainable urban development, then the guiding paradigm for the design of cities in the 21st century must be the idea of an Urban Cyborg.

This concept should enable us to think about a brief for Chandigarh for the next 50 years. Chandigarh should be neither machine, nor organism. It should be an Ecologically Friendly Cyborg. Green and Smart. A City Beautiful, and a City Intelligent. For short, an Eco-Cyborg.

**Conclusion: The Eco-City Vision**

The ecocity vision should be the core a national strategy of sustainable urban development for India in the 21st century.

India has the necessary capability. The Urban Eco-Cyborg idea implies not only the mix of the electronic (digital) with the organic (biological), but also a peculiar mix of high-tech with low-tech. India can provide exactly this combination.

The city itself, as an existing physical landscape, with excellent infrastructure and abundance of open space, offers a receptive base for retrofitting, redevelopment, and further development. All the key strategic components of an eco-city (Green; Solar; Compact; Smart) can be reinforced, amplified, or introduced in the inherited matrix, and upon the inherited stock of infrastructure, architecture, and open landscape. They can also be applied on the-yet to-be-built peripheral and satellite developments, in line with an overall strategy of regional development of the metropolitan area.

Chandigarh should be the flagship of the ecourbanist course of development in India, and a great example for many other developing countries. The city has a short history, but of the right kind. Its national and international fame are a major asset. The Administration, with help and support from the Union government, should know how to use it for the benefit of the entire country. It should not be too difficult to attract international attention and financial and technical assistance.

This is Chandigarh’s second historical chance. It must not be missed.
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1) What is termed here 'Think Big' certainly does not mean another big Master Plan. The futility of anything like large scale, fixed physical plans, and the superiority of incrementalist, evolutionary approaches, is well explained in my colleague Tony van Raafs paper at this conference.

2) In a way, this diabolical feature of this project makes it a perfect example of a lot of Le Corbusier's work, and very much of the entire CIAM conception of architecture and urbanism and the Modernist vision of the world. For critiques of Chandigarh from a social and cultural point of view, see Prakash (1983) and Frampton (1980).

3) The situation is particularly grave with regard to water supply. See L.R. Brown (1998).

4) Also a matter of India's international relations. Urban sustainability will most likely become one of the central global political issues in the next century. International pressures on the developing countries like India, China, Indonesia, Brazil, and Mexico, to cut down their carbon emissions and lower the overall metabolism of their cities will increase.

5) Thus two reasons for its use. First, the term 'ecourbanism' points directly at ecological aspects of sustainability and the body of objective knowledge that appears to hold the fundamental answers - the science of ecology. Second, the term ends with the suffix '-ism'; this indicates that some of the subject matter is of theoretical nature, resting on a number of beliefs or postulates, rather than on scientific truth. The ideological content is thus made explicit. In sum, the term 'ecourbanism' recognises the fact that we are dealing with issues which are not only complicated by being both urban and environmental, but also that we are engaged in creating futures and therefore cannot avoid the normative content. For an alternative definition see Ruano (1998).

6) For more on this subject see Kelly (1994) and Levy (1992).

7) For example, H. Girardet (1992).

8) A good example of a computerised, on-line network acting as a environmental management decision support system at a regional scale is Australia's ERIN programme. See Kaye et al (1997). A good collection of examples of architecture that harnesses the idea of ecology-technology combination is presented in Slessor (1997).

9) For an account of the profound influence of computerisation on the notions of space, place and distance, and its likely impact on the future of architecture and urban design, see Mitchell (1997). For an analysis of the complexities of the relationship between telecommunications infrastructure and the urban environmental situation and policy, see Marvin (1997). The dangers of being pulled into the cyberspace and loosing touch with the problems which plague the real urban environment are elucidated in Boyer (1996). An example of urban landscape planning based on the concept of on-line connection of natural systems in the city to a network of computers and telecommunications is described in Bogunovich (1998).

10) The conventional definition of cyborg as 'half-machine, half-organism' tends to forget the fact that the machine part needs to be automated to deserve the name 'cyber'. By some accounts, we already live in a 'cyborg society'. See The Cyborg Handbook, C.H. Gray, ed. (1995).

11) This is neither advocacy of a technocratic society, nor abolishing of art in favour of cold engineering. The role of art is in fact central in all this. That is our best bet that we shall not surrender to a 'technological world'. See more on ethical and aesthetic issues in Vesely (1994), or more in depth in the writings of Martin Heidegger.
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