The scale of growth
By the year 2000, there will be almost 50 cities in the world each with over 15 million inhabitants: 40 will be in the Third World, most of these in Asia; and one of them will be Bombay. Between 1900 and 1940 Bombay’s population increased marginally to about 1.8 million. By 1960 it had shot up to 4 million and today it has crossed 9 million.

Mass migration to urban areas is nothing new: European society was similarly restructured between the 17th and 19th centuries. That precedent had one major difference: the Europeans could distribute themselves around the globe — an option not open to Asian countries today. To understand this is to perceive the crucial role which our towns and cities are actually playing: they are substitutes for emigration, functioning as mechanisms for generating employment, marginally in industrial jobs and far more widely in tertiary and bazaar sectors.

By the year 2000, these demographic changes will have begun to stabilise; what we need during the next two decades is a holding action which involves increasing employment and incomes at the village and small town level and stimulating the economic growth of middle-sized towns and cities to act as counter magnets to the big metropolis. Because both these strategies would have a take-off period of at least 10 to 15 years, action must simultaneously be taken to re-structure the existing metropolis so that they can function during this interim period while their growth rate tapers off. If the two strategies fail, it is possible that a city like Bombay will grow into a vast conurbation containing 30 or 40 million by the turn of the century. But even if they are successful there still remains the problem of making Bombay function with as many as 15 million inhabitants.

Like many seaports the city itself is one land breakwater, protecting the harbour from the open sea. This linear structure provided a natural functional framework which sufficed up to World War II. Since then, population increases have stretched this structure further and further, until now, like a rubber band, it is ready to snap.

At the southernmost tip of the island lies an enormous complex of government and commercial offices — the financial centre of the entire nation. These offices and the vast textile mills next to them daily trigger massive flows of traffic; southward in the morning, northward in the evening. To avoid this gruelling commuting (up to 4 hours each way) people try to live as close as possible to the southern end in squatter settlements or in overcrowded slums, 10 to 15 in a room.

Restructuring the city
There is a brutal mismatch between the city’s structure and the load it must carry today. Like many a Third World city, the holding capacity of Bombay has to be drastically increased. This was the basis of the proposals which colleagues, Pravina Mehta, Shirish Patel and I made to the Government in 1964.

In essence, we suggested opening up new growth centres across the harbour so that Bombay’s north-south linear structure would metamorphosise into a circular polycentred one. A number of significant — but
as yet unrelated - locational decisions had already been taken involving transport, industry and other ingredients of the urban growth equation. Were the authorities to act decisively and add the governmental/commercial function, they might well be able, through the interaction of these inputs, to generate a new urban centre on a scale commensurate with Bombay’s growth. Furthermore through public ownership of the land, a cash flow could be set up using the enhanced value of developed acreage to help finance service infrastructure, public transport and housing for the poor. Also, generating a new pattern of jobs (and redeploying some of the existing ones) could also serve to change “desire lines” across the city, thus optimising the load on the transport network.

In short we would be trying to use this new growth itself to re-structure the city, taking the opportunity to — in Buckminster Fuller’s in-ef-fable phrase — “re-arrange the scenery”. This is the real advantage of Asian cities of today. Hopefully, many of them will be able to use this quantum jump to their permanent advantage.

In 1970, the Government of Maharashtra accepted the basic planning concepts and notified 55,000 acres of land for acquisition. It set up CIDCO (the City and Industrial Development Corporation) to design and develop the new city called New Bombay. Since the metropolitan region was expected to grow by about 4 million between 1970 and 1985, it has estimated that about half would locate in the new city.
Arranging the scenery

Working as Chief Architect to CIDCO (from 1970 to 1974), gave me an opportunity for a comprehensive overview on many problems of which I had only fragments — problems which seem insoluble viewed in isolation, but which suggest a totally different strategy when examined in the context of an entire city.

For instance, take the question of low-income housing. Living in an Asian city involves much more than the use of a small room. Such a cell is only one element in a whole system of spaces people need in order to live. This system is generally hierarchical consisting of four major elements:

- Space needed by the family for exclusively private use such as cooking and sleeping.
- Areas of intimate contact i.e. the front doorstep where children play, you meet your neighbour, etc.
- Neighbourhood places e.g. the city water-tap where you become part of your community.
- The principal urban area e.g. the maidan (open space) used by the whole city.

The most important characteristic of the system is that each element can consist of either covered or open-to-sky space which is of crucial significance to Asian countries, since almost all of them are located in warm climates where a number of essential activities take place outdoors. In the case of Bombay, we estimate that about 75% of these essential functions (e.g., cooking, sleeping, entertaining friends) can occur in a private courtyard for at least 70% of the year. The room has a production cost (materials,
etc.) and so does the courtyard (land prices, city services, etc.): the trade-off between the two determines the optimum pattern of housing. This underlines a cardinal principal: that in a warm climate — like steel and cement — space itself can be used as a resource.

To identify the spatial hierarchy (which varies with the cultural/climatic context) and understand the nature of these trade-offs is the first step towards providing economical housing. Without this one is in grave danger of formulating the wrong question. This is why many attempts at low-cost housing perceive it only as a simplistic question of trying to pile up as many dwelling units as possible on a given site, without any concern for the other spaces involved in the system. Result: the desperate effort of the poor trying to live in a context totally unrelated to their needs.

The situation is even more tragic if one views it from the perspective of the overall city. In most metropolii around the world only about one-third of land is devoted to residential use. In fact, the building plots themselves cover less than 20% of the overall area. We found that in New Bombay, if we doubled the number of units on each site, we would not be saving much land for the city. On the other hand, if we halved it, the city would increase only marginally. But — and this is the heart of the matter — would not these variations in residential densities make a decisive difference to the cost and the mode of constructing the dwelling units?

In most Asian countries, the specifications for 1, 5 and 20 storeys vary dramatically. A multi-storeyed building must of necessity be built of brick and concrete for structural strength. In contrast, ground floor structures can be built (at a mere fraction of the cost) of a wide variety of materials — such as earthen brick, or mud and bamboo.

**Hawkers/Pavements**

In the crowded centres of Indian cities, pavements are used intensively: during the day they are crowded with hawkers so that pedestrians are forced onto the road blocking the traffic lanes. As evening falls, the hawkers gather their possessions and go home — to be replaced by people unfolding their beddings for a night’s rest.

These night people are not pavement-dwellers (who are another group altogether), but mostly domestic servants and office boys who have to share a room in their places of work where they keep their belongings and use city pavements for sleeping. This allows them to economise on their living expenses. Furthermore on hot sultry nights, sleeping outdoors is a more attractive proposition than the crowded airless room: that they have to do so under unhygienic conditions with the public walking right amongst (and over) them is disturbing.

This project in 1968 recommended to the Bombay Municipal Corporation an experimental modification in one of the city’s principal streets (Dadabhai Naoroji Road) in order to deal with both the hawkers during the day and the sleepers at night. What was proposed was a line of platforms 2 metres wide and 0.6 metre high, with water taps placed at approximately intervals of 30 metres.

During the day these platforms would be used by the hawkers — thus clearing the pavements and the arcades for pedestrians. (The platform would also act as a safety barrier between pedestrians and vehicular traffic). In the evening, at about sunset, the taps would be turned on and the platforms washed clean by municipal sweepers. They would then provide convenient otla (platforms) for people to sleep — out of the path of any pedestrians walking home at night.
Mobility and Jobs

The problem of increasing city size is also one of servicing the larger area: will not lowering residential densities increase disproportionately the travel time and cost of a mass transport system? After all, the poor aren’t pouring into Bombay for houses — they are looking for jobs. Giving them housing far away from the city isn’t much help; these are merely ghettos of cheap labour, at the mercy of such local industry as may exist.

A mass transport system is, by definition, a linear element. It only becomes viable in the context of a land-use plan that develops corridors of high density demand. This is why a grid plan (e.g. Chandigarh) is difficult to service with public transport. On the other hand, a linear pattern creates a corridor of demand and thus an efficient bus system.

As traffic grows, primary MRT (Mass Rapid Transit), e.g. a train becomes necessary. To install a track down the centre of the development involves reserving land — which is difficult. Keeping the MRT alignment outside the system is better, since the train stations occur only every fourth or fifth sector. In order to avoid the somewhat devious train alignment, the pattern is reversed with a bus line which meanders.

This is how the system grows: we start with a bus line generating a series of sectors of approximately equal importance. Let’s call them Type A. Perhaps one, because of its particular location grows in importance; let’s call it Type B. As the traffic grows and the primary MRT is installed, the Interchanges generate new activity, upgrading these particular sectors (Type C). With time, a second bus line can be installed, opening up a whole new section of the hinterland. (The system shown diagrammatically is on a typical portion of the New Bombay site which runs between hills and water.) In future, should densities and traffic grow beyond expectation, an additional primary MRT can be installed. This upgrades the importance of some Type A sectors which then provide an opportunity for locating new social infrastructure and other facilities for the additional population.

The structural plan for New Bombay with three such linear spines is arranged in a pinwheel around the CBD (Central Business District) at one end and into the regional transport network at the other, anchoring the new city into the surrounding region.

Thus starting with a simple bus in mixed traffic, we gradually build up to a complex network involving trains on four or more tracks, without at any time transgressing the cost/capacity constraints. Even if some subsidy is involved this is really an indirect subsidy on housing; a far more effective strategy than directly subsidising housing, which often leads (at least under Indian conditions) to an illegal transfer of these tenements, the allottee preferring to cash in on the actual market value of the unit and move back onto the pavements.

In effect, the MRT is used to increase the supply of urban land at a rate commensurate with the demand — thus maintaining residential densities at the optimal levels which generate the pattern of low-rise housing discussed earlier. (The analogue to the human body is tempting; we know we are in trouble when our temperature crosses 37°C; perhaps density levels are a similar indicator for cities.)
The New Landscape
The year 2000 is not far away. As we approach the start of the next century, one begins to suspect that the current pessimism may prove to be unnecessarily alarmist. Answers, like pieces of a jig-saw puzzle, are surfacing more and more frequently. Inexorably, they are beginning to generate a new landscape.

Often we miss these fragments because our view of the Third World is a limited and (unknowingly) egocentric one. For instance, consider one of the miraculous and largely uncelebrated plus-points of most Asian cities: despite poverty and exploitation, the people of Asia — as social and human entities — are still largely intact. This is a factor of great importance to their future development. In the eyes of the “haves” the squatter struggling to shelter his family is an anti-social element. From just about any other viewpoint, his endeavour is as marvellous, intuitive and socially-positive as a bird building a nest. Compare the phenomenon he represents with the muggings and the meaningless slayings of affluent cities.

Or consider the enormous inventiveness — the incredible handicraft — of people, for everything from decorating a bullock-cart to building a house. If we look at all the major concerns of humanists and environmentalists today: balanced eco-systems, re-cycling of waste products, people’s participation, appropriate life-styles, indigenous technology, etc. we find the people of Asia already have it all. From the Polynesian islands, to the Yemeni towns, to the jungles of Bangladesh, for thousands of years they have been building marvellous (low-energy, high-visual) shelter. In fact that is the wonderful thing about Asia: there is no shortage of housing. What there is a shortage of is the urban context in which these solutions are viable.

That then is the real task and responsibility of the Asian architect: to help generate this urban context.