INFORMATION TO USERS

This reproduction was made from a copy of a document sent to us for microfilming. While the most advanced technology has been used to photograph and reproduce this document, the quality of the reproduction is heavily dependent upon the quality of the material submitted.

The following explanation of techniques is provided to help clarify markings or notations which may appear on this reproduction.

1. The sign or "target" for pages apparently lacking from the document photographed is "Missing Page(s)". If it was possible to obtain the missing page(s) or section, they are spliced into the film along with adjacent pages. This may have necessitated cutting through an image and duplicating adjacent pages to assure complete continuity.

2. When an image on the film is obliterated with a round black mark, it is an indication of either blurred copy because of movement during exposure, duplicate copy, or copyrighted materials that should not have been filmed. For blurred pages, a good image of the page can be found in the adjacent frame. If copyrighted materials were deleted, a target note will appear listing the pages in the adjacent frame.

3. When a map, drawing or chart, etc., is part of the material being photographed, a definite method of "sectioning" the material has been followed. It is customary to begin filming at the upper left hand corner of a large sheet and to continue from left to right in equal sections with small overlaps. If necessary, sectioning is continued again—beginning below the first row and continuing on until complete.

4. For illustrations that cannot be satisfactorily reproduced by xerographic means, photographic prints can be purchased at additional cost and inserted into your xerographic copy. These prints are available upon request from the Dissertations Customer Services Department.

5. Some pages in any document may have indistinct print. In all cases the best available copy has been filmed.
An approach to the 'design' of cities in India: Case study
Gandhinagar

Khambatta, Ismet Tehmesp, M.Arch.
Rice University, 1987
PLEASE NOTE:

In all cases this material has been filmed in the best possible way from the available copy. Problems encountered with this document have been identified here with a check mark \( \checkmark \).

1. Glossy photographs or pages
2. Colored illustrations, paper or print
3. Photographs with dark background
4. Illustrations are poor copy
5. Pages with black marks, not original copy
6. Print shows through as there is text on both sides of page \( \checkmark \)
7. Indistinct, broken or small print on several pages \( \checkmark \)
8. Print exceeds margin requirements
9. Tightly bound copy with print lost in spine
10. Computer printout pages with indistinct print
11. Page(s) lacking when material received, and not available from school or author.
12. Page(s) seem to be missing in numbering only as text follows.
13. Two pages numbered. Text follows.
14. Curling and wrinkled pages
15. Dissertation contains pages with print at a slant, filmed as received
16. Other

University
Microfilms
International
RICE UNIVERSITY

AN APPROACH TO THE 'DESIGN' OF CITIES IN INDIA
Case Study Gandhinagar

by

Ismet Khambatta

A THESIS SUBMITTED
IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE

MASTER OF ARCHITECTURE

Approved, Thesis Committee:

[Signatures and names of committee members]

Dr. Richard Ingersoll, Assistant Professor,
School of Architecture. Chairman.

Mr. Peter Waldman, Associate Professor,
School of Architecture.

Mr. Michael Underhill, Associate Professor,
School of Architecture.

Houston, Texas

JANUARY 1987.
Title: An Approach to the 'Design' of Cities in India: Case Study Gandhinagar.

Author: Ismet Khambatta

Abstract

Gandhinagar is one of the several 'planned' cities that India has developed since its independence from British rule. Being the most recent State capital to be built, the planners have naturally looked to New Delhi and Chandigarh, which are the other two State capitals built in the first half of this century - for ideas and precedents. New Delhi and Chandigarh were landmarks in India's city planning history for several reasons but mainly because they have had such a major impact on all the developments in city planning after independence. Many of the strategies and ideas visible in the master plans of these two cities have been adopted in formulating land legislation and building bye-laws. The roots of most of these ideas lie in a period when Europe was reacting strongly to the rapidly degenerating large industrial cities, and concerns of health, hygiene and social reform were uppermost. That these ideas would influence city planning in a 'modernizing' India was inevitable.

The apparent mismatch between the kind of development that has taken place in these modern cities and the expectations of urban life in India seems to arise from a fundamental difference in the understanding of certain basic concepts in the culture that these city planning ideas originated in and in the Indian urban culture. I have tried to illustrate this using the examples of a) the attitude to open space - conditioned also by the attitude to the relationship of built form to the climate, and b) the understanding of the community structure.

Gandhinagar, since it is not yet fully developed, provides the opportunity to demonstrate how the general ideas of city planning theory might be modified using our understanding of culture specific attitudes in the development of cities with a better sense of 'fit' within their physical and cultural environment.
Acknowledgements.

I am grateful
To professors Richard Ingersoll, Peter Waldman and Michael Underhill for devoting their time to guiding and improving this study and for their constant encouragement.
To the faculty and staff at the School of Architecture who were always willing to help.
To Virginia Swain for her help with editing the rough draft.
To Shirine Hamadeh, Laure Marquet de Vasselot and all the friends who made this semester so enjoyable.
To Chetan Chintis for helping me make it through the final crunch.
And to Bimal Patel for acting as a sounding board for my ideas and for always being there when I needed to discuss something.

The confidence and encouragement of my parents is what has made everything possible and worthwhile and I am grateful to them most of all.
Contents:

<table>
<thead>
<tr>
<th>CHAPTER</th>
<th>PAGE NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>Preface: A Note on Gandhinagar</td>
</tr>
<tr>
<td>1.0</td>
<td>Introduction</td>
</tr>
<tr>
<td>1.1</td>
<td>Scope</td>
</tr>
<tr>
<td>1.2</td>
<td>Methodology</td>
</tr>
<tr>
<td>2.0</td>
<td>A Comparative Analysis:</td>
</tr>
<tr>
<td></td>
<td>New Delhi, Chandigarh and Gandhinagar</td>
</tr>
<tr>
<td>2.1</td>
<td>Precedents</td>
</tr>
<tr>
<td>2.2</td>
<td>The Physical Plans</td>
</tr>
<tr>
<td>2.3</td>
<td>Analysis</td>
</tr>
<tr>
<td>3.0</td>
<td>The Neighbourhood Unit</td>
</tr>
<tr>
<td>3.1</td>
<td>Traditional Neighbourhood</td>
</tr>
<tr>
<td>3.2</td>
<td>Analysis</td>
</tr>
<tr>
<td>3.3</td>
<td>Modern Neighbourhood:</td>
</tr>
<tr>
<td></td>
<td>Restructuring the Gandhinagar Sector</td>
</tr>
<tr>
<td>4.0</td>
<td>Overview</td>
</tr>
</tbody>
</table>
1. Plan Showing the location of Gandhinagar with respect to Ahmedabad.

2. The master plan for Gandhinagar, this is really a land use map.

1. Two cities, Ahmedabad and Baroda, had been considered as potential sites for locating the government, but were rejected for the following reasons: a) Ahmedabad was a flourishing industrial city growing at a rate of 4% annually, and locating the government and all its supporting structure within the city would only add to the congestion and strain on the infrastructure. If located in the suburbs, the expenses incurred in expanding the services and infrastructure would be disproportionately large. b) Baroda was a university town, and it would be desirable to preserve its character as such. c) The government or at least the individuals in power wanted a distinctive new center, a symbol of their achievement.


"It was to be a town on a large river, which is dry in the summertime. This city is known as Gandhinagar, which means the city of Gandhi. This river becomes flooded in the time of rain. The water comes from the Himalayas. It's a beautiful site to see, because it comes, as they say, like galloping horses. Suddenly you see this big gallop of horses coming down the dry river bed. My idea was to capture this water at intersections with structures over the water - kinds of bridges - and bring the water to the city and hold it in tower reservoirs. This way, the city would never be dry in the summertime. I began the city with these important stations, the water towers, which would also be utility stations. Water is a gift to a city in India. Water does not always come in pipes. Here, it is a river source, and it can be dramatized here, whereas in other cities it cannot be dramatized........

What are they doing instead?

They are building a boring gridplan town."

3. According to Mr. Mevada, the need was on the one hand, to present Gandhinagar to the public as a small low-density settlement, a garden city; and on the other hand to retain all the land that the government had acquired knowing that in reality the population figure they were planning for was more than double the figure presented to the public.
0.0 Preface: A Note on Gandhinagar.

On the 1st of May 1960, thirteen years after independence, the State of Bombay was divided into Gujarat and Maharashtra. Bombay city which had served as the State capital up to that time, became the capital of Maharashtra and the newly formed government of Gujarat was temporarily located in Ahmedabad. The Government of Gujarat, decided that the State should have a new capital city, which would be called Gandhinagar.

The site measuring 5 miles X 5 miles, and located 15 miles north of Ahmedabad had already been selected. This too, was a political decision based on the fact that: a) it was more or less centrally located within the state, b) it was fairly well connected to the areas around by road, rail and air (Ahmedabad has a major airport which is located north of the city, almost half way to Gandhinagar) c) it was close enough to Ahmedabad (the largest city in Gujarat) to take advantage of some of the facilities that only a very large city can support, and not so close that it might take on the character of a dormitory suburb d) it was also hoped that by locating Gandhinagar within a relatively underdeveloped area, it would boost the economy of the small towns and villages e) the land acquired for building on was not very suitable for agriculture.

Despite a proposal submitted by Louis Kahn for the design of the new capital, the chief minister was very definite about wanting to entrust the project to an Indian architect-planner only. As per Mr. H.K. Mevada’s explanation, he was one of the two or three persons in India at that time with the right combination of qualifications and was accordingly offered the position of Chief Town Planner for the Capital project in 1965. Mr. Mevada, after finishing his undergraduate degree in Architecture from Baroda, India, had studied city planning at Cornell University and on returning to India had worked initially in the Chandigarh town planning office, and then on the Bhakra-Nangal township and the Rajasthan Canal projects before coming to Gandhinagar. Working with a staff of two other persons, he started on the master plan for the city in January 1965 and submitted the completed plan in April of the same year. Execution of the plan, however, could not be started until 1967 due to strong opposition from various groups. The building of a new capital was opposed by both the Ahmedabad elite, who were reluctant to have Ahmedabad lose its status symbol, and the public who resented so much land being acquired for a small town of 150,000 people. This debate formed one of the key issues for the 1967 State elections. But, the Congress (the ruling party at the time) was elected to power once again, and Gandhinagar begun in right earnest.

In June 1970 the Government of Gujarat moved to Gandhinagar.
1 Diagrams from Ebenezer Howard's "Tomorrow: A Peaceful Path to Real Reform" illustrating his concept of the "Garden City" with a central park and peripheral green belts, a network of radial boulevards and circular avenues, the 'Grand Avenue' being midway between the central park and the green belt; and industries relegated to the periphery. Howard successfully synthesised several ideas on city planning that were 'in the air' at that time. Illustration no. 6 shows how several such garden cities would function within a region forming the 'social city'.

2 The Plan Voisin for Paris proposed by Le Corbusier showing a part of the old city and his proposal for the area at the same scale. Elsewhere in his book The City of Tomorrow, below an aerial photograph of the center of Paris he wrote: "Is this a picture of the Seventh Circle of Dante's Inferno? Alas no! It shows the terrible conditions under which hundreds of thousands of people have to live.....In our walks through this maze of streets, we are enraptured by their picturesque ness, so redolent of the past. But tuberculosis, demoralization, misery and shame are doing the Devil's work among them. As for the Committee of Old Paris it is busy collecting antiques."


2. See, Le Corbusier, The City of Tomorrow and Its Planning, London, John Rodker Publisher, 1929, pp.198-99. "Exhaust gases and tar dust have the most appalling effects on our organisms. It has been observed that individuals who owing to their work, are directly exposed to these emanations, eventually lose the faculty to procreate and become impotent, and it is generally acknowledged that the third generation to live in a town is sterile." This more or less typifies the views held by writers and thinkers of that time.


1.0 Introduction:

Gandhinagar is the second State Capital to be built since India acquired independence in 1947. But, it is one of the several new towns to be designed and built since then - most of them industrial townships. The Indian government has consistently supported the development of such townships in an attempt to ensure balanced rural and urban growth. The industrial townships, though organised on the scale of small cities, are really the labor pool for a single large industry and lay no claims to providing the kind of environment that could support a full urban life. Capital cities like Chandigarh and Gandhinagar on the other hand, though similar in the sense that there is one major employer, the government - claim a greater amount of self-sufficiency in terms of providing for higher education, cultural activities, commerce, industry etc. They aspire to become cities.

These 'designed' towns and cities exhibit certain characteristic features which have come to be accepted as necessary elements of the city plan - for example, the gridded layout, green belt, zoning of land use, segregation of industry, segregation of housing by type or category, etc. These are ideas that developed in Europe in the nineteenth and early twentieth centuries in response to the problems of cities that were undergoing rapid industrialisation, and suffering, in consequence all the ills of over-crowding, pollution, poverty, etc. The city came to be looked upon by nineteenth century writers, reformers and utopians as an exploitative environment not conducive to the growth of a healthy society. There were those like Ebenezer Howard, (who has been accused of being anti-city) who felt that only moving out and building new cities would allow the centers of older cities to be opened up for redevelopment while others like Le Corbusier denounced this attitude and called for sweeping changes in the structure of the city more in the nature of Haussmann's restructuring of Paris. Though these ideas dominated most of the new development that took place in Europe until the second world war and for some time after - when it was a question of rebuilding vast areas of cities destroyed during the war - they began to be questioned in the late fifties and early sixties. There seemed to be a general feeling of dissatisfaction with the development of the past few decades - of "opportunities wasted and challenges denied". The British new towns program had not been as much of a success as it was hoped, and there were complaints of a sterile environment, a lack of character, and very few opportunities for a rich social and cultural life. India's experience with Chandigarh has been much the same. The sixties in Europe and America saw a complete rethinking of the role of city planning in urban development and a radical departure from the static master plan. But Indian city planners and decision makers seemed oblivious to these changes and in 1967 the master plan for Gandhinagar was finalised.
The master plan for Gandhinagar and the city as it has developed so far, raise a number of questions about the values implicit in the plan and its development and how these fit into the local social, political and environmental context. At a broader level it is really a question of examining the validity, today, of certain ideas that we have adopted as norms for the planning of cities which are rooted in concerns that are foreign to the context. Gandhinagar provides an appropriate case study.

1.1 Scope:

Though the broader aim of the study is to provide a critique on attitudes within city planning in India, today, I have restricted the discussion to issues specific to the development of Gandhinagar and to the climatic, social, and cultural context of its region. The discussion on New Delhi and Chandigarh too is restricted to these same aspects of the process of development or the plan itself. In the section that deals with recommendations for changes that might be made within the existing structure of Gandhinagar, I have chosen to deal only with the sector or the typical residential neighbourhood for the following reasons: a) working within the sectors is one way in which substantial change can be brought about without radical changes in the infrastructure b) the sector or residential neighbourhood which is really a self contained unit of the city, within which most of the needs of the individual are supposed to be met, seemed to me to demand the most immediate attention.

The study does not claim to cover every aspect of city planning in India, but makes a beginning towards such an effort.

1.2 Methodology:

The study can be seen as divided into three sections:
The first section consisting of the preface and the introduction, deals with the events that led to the development of Gandhinagar and sets it in its geographic and political context. The second, consisting of the chapter on precedents and the physical plan deals with the larger historical context and then narrows the discussion down to a comparative analysis of the plans for New Delhi, Chandigarh and Gandhinagar in order to emphasise the similarities in approach and influences, and to isolate the two key aspects of the city plan - attitudes to outdoor space and community - that are discussed in the following chapter. The third section studies a traditional neighbourhood, isolates those qualities in the traditional environment that I feel are based on values important to the society and culture, and attempts to suggest ways in which further development within the residential neighbourhood of Gandhinagar might be modified to achieve a greater sense of 'fit'. In conclusion, I have tried to emphasise the fact that the study does not provide a solution to
designing better cities, but, demonstrates an attitude that, I feel, we must take if we intend to continue to ‘design’ new cities and townships in modern India.

Observations made in the study are based on an empirical analysis of the material available in the form of drawings and published or unpublished works by several authors and on my personal knowledge of the Indian cities being discussed. The material on Gandhinagar was collected largely through meetings with the present Chief Town Planner and with Mr. Mevada, the former Chief Town Planner for the city who prepared the master plan. This is supplemented by drawings and a government report on Gandhinagar, and my personal observations made on several trips to the city.
3. Plan of the city of Mohenjodaro in Sind

4. Plan of the city of Jaipur based on a mandala of nine squares.

5. Plan for the French city of Pondicherry in South India, 1741, showing the fortifications and gridiron plan reminiscent of some Renaissance plans for fortified towns.

6. Plan of the city of Shahjahanabad (Old Delhi), showing the Red Fort (F), the main market street Chandni Chowk (C), the Jumma Mosque (J), Faiz bazaar (B), and the fortwall; forming the planned infrastructure around which spontaneous growth took place gradually.


2.0 A Comparative Analysis: New Delhi, Chandigarh and Gandhinagar.

2.1 Precedents:

India has had a long and varied history of city planning. The earliest evidence we have of planned cities dates back to 2000 B.C., i.e. sites of the pre-Aryan Indus Valley civilization at Mohenjodaro and Harappa in Sind. These cities were 'planned' on a regular rectangular grid, divided into different residential districts and a central area which housed all the public amenities. There does not appear to be any direct link between the Indus culture and the Hindu kingdoms of the Gangetic plain which flourished between 600 B.C. and 700 A.D. and are the next examples of a highly urbanised culture. It was during this period that religious codes and rituals dealing with every aspect of daily life were set down in written form and a social order based on the division of labour was firmly established which persists in Indian villages and towns even today. Jaipur, though built at a later date, 1728, is planned on these Hindu canons of town planning. It is a grid of nine squares, with the palace complex occupying the central square, and areas allocated to the different communities and trades as prescribed in the texts.

The years of decline of the Hindu kingdoms were marked by a series of foreign invasions until the 12th century AD. when the first Muslim king proclaimed himself Sultan of Delhi. Empire building on a large scale however did not take place until the Mughal dynasty came into power in the 16th century. Some of the best examples of this era of vigorous building activity are Shahjahanabad (old Delhi), Agra Fort, Fatehpur Sikri, Hyderabad, and Lahore all of which, except for Fatehpur Sikri are flourishing urban centers. In their layout and organization these cities reveal some of the Persian traditions that the invaders had brought with them. The gardens which were an important part of these cities are modeled after the vision of the Garden of Paradise in Persian mythology.

The Europeans did not invade India but came as traders and usually set up small trading posts in some of the coastal towns. The impact of these was felt only locally. The Dutch and French around Pondicherry and Trivandrum, the Portuguese around Goa and Daman and the British East India company in Calcutta. Gradually, the British expanded their trading centers to Madras and Bombay, but Calcutta remained the headquarters.

By the mid 18th century the British were fairly well established in the major cities of India. With a growing sense of security, cities began to expand beyond the fort walls. Usually, the first important addition made by the British to any city, was laying out the 'cantonment'- the military camp. The cantonment was laid out on a grid iron pattern with wide roads and a central street, a church, bungalows for
7. Layout of a cantonment showing the relative position of the officers' bungalows, the barracks and the parade grounds.

8. Geddes' drawings for an area of the town of Balrampur illustrating his ideas of conservative surgery.


the officers, the soldiers barracks and a Gymkhana or club house. Once the cantonment was established most of the British civilian population also moved out and settled on the fringes of the military camp. This area was referred to as the "civil lines"\(^4\).

"Modern" town planning efforts were initiated with the appointment of Sanitary Commissions in the three Presidencies of Madras, Bengal and Bombay. These commissions were required to advise the government on matters relating to public health and sanitation in existing urban areas. These were found inadequate as the problems of cities grew more complex and Improvement Trusts were created in 1898\(^5\). The trusts handled the expansion of urban areas, provision of services and amenities etc. In 1915 the Governor of Madras invited Dr. Patrick Geddes to visit India and advise the government on the redevelopment of old towns. Dr. Geddes was a social thinker in the broadest sense of the term and unlike most of his contemporaries who were staunch individualists and believed in the power of the master plan, stressed the need for voluntary cooperation and democratic action. He saw the city and its population as an organic whole, and therefore large scale demolition and restructuring was equivalent to amputating a limb - a measure to be taken only in extreme situations\(^6\). His ideas on diagnostic surveys and conservative surgery found a large following amongst Indians but unfortunately were not well received by the British. Sir Edwin Lutyens, who was at that time, working on the plans for the new imperial capital at Delhi, wrote: "They are all very wild and angry from H. E. [His Excellency] down with a certain Professor Geddes who has come out here to lecture on Town Planning. He seems to talk rot in an insulting way. I hear he is going to tackle me! A crank who don't know his subject."\(^7\)

Following this visit the Government of India appointed H.V. Lanchester to the post of Town Planning advisor to the government and some of the states enacted Town Planning Acts on the lines of the British Housing and Town Planning Act of 1909. The second world war practically put a stop to town planning activity in India, and immediately following the war, the government set up a committee under the chairmanship of Sir Joseph Bshore to report on all aspects of public health and environmental hygiene. The report which was published in 1946 just prior to independence was what guided town planning and housing activities in independent India at least up to the end of the first Five Year Plan. In conclusion the Bshore committee made two recommendations: "one is that a certain number of selected individuals should be sent to Europe for training in the subject. The other is that town planning experts from abroad should if necessary, be recruited on short-term contracts and that training centers should be set up at least in a few universities in the country."\(^8\) When, in 1947, the new capital of Punjab was to be planned, it was with similar intentions that the government invited a foreign architect. Chandigarh was to be the laboratory in which the new cadre of Indian planners would be trained.
5. Plan of the city of Old Delhi (1857), showing the areas obliterated by the British to accommodate troops and civilians.

10. Map of the areas around Old Delhi showing, a) the site of the 'durbar' to the north of the old city which was initially considered for New Delhi, b) the southern ridge (Raisen ridge) and the final location of New Delhi.


10. The word 'durbar' in Hindi means court. In this case it refers to the camp that was set up - a miniature town - to house the British sovereigns and their court on their visit to India. See, Sten Nilsson, The New Capitals of India, Pakistan and Bangladesh, Lund, Studentlitteratur, 1973.


New Delhi and Chandigarh have been by far the most important new urban developments in the twentieth century in India, and the most influential as far as later developments in city planning are concerned. Both the cities were important political events and each in its own time made India the focus of international controversies in city planning. A closer look is taken in the second half of this section at the events that led up to the building of these cities, the personalities involved, and the physical plans in order to point out the origins of most of the ideas which form the basis of the master plan for Gandhinagar.

2.11 New Delhi:

At the time that the decision to build New Delhi was taken in 1912, the British had already been occupying Old Delhi for over a century. A large area of the city bordering the fort wall had been cleared for defense purposes and the cantonment was established within the city walls. Within the cantonment, European troops were strictly segregated from the Indian troops and a civil station developed outside the city to which most of the European population migrated. The civil station developed into the major residential area for the European community separated from the indigenous city by the city wall and the military security zone.

It is interesting to note that though a third of the walled city was occupied by the military and the local population crowded into the remaining two thirds, the government did not show any inclination to want to open up the walled area as was happening in European cities at that time. Only a part of the city wall was demolished as late as 1930 to accommodate the railway line.

Between 1857 and 1912 three 'durbars' were held (1877, 1903 &1911) in Delhi on a site to the North of the walled city. This site was later considered for founding the new capital of the British Empire in India but rejected in favour of a site on the southern side which had more obvious advantages topographically and climatically. Another important factor that was just beginning to be considered, was that of hygiene. For example, the question of whether the new development should be on the windward or leeward side of the old city since germs and disease from the native settlement would be carried by the wind. The decision to move the capital from Calcutta to Delhi was taken soon after the Coronation Durbar of 1911.

A few important considerations influenced this decision:

1. Increased political control over the entire sub-continent required a centrally located capital.
2. By the end of the century a wide spread communication system had been established in the form of roads, railways, telegraphs, telephone, and mail service, therefore the capital could now be located independently of 'natural' communication links like rivers.
3. The opening of the new Delhi Ambala railway linked the city directly to Simla the British 'summer capital'.
11. Map showing the various cities and developments that have taken place around the historic site selected for the new capital of the British Empire in India.

12. Lanchester's proposal for New Delhi showing, a) Viceroy's house and the secretariat buildings, b) Connaught place, c) Jumma Mosque.


The viceroy, Lord hardinge, approached local government boards in London and Liverpool to recommend an engineer who would serve on the Delhi Town Planning Committee. This was quickly decided and J. A. Brodie was appointed. Finding an individual who combined the skills of Architect and Planner proved more difficult with a great deal of lobbying for the post both in Britain and India. Finally it was a telegram from the Secretary of State for India in London, that decided the appointment of Edwin Lutyens and Captain Swinton.

15. Victory Tower built by the first Muslim king.


The title of the report itself shows how different Lanchester's attitude was from that of Lutyens who finally created the master plan for the city.
4). Its historic association with earlier dynasties was seen as something that would recommend the city in the eyes of a hostile populace.

"It is not a cantonment we have to lay out at Delhi, but an Imperial City- the symbol of the British Raj in India- and it must like Rome, be built for eternity."13

The committee that was to advise the government on the planning of New Delhi as appointed by the viceroy Lord Hardinge in 1912 consisted of three individuals Edwin Landseer Lutyens, J. A. Brodie and Captain Swinton. H.V. Lanchester was appointed as a consulting expert for a month.14 The committee was to advise the government on two things (a) selection of the site, (b) tentative layout of the city. Selection of the site, however, was finally done by the viceroy himself after the committee had given their recommendations. The site, being so close to old Delhi did not require too much input in services since it was very well connected by rail and road to most of the country situated on the major N.S. railway route. The city is bounded on one side by the ridge on which the Capitol was to be located and sloped down gradually to the banks of the river Jamuna- one of India’s major perennial rivers. (It is interesting to note here that all of the three cities being discussed were deliberately located on rivers even though it is no longer thought of as an asset in terms of communication and transportation.) The southern boundary of the site, at one time, encompassed the Qutab Minar15 but in the final report of the Delhi Town Planning committee, the entire area south of Safdarjang’s tomb was indicated for future extensions.

The committee returned to England and Lanchester proceeded to develop a preliminary layout for the city. Lanchester agreed with Geddes’ approach to city planning and this first plan for New Delhi is interesting in its contrast with Lutyens’ proposal which was actually executed. Both Lanchester and Lutyens, in preparing the initial layouts of their master plans took their cues from a) Purana Quila the oldest of the Delhi’s and (b) the Red Fort at Shahjahanabad which was the most recent. (i.e. built in the mid 1600’s). Lanchester set up the main axis of the city connecting Government House which in his plan was located at the base of Raisena Ridge and the historic Jumma mosque in the heart of Old Delhi. At the entrance to the Old city, Lanchester visualized a ceremonial railway station from which a wide avenue would lead south to a large square with the Jumma mosque on the right and the Red Fort on the left. The square was intersected by a cross axis in the East West direction which led west to the suburban extensions and East to the river. At the point where the main avenue connecting government house and the mosque was intersected by the road from the medieval observatory. Lanchester located a large circus which was the direct antecedent of Connaught Place and was retained in all subsequent layouts. In his report to the viceroy entitled, "The Extension of the Indian City",16 Lanchester had made provision for factories, godowns (warehouses), markets, mosques temples and a range of housing types.

Though Lord Hardinge was very much in favour of the changes Lanchester had proposed within the city,
Plan of Letchworth Garden City started in 1904.


19. Hampstead was really Lutyens' only claim to urban design up to that point. Only half his scheme was executed however.


(he was later to tell Lutyens he wanted Old and New Delhi as one city not two) he was alarmed at the cost of having to acquire one of the existing villages which at that time, sat right across the grand axis - or at least that seemed the apparent reason for not going ahead with the plan. Lutyens was an ambitious man and New Delhi was precisely the kind of 'big' commission that he had been waiting for. He wrote to his wife: "I am rather perturbed about Hardinge still insisting on Lanchester coming out.....", and a few days later: "I asked Lady H. [Hardinge] about Lanchester. She said he was only coming for a month and they had to humour him. I asked if there was any chance of my doing the building. She said Yes, of course - who else. That doesn't commit the viceroy but it does, I hope, point to the mind wind."17 After long debates on the choice of site and a number of alternative proposals, Lutyens' layout for the site on Raisena hill was selected and finalised.

Lutyens had spent almost all of his student life and early years as a practicing architect, in England, "...with Wren and Inigo Jones as household deities."18 He had not travelled a great deal outside the country, and in fact had just had the opportunity to travel to S. Africa and Italy prior to being appointed to the Town Planning Committee of Delhi. Within England, he was known more for his designs of expensive country retreats than for any efforts at town planning. Just prior to his departure for India he was working on the principal buildings for Hampstead Garden Suburb19 planned by Raymond Unwin the designer of Letchworth Garden City--the first Garden City Project, built as an experiment by Ebenezer Howard.20

Lutyens was an absolute believer in the virtues of the "classical style" and felt that architecturally India had very little to offer. He was very ambitious and tried every way he could to secure the commission for Viceroy's house for himself. His views on Indian architecture and India are expressed in his letters to his wife. "The Moghul architecture is cumbersome, ill-constructed building covered with a veneer of stone or marble and very tiresome to the western intelligence. Some of the work is lovely but then it is from some outside and possibly Italian influence! .....India- well man's work is so vile that it depresses me. This does not mean that I dislike the country and I am pleased when I can recognize a likeness to a Hampshire down, Scotland, Italy or some homey place......The very low intellects of the natives spoil much and I do not think it is possible for the Indians and whites to mix freely and naturally. They are very, very different and even my ultra wide sympathy with them cannot admit them on the same plane as myself."21

New Delhi, developing as it did, parallel with the agitations for self-rule, freedom of the press, boycott of foreign goods and the independence struggle, became a symbol of oppression and tyranny. After independence, however, the new democratic government seemed reluctant to give up these trappings of power and problems of over crowding and lack of services continued to grow in Old Delhi where the majority of refugees from Pakistan made their way. New Delhi still belonged to the elite - an Indian elite.
The very structure of the city continued to influence the way it was used.

2.12 Chandigarh:

India achieved independence from British rule in 1947 - but at the cost of her unity. The country was divided into the predominantly Muslim state of Pakistan and the predominantly Hindu state of India. One of the areas worst hit by the rioting which broke out as a result of this move, was Punjab. The western portion of the state of Punjab went over into Pakistan including its former capital- Lahore. The cities and towns of Punjab were crowded with refugees- people who had fled their homes in the west leaving behind all their possessions and property. The government of Punjab itself was without a home- temporarily stationed in Simla. The decision to build a new capital was taken for a number of reasons:

1). Most of the existing cities and towns were facing a crisis with a sudden increase in their population and a highly inadequate infrastructure.
2). Simla was not centrally located within the state and not very well connected by communication routes.
3). Ambala which was the other town considered, was strategically unsound being the major military center in that region and a likely target in the event of an attack.
4). The cost of setting up a new city in these circumstances was going to be only a little more than trying to expand any existing city structure to accommodate all the government machinery.
5). The building of a new city would symbolize the hopes and aspirations of the new country- starting afresh.
6). It would also become a training ground for the young Indian planners who would manage urban development in the future.

The manner in which the transfer of power from British hands took place was indicative of how much real 'change' India would see in its government. There was no takeover overnight, no breakdown of government and administrative machinery. In this area, the transition was relatively smooth. In the years preceding the handing over of power the British civil service had steadily built up a cadre of Indian civil servants trained in the same traditions. Power was still in the hands of a minority social elite. India declared itself a Social Democratic Republic but retained the centralized power structure of the British Raj - the fundamental organizing principles of government were unchanged.

The search for a site for Chandigarh, as the new capital was to be called, was conducted very much in the manner of that for New Delhi. (The only difference was that an airplane was used in place of an Elephant.) A committee was formed and sent out to reconnoitre the area without any of the detailed analysis and data that have come to be regarded as essential today. Selection of the site was to a great extent intuitive - as
14. Master plan for the city of Chandigarh prepared by Albert Mayer. The shaded areas represent development that would have taken place in the initial phase. The capitol is located at the top of the plan somewhat to the right. The civic center and the business district are at the center of the plan.

15. Layout of the typical superblock in Mayer's plan comprised of three smaller blocks each having a mix of two types of housing, a central open space, parks, a shopping center and primary school.

22. Mayer, Whittlesey and Glass were also the architects for the 'new town' of Columbia Maryland.


24. See, Norma Evenson, Chandigarh.
later decisions were to be also. Chandigarh, was located on a relatively flat plain at the confluence of two rivers, with the Himalayan foothills rising abruptly in the background. It had none of the distinguishing characteristics of New Delhi; in fact it seemed to symbolize the spirit of that time - a bold move forward leaving behind the fetters of tradition and of past eras.

The contract for the 'master-plan' of Chandigarh was initially given to Albert Mayer, a partner in the New York firm of Mayer, Whitlesey and Glass in 1949. Mayer had spent time in India with the army during WW II and was familiar with India and its problems. The master plan produced by Mayer also received substantial input from his friend and consultant for the project, Clarence Stein. Mathew Nowicki, a young architect was invited to join the staff on Stein's recommendation. Stein was already known for his work on the planning of 'new towns' in the U.S. and particularly for the planning of Radburn, a suburb of New York in which he had developed the concept of 'neighbourhood' planning aimed at segregating traffic to ensure the safety of children.

Summing up his aims for Chandigarh at a symposium in Washington D.C. in 1950, Mayer identified a number of real concerns: "Seeking symbols of pride and confidence", the need to create not in the idiom of "bold-winged engineering and cantilevers which India's resources do not justify," but in the Indian idiom, the need for community and neighbourhood unit. Mayer's plan was organised on a roughly rectangular grid of curved roads spreading out gently in the south western direction. The capitol was located outside the city within a fork in one of the two rivers which bound the city on either side.

The generative unit of the plan was the superblock which was essentially a residential neighbourhood bounded on four sides by traffic arteries. In the center of the block was a piece of reserved parkland around which were grouped community facilities, primary schools, health facilities, etc. These aimed at fostering a sense of community amongst the residents, also a stepping down to a pedestrian scale such that a person was provided with most of his daily needs within an easy walk from his house and children would not have to cross busy traffic arteries on their way to school. The business and commercial area was located at the heart of the plan. Visually the high court and the capitol complex were treated with equal emphasis giving the impression of a more balanced democratic form. Within the capitol complex it is the legislative assembly (the one arm of government which is unique to a democratic system) that is on axis with the main approach. Mayer's plan also incorporated two continuous belts of parkland along the two main avenues running N.E. to S.W..

The plan has usually been criticised for its "romantic" use of a curving grid and "the overall urban form evolving from the multiplication of such (neighbourhood) units rather than from a single dominant formal
16. Plan of the Contemporary City for Three Million People. The rectilinear city is surrounded by a wide green belt with outlying 'Garden Cities'. The industrial district is at the extreme right. The commercial and business district is located at the center.

17. View of the business district with a central station and airport.

18. The Radiant City. The business district is at the 'head' of the plan with the commercial and civic 'belt' running along the center. The industrial complex is at the bottom of the plan.


27. Though, Le Corbusier had been approached earlier with the project, he had not shown any interest since it would have meant abandoning his practice in Paris. When Jane Drew and Maxwell Fry were approached, they agreed but insisted that Le Corbusier be involved in the project at some level.

28. From a speech delivered at a seminar on architecture at the Lalit Kala Akademi, New Delhi, March 1959.
concept. This, in fact, is the point on which Corbusier's layout for the city differs very obviously from Mayer's. The ideas on which they converge are in the subdivision of the plan into neighbourhoods, provision of facilities within the neighbourhood, the distribution of green areas and containment of the city. These are ideas for which Mayer had cited Radburn (done by Clarence Stein in 1929) and the Green belt towns of the U.S. as sources of inspiration but which in fact can be traced back to the English Garden City Movement, which "sought to counteract the disadvantages of the sprawling industrial city by the establishment of new self-sufficient cities, restricted in size which would combine the advantages of both town and country."26

When the contract of the Punjab government with Mayer's firm ended, a shortfall of funds forced them to approach Nowicki, who accepted the project. Unfortunately Nowicki was killed in an air crash before he could take over and the Punjab government was in search of an architect once again.

At the suggestion of Maxwell Fry and Jane Drew, India approached Le Corbusier with the project for Chandigarh.27 Le Corbusier's ideas on city planning were already well known in Europe and England and to some extent in America. He had consistently exhibited and published his work and the radical nature of his proposals their comprehensiveness and the sheer force of his vision won him grudging admiration even from his worst critics. Jawaharlal Nehru, India's first Prime minister clearly admired him and was the motivating force behind the building of Chandigarh. Nehru:

"Now I have greatly welcomed, very greatly, one great experiment in India which you know very well, Chandigarh. Many people argue about it, some like it, some dislike it. It is totally immaterial, whether you like it or not, it is the biggest thing in India of this kind. That is why I welcome it... I do not like every building in Chandigarh. I like the general conception of the township very much but what I like above all is the creative approach: not being tied down to what has been done by our forefathers and the like but thinking out in new terms, trying to think in terms of light and air and ground and water and human beings, not in terms of rules and regulations laid down by our ancestors. Therefore, Chandigarh is of enormous importance regardless of whether something in it succeeds or something in it does not succeed. As a matter of fact, even now many things in Chandigarh have spread, many ideas, in small ways and big ways. It is a thing of power coming out of a powerful mind and if you want anything of power, it must come out of a powerful mind, not a flat mind or a mind which is a mirror and that too not a very clear mirror reflecting somebody else's mind. There is no doubt that Le Corbusier is a man with a powerful creative type of mind, because he has that he may become extravagant occasionally. He can produce extravaganzas occasionally but it is better to have that than a person with no mind at all."28

Starting with the 'Contemporary City for Three Million in 1922, Le Corbusier worked consistently at developing his ideas on city planning and produced subsequently the Plan Voisin for Paris, the Radiant City and built the Unite de Habitation at Marsailles. Just prior to starting work on Chandigarh, he had been working on a master plan for Bogota. His schemes show a progression of certain basic ideas which
15. Le Corbusier's project for the development of a sub-division at La Chaux-de-Fonds, 1914.

20. Early sketch from Le Corbusier's sketch book of Hampstead which he cites in his manuscript for it's excellent residential layout.

21. Comparative studies of New Delhi and Chandigarh done at the time that Chandigarh was being planned.


32. See, Sten Nilsson, New Capitals.
pre-occupied him through most of his career, namely: 1) a fascination with technology and the physical possibilities it could open up like being able to build higher or travel faster. (2) a new society based on co-operation, (3) a society with increased leisure, (4) the city as a self-contained biological unit. 29 However, it is important to note that Le Corbusier's earliest writings on city planning were influenced a great deal by Camillo Sitte's book - City Planning According to Artistic Principles - and the work of Ebenezer Howard. His first manuscript which was never published and which he started after he returned to La Chaux de Fonds from his travels all over Europe, was modelled after Sitte's book - to the extent of having similar titles, and practically the same chapters. 30 In the manuscript, he discusses the layout of residential lots and the sub-division of land and extolls the virtues of the curved street as opposed to the straight street and cites Hampstead Garden suburb and Bourneville and Hellerau as examples of a good layout and street pattern. He speaks of learning a lesson from the pack donkey on how to design streets which respect the contours of the land and are never tiring to ascend because of the variations in their shape. Years later while writing The Radiant City he declared "the death of the street" and used the same analogy to ridicule Sitte's views. In 1914, Le Corbusier designed a sub-division for La Chaux de Fonds, his first major urban design assignment. "...the design including that of the houses is almost pure Hellerau with a bit of Barry Parker and Sir Raymond Unwin thrown in." 31

To sum up the above discussion in brief, the points I have tried to make are:

a) the two cities were major political events.

b) the building of both cities was backed by a powerful political figure.

c) in both cases there was a preliminary proposal by a lesser known architect who tried to work 'with' the context climatic and cultural - a less radical approach that was not pursued. Some critics have seen this as a deliberate choice made by those in power to select a designer whose ideologies matched their own.

d) both designers took as their point of reference the European industrial city and most of their ideas are a reaction to the conditions there and at that time. This is apparent in Le Corbusier's early preoccupation with Sitte and Howard and later his admiration as also Lutyens' for Haussmann's work in Paris.

e) in both cases the response was the master plan the grand design which needed a central authority or power for its execution.

Around the time that the planning for New Delhi was getting under way, Le Corbusier was writing his manuscript "La Construction des Villes". Though Lutyens and Le Corbusier are taken to be antithetical in their approach, the fact is that Le Corbusier admired Lutyens a great deal. When he arrived in India to start on the Chandigarh project the only city that he visited before retreating to the small hill town of Simla to create the master plan, was New Delhi. 32
22. Map of India showing the locations of the three cities being discussed, New Delhi, Chandigarh and Gandhinagar.


24. Diagrams of a) New Delhi, b) Chandigarh, c) Gandhinagar, showing the principal axes and major landmarks.

33. Sten Nilsson, New Capitals. p. 84.

34. Robert Irving, Indian Summer. p. 82.
2.2 The Physical Plan:

Taking different aspects of the master plans of New Delhi, Chandigarh and Gandhinagar, I will try to bring out the similarities in approach and attitude visible in their structure, in an effort to point out:

First, that though the political structure of the country had changed since the planning of New Delhi, this change was not reflected in the later planning of political capitals particularly in the case of Chandigarh which was to be a symbol of India's newly won freedom. Second, that most of the ideas visible in these plans were rooted in a foreign culture and no effort was made to modify these to suit the local climate - physical, economic and cultural. Though this was justified in the case of New Delhi by its being the symbol of a foreign imperial power, in the case of Chandigarh it was contrary to everything that the new city was supposed to stand for. And, third, that though Gandhinagar was built several decades after New Delhi and Chandigarh there have been no efforts to evaluate and modify - the similarities to Chandigarh are striking.

2.21 Organising Principles and First Moves:

Lutyens' vision for New Delhi was ambitious. In a letter to his wife he had written "The Viceroy thinks only of what the place will look like in three years' time. Three Hundred is what I think of!" 33

Lutyens maintained the major elements of Lanchester's proposal but turned the capitol complex and the central vista around by practically forty five degrees. The Viceroy's residence was now located on the highest point on the ridge and faced the river and Purana Quila instead of the Jumma mosque. "The old buildings that have most impressed the imagination of mankind are those raised upon an eminence such as those of ancient greek cities and the capitol of Rome", 34 Also he felt very strongly about the imperial grandeur of New Delhi and felt that the viceroy's house should not be dwarfed in any way by mosques or minarets or any other structure. He retained the circus at Connaught Place and made it even larger. This still punctuated the axis from the great place to the Jumma mosque in old Delhi, but the axis in part, was only visible in plan not in reality. Lanchester's ideas for changes within Old Delhi were ignored. His 'ceremonial railway station' was moved to just north of Connaught circus, forming the main 'gateway' to the city as it were.

The new city was organised along two principle axes. "Lutyens found major historic monuments useful to terminate the main axes of Imperial Delhi and to provide strong visual accents emphasising his street pattern in the fashion of contemporary Beaux Arts or City Beautiful Planners." The major axis called King's Way was the grand ceremonial/procesional route which starting from the imposing All India War Memorial archway, rose from the base of Raisena hill, passed between the two Secretariat blocks and
25. Central vista New Delhi, Rajpath.

26. View of the central vista New Delhi from India Gate looking towards Raisena Ridge.

27. Master plan for Chandigarh developed by Le Corbusier and the team of Jeanneret, Maxwell Fry and Jane Drew, showing, a) the capitol complex, b) the university, c) the civic center, d) the industrial sector. The shaded areas denote green spaces.

35. The cathedral was never built. For a sketch plan of the proposed building see Robert Irving, Indian Summer, p. 273.

36. See, Anthony King, Colonial Urban Development, pp. 231-275. “As in the previous century, proposals were made to demolish the wall...to relieve congestion in the city. The proposal was turned down by the central government in 1929. Instead, the area south of the wall was levelled and grassed over for sports grounds and intervening spaces planted with ornamental and flowering shrubs effectively dividing the populations of the two cities.”


39. See, Le Corbusier, The Radiant City. In the Radiant City the head is composed of the office towers and business houses. In the Contemporary City for Three Million, these were located at the center of the plan.

40. The governor’s palace, though a relatively small building was made prominent by its location within the complex. The building was not built because, Nehru, the prime minister at the time, felt among other things that it was symbolically unsuitable for a democracy. It was replaced by the Museum of Knowledge.
culminated in the viceroy's palace. The cross axis was the route that most newcomers to the city would take. Starting at the proposed railway station it passed through Connaught circus and connected it with the Anglican cathedral South of Kingsway which was to be the focal point of the residential area\textsuperscript{35}. The junction of these two axes was to be developed into a cultural plaza. The cantonment was located to the S.W. of Raisena ridge and the area around the city was developed into parkland, or race course, or golf links, forming a green belt which virtually surrounded the city effectively separating it from Old Delhi. (This move did not merely reflect the 'British' attitude but also what had become the norm amongst planners and architects - the green belt, the 'cordon sanitaire'\textsuperscript{36}. In a letter in May 1912, Lutyens mentioned, "...Lord H. is quite keen and agreed with my view as to the architecture of the country and how the problems should be met. He said he wanted the two cities one and not two- the new and the old...".\textsuperscript{37} The result is quite to the contrary. The new city acknowledges the presence of Shahjahanabad, Purana Quila and the other remnants of Delhi's past but does little more.

Le Corbusier, was hired as the architectural co-ordinator for Chandigarh, however, he took it upon himself to alter the plan of the city (which had been done by Mayer and Nowicki) significantly. Maxwell Fry has given an account of the creation of Chandigarh. "Corbusier, with the three of us more witnessing than assisting, created the plan of Chandigarh in about four days of concentrated work, but substantially in less time than that. Starting on a clean sheet of paper and proceeding from a broad analysis to synthesis following a method of working that was his gift to CIAM, he laid out the main lines of the city, from which he never after departed..." "Forty years earlier in Simla Lutyens had worked as fast and confidently. He had not departed from his first plan either."\textsuperscript{38}

Le Corbusier's plan however retains, in essence, most of the elements of the previous plan. The most significant changes were in the location of the capitol complex, the segregation of traffic, and the geometrization of the plan. The location of the major land uses like industry, etc., remained similar.

The plan in this case too, is organized on two central axes running NE-SW linking the capitol with the central business district and the civic center and NW-SE linking the railway station and industrial sector with the university. Le Corbusier moved the Capitole complex (which was already located outside the city in Mayer's plan) a little to the northwest taking advantage of the slight irregularities in the landscape, to locate the 'Acropolis' as it were at a slightly higher elevation. The capitol complex is symbolically and physically the 'head' of the city- the thinking organ.\textsuperscript{39} It is somewhat removed from the city, surrounded by greenery and a lake. Within the complex, the governor's palace\textsuperscript{40} is located on axis with the central avenue, with the high court on the right and the legislative assembly and secretariat on the left. As a footnote to one of his sketches Corbusier writes "My idea is that the farming unit be
28. Sketch by Le Corbusier of Chandigarh as it would sit within the landscape 1952.

29. Illustration from Le Corbusier's Radiant City captioned "Then the orientation of any given city is planned to take maximum advantage of the available sunlight.

30. The capitol complex Gandhinagar seen from the axial road leading to the railway station.

31. Central vista Gandhinagar.


42. Le Corbusier Archives, vol. 25.

43. See, Le Corbusier, The Radiant City.

44. The organization of the buildings within the capitol complex, with respect to the major axis, appears more democratic than in the case of Chandigarh. The Legislative Assembly which is the one arm of government unique in a democratic system, is given the most prominent position.
conserved directly near (in contact with) the Capital Area, so that the life expressed by the work of the farmers, will be seen and appreciated - the order of the fields of sugarcane, wheat, etc. And little by little the way of modernization of the peasant life will occur.\textsuperscript{41}

The central avenue leading down from the capitol is bounded on one side by parkland and on the other by the multi storeyed buildings of banks, offices and hotels. At its lower end the central avenue edges the central commercial and business district. The avenue lacks a strong terminus in the sense of Lutyens' King's Way. It terminates in (or springs from) what would become the geographic and functional heart of the city in its fully developed phase. The secondary axis leading from the railway station and industrial sector to the University crosses the central avenue just north of the commercial center. The street completely changes character at this point. The part toward the railway station is bounded by small scale industry and shops, that towards the University by museums, a theater and sports stadium. A belt of parkland runs right across the city from NE to SW- developed within an eroded stream bed.

The extent of Chandigarh's ultimate growth is regulated by a five to six mile wide green-belt surrounding the city; within which no construction is permitted. In a sketch showing the 'periphery control of Chandigarh, Le Corbusier writes: "Chandigarh is an administration city- and in consequence is a radial-concentric city. It has never to become an Industrial-City.' The industry must never enter in the radial concentric city.\textsuperscript{42}

Like Chandigarh, Gandhinagar is oriented NE-SW, and apparently (from an interview with the planner) for the same reasons\textsuperscript{43} i.e. that none of the major streets are oriented directly East-west or north-south so the traffic does not have to face the direct sun at any time of the day. Here too, the city is organised on a rectangular grid with more or less the same dimensions, and attempts a similar segregation of traffic. The principal axes in this case form a "T". The major axis which is to be developed into a grand parkway connects the railway station to the capitol complex\textsuperscript{44} and is on axis with the Legislative Assembly building with the high court on its right and the secretariat on the left. The governor's residence in this case is set far back from the capital complex within the green belt which runs along the bank of the river.

The secondary axis cuts right across the city, linking the highway approach (from the Ahmedabad airport) with the industrial sector (whether deliberately or incidentally, it is directly on axis with the two huge cooling towers of the thermal power station which dominate the skyline more than any other structure.) The junction of these two roads is marked by the civic center and a commercial area which spreads out along one side of both roads. Except for the capital complex and railway station
32. Diagrams for a) New Delhi b) Chandigarh c) Gandhinagar, showing the following land uses:

Governmental
Commercial
Institutional
Industrial
Residential
Green

Gandhinagar does not have any foci which as in the other two cases, counterbalance each other. The plan appears to lack a comprehensive philosophy/reasoning guiding the organization of space.

2.22 Land Use:

_New Delhi_ was designed to serve no purpose other than housing the Government of India and its functionaries and other representatives. Most of the land is taken up by very low density residential areas- the average plot for an officer or civil servant ranged from 1 to 3 acres. The emphasis was very much on gardens and green spaces. "But for its green stuffing, the plan would have been impossible no matter what season of the year. The idea of a garden city had been adopted by Lutyens and the Delhi committee right from the start."45 Apart from the ceremonial green of the central vista which was 440 ft. wide and stretched a length of one and a half miles, a belt of green surrounded the city; parts of which were developed into a golf course, a race course, and gymkhanas.

The viceregal estate itself occupies 250 acres, of which 15 acres is given over to the Mughal gardens behind the viceroy's palace. Connaught Circus, the other important focus of activity consists of two concentric rings of arcaded shops and offices its diameter being "close on twice the length of the longitudinal axis of the Colisseum."46 This monument to commerce is modeled after the circus at Bath, England. The economy of the British empire in India, after all, was based on trade, hence it is not surprising that the development of industry or even the allocation of space for any such development was neglected completely.

The British population in New Delhi was predominantly male, children and old people making up only a very small percentage of the total. This explains the lack of any formal provision for educational institutions. The religious function however was accorded greater importance and churches formed the focal points of all the residential areas. Lutyens and Baker designed two churches. The Anglican Cathedral which was to form the southern terminus for the N-S axis was never built.

Despite repeated urging from Lord Hardinge and Herbert Baker, New Delhi as it came about was a city only for the British in India. The design does not allow for any unplanned development. The question of migrants from rural areas and landless labourers did not even arise, probably due to the fact that industry which is the prime attraction, was not intended. (This was despite the noble views and intentions voiced in the final report of the committee, "...there must be a readiness to meet every requirement of the future.....A well planned city should stand complete at its birth and yet have the power of receiving additions without losing its character."47
33. Central vista Chandigarh, Madhya marg.

34. Sketch by Le Corbusier of the periphery control plan for Chandigarh.

35. Periphery control plan of Chandigarh showing growth beyond the green belt in the form of linear cities.

36. Plan of Chandigarh and its surrounding areas showing later changes in the State boundaries with the border of the States of Punjab and Haryana passing through the green belt area, and new developments within the green belt.
Though the architects claimed to have created a Garden City', New Delhi had only the superficial characteristics which had come to be associated with the design of Garden Cities and none of the social concerns. Most of the physical 'elements' that had come to be taken as manifestations of Ebenezer Howard's approach to city planning (developed in his book "Tomorrow" - A Peaceful Path to Real Reform) were actually the interpretations of Parker and Unwin who designed the first Garden City at Letchworth. Howard's ideas were based on his experiences in the crowded industrial cities of England and were aimed primarily at social change more than physical change. His intentions were not merely to draw people out of the city but to change the patterns of exploitation that had developed in the industrial city and to create an ideal environment which would combine the advantages of urban and rural life. His ideas were taken up by designers and used in a fragmented manner. The ideas of containing urban growth, limiting the population, segregation of land use, an emphasis on health and hygiene, all have their roots in Industrial England and Howard's 'Tomorrow'.

Coming as it did, soon after India's independence from British rule and after the partition of the country, the priorities for Chandigarh were very different from New Delhi's (or should have been). Chandigarh too, was built to house the Punjab government and it's employees, but it also had the added responsibility of housing the refugees that had poured in from west Punjab, and providing them the opportunities for a reasonable livelihood. The principal function, the capitol complex, is situated virtually outside the city occupying an area of 800m by 800m square. The gigantic scale of the buildings and of the open spaces in-between, relates more to the vast open plain and the mountains than to the human being. The whole area is composed like a gigantic piece of sculpture. The Governor's palace sits on axis with the main approach from the city but there is a slight shift to the left as one nears the building. Internally the complex duplicates the cross axial organisation of the plan, with the legislative assembly and the judiciary juxtaposed on the secondary axis. The secretariat is placed forward and to the left of the legislature. The civic center and the commercial district are located at the heart of the city. This sector forms a kind of terminus for the central axis the Madhya Marg. The sector (1200m X 800m) is divided more or less midway, like all the others, by the market street. The area north of the market street was set aside for the commercial center and some of the civic buildings, (i.e. Town Hall, Central Library, Post and Telegraph Office, Chamber of Commerce) while the area South of the street was reserved for district administration and the central bus terminal.

At the two ends of the cross axis are located the university (to the west) and the industrial sector (to the east). The University of Punjab Like the state Government, had had its headquarters in Lahore prior to the partition. When the new capital was to be designed, however, the intention was to locate the university outside the city. It was Mayer who insisted on keeping the university as close to the city as
48. Norma Evenson, Chandigarh, p. 16.

49. Le Corbusier Archive, vol. 25.

50. Howard visualized the growth of urban settlements within a region as several garden cities with a population of 32000, clustered around one central city with a population of 58000, and separated by wide belts of country. The garden cities would be connected with each other by road and rail and with the central city by rail, road and canal. For a detailed description and diagram, see, Ebenezer Howard, Garden Cities, pp. 138-159.

51. For a sketch plan of Chandigarh showing the future development of linear cities see, Le Corbusier Archives vol. 25. Le Corbusier had made references to Soria y Mata's vision of the linear city in some of his earliest writing. See, H. Allen Brooks, Jeanneret and Sitte.

possible since he had serious doubts about Chandigarh achieving its initial target of a population of 150,000 - not to mention the final figure of 500,000. He felt that, "...a state capital without any particular attraction other than government is usually a deadly dull place and stays a small insignificant place."48 It was also Mayer who suggested that an area adjacent to the proposed railway station should be set aside for the growth of small and medium scale industry. Le Corbusier, in fact, was against the idea of including an industrial sector, but was later persuaded to do so.

Not unlike the ceremonial green of Lutyens' plan, a belt of parkland crosses the city from NE to SW. Developed within an eroded stream bed, it was called 'the Valley of Leisure' by Le Corbusier. Within Sector 10, a part of the 'valley' was to be developed as a cultural center with a museum and outdoor theater. The Periphery Control Act of 1952, provided for the continuing maintenance of a rural belt within a ten mile radius of the city center. Le Corbusier's sketch, indicates the removal of existing industries within the belt - comments describe his image of how the city should grow. "The Industry must never enter in the radial-concentric city. The radial-concentric city are connected by 1. Land roads 2. Railways 3. Water ways (very few in Punjab) 4. Air route."49 (Le Corbusier's "radial-concentric city", conjurs up an image not unlike Howard's "social city".50 Future growth for Chandigarh was envisioned in the form of linear cities radiating outward along the major transportation arteries, starting outside the green-belt.51

In the matter of land-use and zoning regulations, Chandigarh is an idealised version of planning 'norms'. There is absolutely no room for uses that have not been planned for. At the very outset, the first people to come and settle there, were construction laborers, but, till today, there is no room for them in the city. Even the lowest category of housing, (an additional category designed by Jane Drew on her own initiative) was much more than what they could afford. The greatest number of zoning 'violations' are within the residential sectors where residents have set up small workshops or businesses within their premises. This is more evident in the commercial zone where only one side of the main street has been designated as commercial. The houses facing this street on the other side are obviously ideally located for small businesses and enterprises. The 'green belt' today houses two new industrial developments, the military cantonment, and a market town. The border of Punjab and Haryana passes through the belt, north to south.52

Though, Gandhinagar's raison d'être was housing the government center, one of its aims from the outset had been to boost the economy of the surrounding areas. Hence, providing for a diverse economic base was part of the program. The entire government complex, including the offices of the Central and State governments, occupies the equivalent of two sectors (185 acres) in the heart of the city. The
planner, Mr. Mevada, felt after having studied Chandigarh and New Delhi, that the capitol complex really should be at the 'heart' of the city and not the 'head'. The building of the legislative assembly, which is directly on axis with the central vista, is a perfectly symmetrical building - a square plan with four identical facades - "without any front or back". In fact the entire complex of secretariat, high court and assembly buildings, appears exactly the same whether viewed from the N-W or S-E.

Most of the major functions are located along the 'spine' of the major axis. At it's farthest end is the railway station, wholesale market and industrial estate. A commercial belt runs along one side of the road from the railway station to the civic center. The civic center is located at the junction of the two major axes. This sector also houses the main bus terminus - as at Chandigarh. There is no proposal for setting up a university yet, but most of the educational institutions are concentrated in sector 15, to the north-east side of the central vista. The thermal power station is located just outside the city to the north-east. The city is contained to the north-east and north-west by the railway line and the industrial areas, and on the south-east and east by the river. Apart from these physical barriers, the future growth of the city is regulated by a five kilometer wide 'green belt' within which, no development is allowed. The organization of the city based on the neighbourhood unit or sector, is very much on the lines of Chandigarh. The ceremonial green in this instance is the central belt within the main right-of-way, which is a hundreded meters wide (New Delhi's is 134m.) This belt continues as a garden behind the complex of government buildings, and meets the park development on the river bank.

Unlike the other two cities, the planners of Gandhinagar seem to have given a thought to the needs of the "informal sector". Each quadrant of the city (comprising roughly six sectors) is served by a district center where the movie theater, shops, markets and other facilities are located and here platforms have been provided and space allocated for vendors and hand-carts. Sector 24 next to the industrial estate has an area reserved for squatters. The migrants are usually unskilled labour from the rural areas, but there is provision for a training facility in the same sector. Unfortunately, most of this development has not yet taken place, and it is difficult to foresee how it is going to develop in reality. At the micro level Mr. Mevada has gone to great lengths to provide for the many small events and activities that characterise the regional culture. However, Gandhinagar sorely lacks that confidence and mastery at the conceptual level that the other two cities show so strongly. The intentions are admirable, but seem to be manifest in random gestures without a consistent structure.

2.23 Road Networks:

Speaking of Lord Hardinge's founding role in the layout of New Delhi, Lutyens said: "His command that
37. Diagrams of a) New Delhi b) Chandigarh and c) Gandhinagar showing the road network and green spaces.

38. Diagram of New Delhi emphasising the regular hexagonal grid on which the plan of the city is based.


54. See, Anthony King, *Colonial Urban Development* pp.223-228. "... anticipating the hierarchies of New Delhi, the indigenous nobility were accorded sites, their position and size appropriate to the status of their occupants, near to yet sufficiently distant from the source of prestige."

55. See, Robert Irving *Indian Summer*, p. 264. "Official opinion at first favoured excluding raja's villas from the capital boundaries altogether. ..... Geoffrey de Montmorency cited problems liable to arise concerning sanitation, noise, dust, traffic control, and discipline of unruly retainers."


57. See, Norma Evenson, *Chandigarh*, p. 31. "A comparison of the Bogota sector with that developed for India reveals a similar use of parkland as a means of circulation through the area and as a link between sectors. The Bogota sector differs, however, in its employment of a localized shopping area rather than a street, and the roadways within the sector form a geometric grid very different from the interior loop road to be found at Chandigarh."
one avenue should lead to Purana Kila, and another to the Jumma Masjid, was the father of the
equilateral and hexagonal plan.\textsuperscript{51} Lutyens' obsession with symmetry and the geometric plan however,
would not allow him to tilt the axis sufficiently to really terminate at Purana Quila instead of just
grazing one corner of the fort. What evolved out of these concerns was, an equilateral triangle, with the
three focal points of the city, Government House, India Gate and Connaught Circus forming its vertices.
Connaught circus which was to be the railway station plaza has ten roads radiating from it while the
other two main centers are the focus of seven radial roads each. Each of these centers is further
accentuated by being located at the center of a hexagon. Despite its complex geometric structure, the plan
does not display the kind of carefully graded hierarchy of movement that Chandigarh does. The main
roads, skirting a triangular or hexagonal neighbourhood, are usually 150 feet wide, with the smaller roads
within these areas being 76 feet wide, and the back service roads 18 feet.

The distribution of residences and institutions on the layout .....acknowledged and reinforced the inherent
heirarchy in a city of civil servants.\textsuperscript{53} Houses of the high officials of the government of India and the
gazetted officers were concentrated close to the secretariat and on either side of the central vista. Fanning
out along the radial roads in descending order were the residences of the Deputy Secretaries, Under
Secretaries, Registrars, Superintendents, European Clerks, Indian Clerks and Peons. This arrangement
was very much like that of the British cantonments and has been likened by Sten Nilsson to the layout
of durbar camps.\textsuperscript{54} The peons, the lowest in the heirarchy, were located near the termination of the radial
avenues, at a considerable distance from their place of work. Though the Indian aristocracy needed to be
placed in a prominent location, they did not "really need to be near the secretariat"\textsuperscript{55} and were located in
the area around India Gate - called Princes' Park - the average lot size being eight acres.

The contradictions in locating the well-to-do (who could definitely afford motorised transport) very close
to the city center and to their place of work, and relegating the poor to the fringes, are obvious, but New
Delhi was a "white" city. Around the time that New Delhi was being built, most of the Europeans and
the Indian aristocrats had cars, while the bicycle was the means of transport for the common man - but
not everyone could even afford a bicycle. The wide roads and large distances were anticipating the kind of
rapid development that was taking place in Europe. "The most substantial difference distinguishing the
new from the old city results not from the technology, but from the technological assumptions
underlying it's construction."\textsuperscript{56}

Chandigarh presented an opportunity for Le Corbusier to experiment fully, for the first time, with
theories about the organisation of the city that he had built up over the years. His system of the 7Vs, a
universal heirarchy of roads had been tried most recently in Bogota.\textsuperscript{57} "Le Corbusier explained how the
39. Schematic plan of a sector proposed for Bogota. The sector measures 800 x 1200 meters. A central belt of green runs through the sector in both directions with the common facilities like schools more or less centrally located. Circulation is based on the system of the seven V's.

40. Sketch plan of Chandigarh by Le Corbusier showing the system of the seven V's with a detail of a sector showing internal circulation.

41. Main approach to the capitol complex Gandhinagar, from Ahmedabad.

42. Brick paved cycle path within the sector, Gandhinagar.

58. Sten Nilsson, *New Capitals*, p. 120.

roads were to serve the town dweller: he is able to:
cross continents: the V1
arrive in town: the V1
go to essential public services: the V2
cross at full speed without interruption the territory of the town: the V3
dispose of immediate accesses to daily needs: the V4
reach the door of his dwelling: the V5 and V6 send youth to the green areas of each sector where schools
and sports grounds are located: the V7."^{58}

In Chandigarh the major approach route, (at the bottom of the plan) the central axis, and the cross axis
are V2s. The central axis from the civic center to the capitol complex is designated as V2c while from
the civic center to the residential areas it is known as V2b. Each sector is bounded by V3s. The market
street which cuts across each sector, is a V4 and the green areas running through the sectors from north
to south are V7s. The differences are manifest mainly in terms of the width of right-of-way and the kinds
of planting in the center or on either side. The V7s, which are essentially pedestrian ways, are linked by
underpasses so that a pedestrian can get across from one area to another without having to cross a major
street. Le Corbusier's studies for traffic segregation were based mainly on western experience, and there is
no doubt about the fact that the scheme bears no relation to the reality - even as it is today forty years
after the city was started. His scheme also showed different stages in the development of road junctions
starting with an ordinary cross roads and a round-about and developing into a fully grade separated
junction. This has not yet come about - primarily due to a lack of funds.

The rectangular grid of roads results in the 'sector' or neighbourhood unit. "....the neighbourhood unit
represents a planning device common to much recent Urban Design, having precedence in the work of
Clarence Stein ....."^{59} It also represents the need to simplify and break down the infinite complexity of
the modern city - to incorporate most functions within a module which can then be repeated with minor
variations. Most of the sectors in Chandigarh contain a mix of government housing and private
development. Housing built by the government for its employees (70% of the population) is categorised
by income levels. The distribution of these categories within the city is not very different from that seen
in New Delhi an 'Imperial' city. The houses of ministers and judges of the high court, lie closest to the
capitol, with successively lower categories moving further out and away from the work center. Despite
his ideas for an egalitarian society based on co-operation, when it came to the physical and social
organisation of Chandigarh, Le Corbusier seemed to prefer the classical heirarchic ordering of the city
huddled in the shadow of the Acropolis.
43. Sketch by Lutyens showing the relative positions of buildings along the "line of climax" which clearly reinforced racial distinctions. The buildings in the sketch starting from the left are labeled: Jumma Masjid (mosque), Jantar Mentur (the ancient observatory), Thin black (Indian junior officers), Thin white (British junior officers), Fat white (higher British officials), Secretariat, Government House.

44. Diagrams of a) New Delhi, b) Chandigarh, c) Gandhinagar showing housing distribution by categories based on income. The categories in each city cannot be equated directly, but it is sufficient to observe the relative positions of higher and lower categories within each city.

Gandhinagar has attempted a system of traffic segregation very similar to that of Chandigarh. The official report of the government of Gujarat sums it up in a few lines: "The peripheral roads and the access roads to the city center are 65m wide, roads to the government offices from south-west and north-west, and the crescent road are 100m wide. The rest of the main roads are 45m wide." The 45m wide roads actually perform the function of the V3s in Chandigarh i.e. they form the boundaries of the individual sectors. Within the sectors the organisation of the streets is somewhat different. An access from each of the peripheral roads leads to an internal loop from which each housing cluster is accessible. A strip of green, which includes a cycle track - crosses the sector in both directions and is connected to the sectors adjacent to it by means of an underpass. In theory, then, the system should work as two independent grids - one pedestrian and the other vehicular. This does not happen in reality however, since none of the under/over passes have been constructed.

Gandhinagar aims at a fifty-fifty ratio of government housing and private development. Here too the housing is categorised by income levels. In fact, even in the case of plots auctioned to the public, there is a ceiling on the maximum area of land available for every income category. The distribution of housing groups with respect to the government center, is heirarchic as in the other two cities but with a few differences: 1) The government center and offices are more or less centrally located, so that all residential areas are within 11/2 miles of the center. 2) The bungalows of the governor and the ministers are located behind the capitol complex, towards the river separated from the other residential areas by the mass of the government offices. This ensures them preferential status without having to move the lower categories even farther away from their place of work. The diagram of Gandhinagar appears to function more as a "radial concentric city" than Chandigarh could claim to.

2.24 Generative Unit:

Unlike Chandigarh and Gandhinagar, New Delhi was never thought of by its designers in terms of a repetative community or neighbourhood unit. Except for the housing provided for the clerks and peons, the typical residential 'type' was the bungalow - a low one storeyed structure, with deep overhangs and verandahs, a pitched or flat roof, and usually set in the middle of a large 'compound' with a spacious front and back yard. The image created was that of aloofness and privacy rather than community. The city was designed for a density of 15 to 20 persons per acre - as compared to 840 persons per acre in Old Delhi. "...Curzon, Hardinge and other camp-arrangers saw their task first and foremost as a question of organisation. It was a matter of providing accomodation on a large scale and as such it was solved along the simplest lines possible. In Delhi, a total of 1,667 houses were required for officers of all ranks, 1,157 smaller residences for clerks and 850 quarters for menials. These were placed in the geometric grid
45. Plans of typical sectors in a) Chandigarh and b) Gandhinagar, showing a) government housing, b) private housing, c) primary school, d) shopping, e) health center, f) high school, g) cricket stadium, h) mosque.


62. Ref. section 3.31 in this study.

63. Le Corbusier, *City of Tomorrow*, p. 16.
formed by 60 miles of main streets and as many miles of service roads.61

The primary organising element within the sector in Chandigarh, is the system of movement and transportation. The sector is bisected by the V4 bazaar street in the north-west south-east direction, and by the park and cycle track in the north-east south-west direction. The V5 loop acts as a traffic distributor within the sector from which V6s lead to each small housing cluster. The common facilities like the primary school, the health center etc. are located at the heart of the sector within the park area, while the shops are located along the market street. The periphery of the sector is often reserved for commercial use. Due to the manner in which it is organised, the sector actually behaves like four smaller sectors - in fact the system devised for numbering the houses goes by dividing the sector into quarters.62

Compared with the clarity and strength of the master plan, the internal layout of the sector seems somewhat loose and arbitrary. The structure which is evident in the plan appears hopelessly fragmented in reality. The sector plan brings to mind Le Corbusier's often repeated quote: "The circulation of traffic demands the straight line .......The curve is ruinous, difficult and dangerous, it is a paralysing thing. The straight line enters into all human history."63 It is difficult to find one straight line within the sector.

Housing within the sector is grouped by categories based on income levels. There is an attempt at some mix of categories in the government housing, besides which, almost 50% of the lots are also auctioned for private use. The mix of categories however, is usually limited to the next group in the hierarchy, - so the overall pattern remains unchanged. In comparison with the plan of the sector, each individual cluster of buildings has a more definite structure and the open spaces within are more contained.

As at Chandigarh, the major organising element within the sector, in Gandhinagar, is the circulation system. The inner loop here too acts as a distributor for vehicular traffic within the sector. The cycle and pedestrian paths, however, cut across the sector in both directions, dividing it into four quarters. The manner in which the different functions are organised, breaks down the quarters further into nine or ten discreet sections.

As a rule government housing is located within the internal loop while the peripheral plots are reserved for private residences. (The reasoning behind this was that it would lend more variety to the street facades). Primary schools, health care and sports facilities, and local shopping centers are located somewhat in the center within the loop. Most of these shops are provided with residential space on the
64. See, section 3.1 in this study.

upper floors. High schools, religious buildings etc. which might be shared by three to four sectors, are often located on the periphery. Residential plots available to the public range from 50 sq.m. to 1600 sq.m. and housing units provided by the government range from 37 sq.m. to 147 sq.m. Those of 227 sq.m. are reserved for secretaries and above.

The layout, internally, seems loose and unstructured with meandering paths leading to housing clusters loosely grouped around excessive open areas. According to Mr. Mevada, the main source of inspiration for the layout of the sectors was the traditional urban neighbourhood or 'Pol'. Pols still are the major residential type to be found within the walled city of Ahmedabad (or in any of the old towns of Gujarat). Quoting from the report on Gandhinagar: "The residential groups in Gandhinagar have a basic and fundamental resemblance with the community structure presented by the Pols...The street pattern in the residential groups is as informal as is found in the 'pols', free of fast traffic and serving only the local traffic generated by the residential groups...in Gandhinagar an attempt has been made to form the residential groups of such economic strata as would permit evolution of a fully socially active life." The result unfortunately is 'informality' to the extent of randomness. There is none of the feeling of being within a private space as in the Pols - the open spaces are a no man's land. The Gandhinagar sector lacks most of the strong social and physical characteristics that have held the Pols together through centuries of change.64

2.25 Controls and Incentives:

New Delhi, as planned by Edwin Lutyens and Herbert Baker, was designed for a population of 90,000. (This figure was based on the number of employees of the government of India and families) with an average density of 15 to 20 persons per acre. The city was contained on the north, east, and west, by natural and man-made elements but - in the words of the Committee - there was infinite room for extension to the south. In fact this is the direction in which the city has grown after independence. Though a green belt did surround the city, it was not backed up by sufficient controls to ensure its remaining that way. The Imperial Delhi Committee, had been unanimous in its decision to prevent any industrial development taking place in New Delhi: "We do not want factory chimneys on every side........The motive of the city is governmental".65

The project cost estimated by the P.W.D. was 4,000,000 to 5,000,000 Pounds - however Lord Curzon's pessimistic guess of 12,000,000 Pounds proved to be more correct. Prior to this project, funds required for government buildings were usually found from current revenue i.e. the expenditure was met from the proceeds of ordinary taxation. In the case of New Delhi the sheer magnitude of the expense precluded this


option. The money eventually was to be raised partly from a loan and partly from accumulated revenue surpluses as they arose. In addition to this, there were also the proceeds from the sale of the buildings in Calcutta and of leases and land in New Delhi. "The Viceroy expressed delight that by 1913 the New Delhi had attracted numerous applications from ruling chiefs for housing lots".66

Architectural controls were maintained in many different ways. Lutyens and Baker were appointed "architectural advisors" to the capital and as such had censorial powers over any new building to be built within the capital. "Building restrictions and allotted sites did not permit any Delhi Palaces (of the local rulers) which would eclipse Viceroy's house."67 The construction of the government buildings was supervised by British masons and carpenters who trained several thousand workers on site. Towards the end of the war the same construction staff took over the execution of military works. "The supervision of work in the stoneyard has been in the hands of three English foremasons......In all the other building trades English foremen have been employed to supervise the Indian workmen and to train them to a higher class of work."68

Byron in his article The New Delhi, in 1929 concluded with this statement: "It is to be hoped that the Government of India,.....will notice the responsibility that rests on them of maintaining a sanitary, clean and beautiful town which is properly co-ordinated as regards its buildings of all classes".

Chandigarh was designed for an initial population of 150,000 persons with an estimated increase to 500,000 eventually. Some amount of growth was provided for in fourteen sectors just to the south of the planned area. The city was to be contained within this limit by a green belt 10km wide, which encircles the city. The reasons behind this were, a) to prevent indefinite sprawl, b) to preserve the distinction between city and countryside and protect the rural community from degeneration by contact with urban life, c) to provide a market in the city for the produce from the surrounding agricultural area. Growth beyond this stage was envisioned by Le Corbusier in the form of linear cities originating at the outer edge of the green belt and following the major lines of communication, i.e. the railway line and highways. Though Le Corbusier himself was against the idea of allowing industries to develop within the city, the planners did realise the need for something other than just the government function for the city to flourish as a self-sustaining unit. Though land was allotted for an industrial estate, the government had to offer a number of incentives for industries to locate there since the site had no natural deposits or raw materials available in the vicinity.

Chandigarh was supposed to be a self-financing city. The first example of its kind in India where absolutely all the land was owned by the government. The reasons for doing this were, a) to regulate

70. *Le Corbusier Archives* vol. 25.


growth as per the master plan and, b) to prevent speculation. It was decided that all the land within the plan area should be acquired, developed and sold by the government i.e. by the Capital Project Organisation (C.P.O.). Development costs, however, not only made it impossible to buy land for the majority of the poorer classes, but the value of a small plot was proportionately greater due to development costs. Private development could only take place within the boundaries of a plot acquired from the government for a specified use. Le Corbusier believed: "Good urbanism makes money; bad urbanism looses money." His advise to the government was to sell the land on leasehold so that "they should recoup on the increased value which would be likely to flow from planning". The need for money to carry out the project, however, was so great, that land had to be sold free hold. In fact, psychologically, the idea of selling leasehold to people already made insecure due to the partition of the country was not very good. In the beginning, land prices were fixed and uniform within the whole city, but the need for finances grew so great that towards the end land was auctioned off to the highest bidder. This did not happen regularly, but would happen whenever some new public project was to be undertaken, or when the government needed money for some other public purpose. Thus all government land used for public purposes was subsidised by the private sector. Housing provided by the government for its employees was subsidised for almost all income groups. "Recovery of the development costs of infrastructure and civic amenities at the same rate from all sections of the private sector implicitly assumed that they would be used equally by all.....But since the lower income groups......were not in a position to benefit from sophisticated amenities such as museums, art schools, and higher education institutions, the costing procedure really meant a subsidisation by the poor of amenities predominantly used by the rich".

To promote private construction, (both residential and commercial) loans on easy terms were made available by the government. Plots to be sold for private residential construction ranged from 125 to over 5000 sq.yds. Regulation of private construction was managed through an extensive system of controls. ".........we devised a system of sector planning sheets on which were shown graphically the building lines, permissible heights, building areas of plots, public open spaces, scheduled trees and controlled building walls with standard designs for gates. Some frontages on important streets were controlled as to height, profile, materials and setbacks in order to project to some extent the effect such streets would have when finally built." The architectural controls for private development in the commercial center were as detailed and specific. The immediate precedent in India, for a shopping area of such uniformity was New Delhi's Connaught Place - but then, it was the creation of one man.

Gandhinagar has been planned for a maximum population of 300,000. The development completed so far supports a population of 150,000, to 175,000. A belt 5km.wide, practically surrounding the city on all
sides has been designated a green belt for containing the city and preventing sprawl. However, there is "plenty of room for expansion" to the south-west of the city - towards Ahmedabad.

The importance of industry to the growth of the city was accepted from the outset, however, permission was restricted to the development of the electronics industry only. "Though Gandhinagar is primarily an administrative center, it must have a diversified economic base to make it a living city. It is therefore desirable that light industries that will not basically alter the character of the city be established."73

Fifty percent of the housing in the city is constructed by the government for its employees and is made available to them on rent. Some of the major public buildings and large markets have also been built by the government. Land for private development is sold freehold, either through public auction or by allocation as in the case of co-operative housing societies or government subsidiary companies. Use of land sold to the public is controlled in various ways: 1) It must be used for the purpose it has been sold for, 2) construction on the site should start within six months, 3) construction should be finished within three years, 4) resale of the land requires the prior permission of the government, 5) if permission is granted, the government has the right to recover the whole or part of the difference between the original price paid and the resale value, etc. etc. As in the case of Chandigarh these regulations exist to ensure the growth of the city as per the master plan and to prevent speculative investment in land. (This also helps keep land prices relatively stable.)

Despite the many special provisions made for educational institutions, non-profit organisations, co-operative housing societies etc. the city's growth was rather sluggish initially. In an attempt to boost the growth of the city in 1970, 71 and 73, the government repeatedly had to lower the prices of the plots, or include more categories of use within its revenue free allotments. Architectural controls on private residential development are in the nature of building bye-laws merely specifying maximum height, set backs, number of dwelling units per plot, maximum permissible built-up area etc. For private development in the commercial area the controls are very specific - down to the size of openings, position of openings, column spacing, materials used on the facade etc. This idea of very regular facades along the main shopping street apparently was inspired by Jaipur.

2.3 Analysis:

2.3.1 Values Embodied in the Plans of Lutyens and Le Corbusier.

Since the turn of the century, India has developed forty four new towns. Recapitulating some of the
landmarks of this period in brief: Lutyens and Baker started on the design of New Delhi in 1912, Sir Patrick Geddes visited India in 1915 and prepared plans for the redevelopment of a few old towns like Indore, the master plan for Jamshedpur, an industrial town, was prepared by Otto Koenigsberger in 1944, the planning of Chandigarh first by Albert Mayer and Nowicki in 1949 and then by Le Corbusier in 1951, the second master plan for Delhi prepared under the aegis of the Ford Foundation to which Gordon Cullen and other foreign consultants contributed in 1960. All of these have left their imprint on town planning in India.

The projects for New Delhi and Chandigarh, however, were by far the most influential as far as later developments in city planning were concerned for a number of reasons:

a) they were crucial political ventures,

b) they marked a turning point in India's political history,

c) the sheer magnitude of the projects,

d) the widespread publicity they received within the profession and without. In the case of Chandigarh, particularly, the fact that its designer Le Corbusier was one of the most controversial architects in Europe at the time, and one who had consistently promoted his ideas through writing and design, contributed a great deal to the exposure it received.

"It [Chandigarh] proved to be a catalyst of staggering effectiveness. All at once India was catapulted to center stage on the world architectural scene.......Today much of the Chandigarh vocabulary has become standard vernacular for public works departments all over this subcontinent, and a number of private practices - including my own - have probably survived only because of this interest in architecture triggered by that city." 74 New Delhi and Chandigarh were also the only projects where an effort was made to design a fully self-sufficient city - not an industrial town, not a satellite city or a suburb. Both were also the head quarters of government. Hence it is not surprising that when the project for Gandhinagar (the new capital for Gujarat State) came up, the planners should look to New Delhi and Chandigarh for inspiration.

Lutyens and Le Corbusier have been associated with the two schools of thought (supposed to be diametrically opposed in their beliefs) that guided city planning in Europe in the eighteenth and nineteenth centuries; 1) in the spirit of Ebenezer Howard's garden cities which was taken to be anti-urban and anti-city and, 2) in the spirit of Le Corbusier's plan Voisin for Paris - reconstituting the urban center and re-establishing the city as a desirable place to live in. But they were similar, I feel, in the assumptions they made and in their incongruence with Indian conditions: Both offered an alternative to the industrial city; both see these problems as rooted in the individualist capitalist society and aim at a more egalitarian society based on co-operative living; both assume rapid technological development and universal accessibility to these innovations; both try to maintain the sharp distinction between rural and
46. Master plan for Jamshedpur, an industrial township, prepared by Otto Koenigsberger.

47. Illustration from Le Corbusier's City of Tomorrow showing Louis XIV commanding the building of the Invalides.

75. Alan Greenberg, 

76. Le Corbusier, Radiant City, p. 119.
urban to the mutual benefit of both regions by physically containing the urban area; both are concerned with the quality of the environment and public health, and emphasise segregation of land use and recreation and sports.

Though Lutyens claimed to have designed a "Garden City" in New Delhi, and a number of critics have endorsed this view (given the fact that he had been working on Hampstead Garden Suburb with Unwin the creator of the first "Garden City" at Letchworth) in actual fact it had nothing to do with the sociological and economic concepts that formed the basis of Howard's book "Tomorrow: A Peaceful Path to Real Reform". It merely had the aspect of a garden. Lutyens' plan with its radiating streets, grand boulevards, axes and accents subscribed much more to planning in the "grand tradition" which was characteristic of the new developments in Paris or Vienna in the nineteenth century or of L'Enfant's Washington D.C. Alan Greenberg sees New Delhi as a unique synthesis of garden city and the grand tradition: "The irony of a qualified monumentality enabled Lutyens to simultaneously imply greatness yet accept the mundane, to use monumental forms which despite alterations of scale and context retain the sense of the prototype and to conceive a national capital which is also a garden city."^75 But, New Delhi did not have its equivalent of the Paris block. It had individual 'compounds' or gardens enclosed by a wall with the 'bungalow' pulled far back from the street. The fabric of the city was certainly not "urban".

Chandigarh is as much of an example of planning in the "grand tradition" as New Delhi is. The singular criticism leveled against Chandigarh, usually, is that it has very little relation to its context - whether climatic, technological, economic or social. The roots of this problem can be traced to the fact that a) Le Corbusier was a foreigner operating in a new environment which he had not found it necessary to study, b) he was physically removed from the context - most of the decisions were taken in France c) he approached the problem in very much the same way that he had done at meetings of the CIAM - quickly summarizing the information at hand, generalizing the situation to the point where the context became irrelevant and quickly getting down to a physical solution without arriving first at broad policy and implementation measures. d) most of the ideas that he used at Chandigarh were fully formed elsewhere before he came to the project. They did not develop in response to the local conditions. Though Le Corbusier was planning for a new social order in a new technological age, (in his theoretical writings), he absolutely believed in the need for centralized control and the consolidation of land, (not very different from the rights of kings and princes in Europe) where individual ownership of land would not determine the shape of the city. He admired Lutyens for the same reason that he admired Louis XIV. He admired strength and power. "Louis XIV was the Sun King, he put forth the beams like the beams of the sun; and the beams of the sun are straight as arrows........."^76 In Oeuvre Complete 1952-57, Le Corbusier
48 The 'bungalow': a) View of a typical building of this type, b) typical layouts for officers quarters in New Delhi.

49 Illustrations from Le Corbusier's Radiant City. The caption reads: "To choose between these two attitudes: To preserve this [a] in our disease ridden old neighbouroods...or being able to do this [b] outside our apartments in the Radiant city.

50 The "redent" blocks of the Radiant city with parks, sports fields and schools in between. "Elevator shafts placed at optimum distances...auto ports at the foot of the shafts linked to the roadways...along the roofs, the continuous ribbon of roof gardens with beaches for sun-bathing."

77. Alan Greenberg, Lutyens Restudied, p. 129.


introduces his work at Chandigarh with a tribute to Lutyens: "New Delhi the capital of Imperial India, was built by Lutyens over thirty years ago, with extreme care, great talent, and true success. The critics may rant as they will, but the accomplishment of such an undertaking earns respect."\(^77\) Chandigarh with its geometric grid plan, directional axes, acropolis, hierarchic ordering and the political stand that these seem to connote, was no different from New Delhi. New Delhi and Chandigarh differed fundamentally in two respects however, a) their understanding of 'garden' or 'park', and b) their attitude to 'community' structure.

2.3.11 Outdoor Space:

a) The private 'garden' and public 'park' in the context of New Delhi were the manifestation of many overlapping value systems. Anthony King explains the British population's enthusiasm for gardens and the cultivation of exotic varieties of plants (i.e. flowers and herbs native to the British Isles) as "the need for the individual in the colonial society to establish and constantly reinforce his identity as a member of the group distinct from the indigenous society .....Like dressing for dinner in the African bush."\(^78\) Coupled with this was the 'ideal' perpetuated by the social reformers in industrial England (like Ebenezer Howard) of each dwelling on its own lot and each individual being able to "work" his own land. Thus, 'open space' in New Delhi was of two kinds : the private garden within a walled-in compound, surrounding the 'bungalow', and the park which was a place where one 'went' for recreation, to socialise or merely to enjoy 'nature'. The bungalow with its compound was the basic unit of the city plan. It is interesting to note that this was so despite the fact that there was no individual ownership of land and it presented the ideal situation that planners in the industrial cities of Europe were hoping for to execute their grand designs. "Visual experiences were important and 'nature' had to surround every house. Such ex-urban ideologies with their notions of seclusion and isolation, combined with deference to reference groups 'at home' served to make the elite area of Delhi into a series of private spaces; each an individual unit in itself. These values were essentially those of an urban middle and upper class......Such attitudes were as typical of those professionally concerned with the design of New Delhi as those who lived there."\(^79\)

For Le Corbusier on the other hand, it was a question of providing for the increased hours of leisure that the individual in the new technological age would have and minimising the daily commute - not only between home and work place but to places of recreation too. The solution was a 'city in the park' i.e. a continuous stretch of park on which the residential slabs sat supported on piloris. In between the housing slabs were the sports facilities, stadia, swimming pools etc. "We have allotted the entire ground surface of the city to the pedestrian. The earth itself will be occupied by lawns, trees, sports and
80, 81. Le Corbusier, Radiant City, pp. 64, 65.
playgrounds....sporting activities will take place directly outside the houses. No more courtyards ever again. Instead, an open view from every window.® The practical abolition of private property and the consolidation of land were concepts fundamental to his view of the city. The sector became the unit of organisation in Chandigarh.

2.312 Community Structure:

New Delhi imposed its own hierarchic order - the order of the colonial settlement - on a society that was already highly stratified. First and foremost there was the distinction between the colonists and the indigenous population, next, one's position in the civil service or the government, (for those who were not in some way involved in government service, there was no room in the new city) and third as far as the Indian population was concerned, their standing in their own society based on religion and caste. The triangular pockets formed by the radiating streets in Lutyens' plan were filled in with bungalows on individual lots grouped according to the position that their occupant held in this hierarchy.

Though houses in the same category were grouped in this manner, there was no real attempt at creating neighbourhoods; i.e. as somewhat self-sufficient units with common facilities. In fact, since New Delhi was designed almost entirely with only the British population (for whom transportation was no problem) in mind, most facilities like shopping, markets, etc. were centralized. Smaller markets where they existed were unplanned and catered only to the indigenous population. Thus, though New Delhi did exhibit a grouping of houses, it did not try to promote a new understanding of urban community living or to reinforce the existing community structure. The city was still based on the individual lot.

Le Corbusier envisioned a new society in the machine age which would be faced with the problem of excessive hours of leisure and of "transforming this still vague notion of 'leisure time' as quickly as possible into a disciplined function.......". He envisioned "A new civilization to replace that of Money. Cooperation, collaboration, participation, enthusiasm."® He describes the provision of housing in apartment blocks with nurseries, playgrounds, roof gardens, and community facilities in the form of cooperatives managing food services, laundry etc.

Le Corbusier in all his plans for a new city for the modern age emphasised the need for a centralized authority which would implement these plans and the need to abolish all private ownership of land which is a hindrance to effective planning. The widespread destruction of the second world war provided planners with precisely this opportunity, and the 'block' became the basic unit for planning operations within the city. It is this same idea which is at the basis of the Chandigarh plan where each unit - called
a sector - is essentially an independent neighbourhood with its own community, educational and health facilities. The housing in the sector is usually a mix of two or three categories based on the income level of the occupants. Though this segregation by income seems to be a direct derivation from the colonial city, in Chandigarh it was obviously taken as a fairly reasonable basis for reorganising society in an urban environment and for creating 'communities'. That persons belonging to the same income group necessarily share certain values was implicit and that they would interact as a community given the necessary physical props never questioned. Thus, unlike New Delhi, Chandigarh definitely tried to emphasise the concept of neighbourhoods and cooperative living, but reformulating community life on an economic basis has been more disruptive than constructive. On the other hand it may well have been the only means to modernizing a society bound by tradition.

2.32 The Manifestation of these Values in the Gandhinagar Plan.

The plan of Gandhinagar has very obvious similarities to that of Chandigarh, particularly in its layout based on the sector grid and on the internal organisation of the sectors; i.e. besides the major elements of the city plan which have been discussed earlier. In its interpretation of the two ideas discussed above, it borrows freely from both New Delhi and Chandigarh. The areas used as public gardens are really 'gardens' in the English sense. The park along the river bank is a vast area, but fenced in, thickly wooded in parts with a deer park, playground, picnic area etc. i.e. places created purely for the enjoyment of nature. There are also a few smaller public gardens within the city which as usual are also enclosed and devoted to the cultivation of flowers, lawns and trees purely for 'enjoyment'. Most other areas of the city particularly the area surrounding the government center and some of the housing sectors have more of the aspect of the 'city in the park' with vast flat open areas between buildings interspersed with a stadium or football field or swimming pool.

In its organisation of housing Gandhinagar has adopted categorisation by income level (similar to New Delhi and Chandigarh), and a similar heirarchic ordering of sectors. Though the planners claim to have taken the 'pol' (traditional neighbourhood) as the source of inspiration for the internal organization - physical and social - of the sector any similarity is very hard to find.

Efforts like setting aside an area for small workshops or allowing for residences above the shop space - which do represent a recognition of the needs specific to the local economic conditions and culture - are not really significant without a similar concern being visible at all levels through a synthesis of specific values and general principles. Critics of Le Corbusier's work at Chandigarh usually focus on 'measurables' like how the building responds to the climate, level of technological development and the
provision of roads, or the methods and materials of building. The planners of Gandhinagar have not ignored these points of view. The sector size is smaller, they have made the effort to plant a lot of trees, housing is oriented to the wind direction, etc. but there is still the same feeling of incongruence that persists in Chandigarh even today. I feel, that these somewhat random and piecemeal efforts at improving upon an earlier model are inadequate because they lack a deeper understanding of the 'immeasurables' i.e. the values specific to a culture that are visible in the way a society organises itself and its understanding and use of space.
1. Plan of Gandhinagar indicating development that has already taken place (shaded areas) and areas yet to be developed.

2. Plan of the walled city of Ahmedabad.

3. Plan of the walled city of Ahmedabad superimposed on the Gandhinagar plan at the same scale. The walled city consisting of 500 'pols' occupies an area equivalent to nine 'sectors'. 
3.0 The Neighbourhood Unit:

Having seen the development of Gandhinagar in relation to its historical and political situation, and compared its development and final outcome with that of New Delhi and Chandigarh, we had concluded the previous chapter with a few observations and insights:

a) Many of the ideas and planning strategies used in Gandhinagar have clearly been derived from Le Corbusier's plan for Chandigarh.

b) It has been established that though New Delhi and Chandigarh seem diametrically opposed in the approaches taken, this is really not the case - there are some very fundamental similarities. Where they differ is in their understanding of outdoor space and community. The similarities in all these cities are also obvious in the fact that they have been criticised for similar failures.

c) The efforts made in incorporating lessons learnt from the traditional settlements are merely token gestures and highly inadequate.

My contention is that though most of these ideas, which came to be accepted as norms for city planning, were valuable in themselves, they 'failed' because they were adopted in a rather superficial and literal manner in a context very different from the one that they originated in. What is lacking, particularly in Chandigarh and Gandhinagar, (New Delhi had a very different purpose) is an effort to integrate within the design process a study of traditional urban patterns which we value or find well suited to the climate and culture or see as having a sense of 'fit'.

In this chapter I will try to substantiate this idea by:

a) taking a look at the traditional neighbourhood within the walled city of Ahmedabad, that being closest geographically, climatically and culturally to Gandhinagar,

b) isolating certain qualities in the built environment that are an expression of the values of the local culture and establishing the manner in which the understanding of these differs within the traditional framework and outside it,

c) looking for expressions of these same issues within a typical neighbourhood in Gandhinagar, evaluating them and suggesting changes where necessary which could direct development in the sectors which have not been developed so far.

3.1 The Traditional Neighbourhood:

3.11 Physical Structure:

The word 'pol' refers to the traditional neighbourhood unit within the cities of Gujarat which was
4. Plan of a typical 'Pol' illustrating the configuration of the streets and the boundaries of the neighbourhood.

5. Floor plans and section of a typical pol house showing the internal organization of spaces with respect to the street and the central courtyard. a) street, p) plinth or verandah, t) toilet, b) bath, c) courtyard, k) kitchen, g) store room, r) room.


3. See also, Christopher Alexander, A Pattern Language, New York, Oxford University Press, 1977. Similar ideas in his patterns: Terrace overlooking the street, Common areas at the heart, etc.
organised on the basis of guilds or kinship patterns. It also signifies size and complexity to some extent. A single street with its cluster of houses or a cul-de-sac would usually be referred to as 'khancho', or 'khadki' or 'gali'. A pol on the other hand might have a number of such streets branching off from it and contained within the neighbourhood. As a 'type' the pol has evolved indigenously (most villages have a similar form of organisation) but was also influenced by the image of the neighbourhood that the mughal invaders brought with them. "...the tone of the city was as much Hindu as Muslim. Perhaps it is not without significance that the most famous motif of Ahmedabad's architecture is the banyan tree strangling the palm."  

The pol is a completely introverted structure usually consisting of one major street with gates at the points where it opens to the outside. These gateways are covered over by a small apartment or some rooms of the house immediately adjoining them. The central street is usually the only thoroughfare through the neighbourhood. There are no internal connections between pols (except across terraces and rooftops) even though the two might share a common wall. Smaller lanes which open off this street are usually narrow cul-de-sacs with houses opening directly off them on either side, or sometimes with one row of houses facing the backs of the other. The concept of a 'back alley' (for collecting garbage etc.) does not exist.

The buildings seem to form a continuous dense fabric out of which the streets are carved. The facades of the houses rising three to four storeys high form a continuous but infinitely varying wall on either side of the street creating an outdoor 'room' which is really the focus of life in the pol. A widening in the street acts as the playground, meeting place, and public forum for the neighbourhood, and is often connected with a temple or a small school. Each house focuses onto a central courtyard and has a single exit to and entry from the street. All exchanges have to take place through the front door. The pol house is rather 'transparent' in the sense that openings within the inner walls and outer walls always line up (it is considered inauspicious if they are staggered). This increases the sense of always being in contact with yet removed from the street.

The plinths of the houses stepping up directly from the street to a height of four to five feet form a front porch or verandah. The verandah acts as an extension of the street space and the public area of the house where most of the interaction takes place. (This also adds width to the street at the lower level). Another element which adds greatly to the life in the street (but which also, unfortunately, contributes to the visitor's impression of 'congestion'), is a small washing place outside each house on the street. Since piped water supply and drainage came a few centuries after most of these neighbourhoods developed, many houses have their bathrooms and toilets to one side of the entrance - right off the
6. Views within the pol: a) looking down the major street b) an open space within a cluster, c) an ornamental facade, d) verandah and the entrance from the street, e) the inner courtyard.

4. See, Anthony King, Colonial Urban Development, Chapter 6: Residential Space. The Bungalow-Compound complex as a study in the cultural use of space.

5. The debate on the planning of neighbourhoods or even cities very often revolves around the virtues of the straight street versus the curved street or the labyrinthine layout of the organic city versus the geometric grid.
street- and a place for washing clothes, utensils etc. These wash areas have more or less replaced the
village well where the women used to meet a couple of times a day. The enclosed courtyard house is
better suited to the climate of the region than the free-standing unit, which is a development from British
ideas of health and hygiene4. The paved, open-to-sky courtyard functions as the principal room of the
house and also acts as a ventilating and cooling system. The courtyard usually had a cistern below it
which was used for collecting and storing clean rain water from the roof - this was the source of drinking
water for the household. The cistern below would cool the floor of the courtyard trapping a layer of cool
air at the bottom of the shaft. The internal courtyard also permits the clustering of the houses wall to
wall giving the street a unique character.

The sense of enclosure and privacy within the pol is heightened by the presence of the gates, (though
they are rarely closed today - only in the event of communal riots or disturbances) and the overhanging
eaves of the houses which almost seem to meet overhead. The street becomes an extension of the house.
This quality of the pol and the knowledge that almost all the residents belong to the same community
and are often related, contributes to a strong sense of security and allows for a great deal of
interdependence between households.

At its edges the pol opens out to the city with shops that face outward on the first floor and living areas
that face inward. For the pol dweller even today, access to his place of work and to public services and
amenities is never a problem. Though bicycles, scooters, and mopeds are the most popular form of
private transport, the majority of the population walks to work or uses public transportation. The degree
of accessibility, - to work, shops, entertainment - is in fact one of the reasons why a portion of the
middle class suii prefers to live in the pols in the city center rather than move out to some of the new
developments on the periphery.

In summing up our observations on the physical structure we might say that:

a) The 'pol' is not the cluster of buildings, but the voids between them. In fact one does not get a sense
of 'building' at all - only of facade and courtyard. The walls around the courtyard and the facade are also
the most ornamented surfaces; - the rest is usually bare.

b) The emphasis is definitely on the outside space and all the elements of the house contribute to this
outdoor living. i.e. verandas, terraces to sleep out on, windows on the upper storeys that extend almost
to the floor - so one can look out when seated on the floor.

c) It is not the configuration of the street that gives it its special quality but the sense of enclosure 5 (no
infinite 'views' or 'vistas'), the quality of light (never harsh except when the sun is directly overhead), the
silence visual and audible and the sense of privacy7. The often intricately carved wood facades give a fine


10. The reasons for this are explained at some length in section 3.13 of this chapter; the predominant ones being the outward migration of the rich, the rent control act, and the land ceiling act. See also, Anjana Desai et. al., *Pre-Industrial elements in the Industrial city of Ahmedabad*, Ekistics 295, July-August 1982.
texture to and soften the enclosing walls which would otherwise seem oppressive.

d) The compact neighbourhood form, north-south orientation, deep narrow streets, and courtyard house are forms eminently suited to the local climate which is hot and dry for most of the year and hot and damp during the monsoon. Winters are dry, and can get extremely cold, but for the most part are mild.

e) There is a complete absence of playing fields, parks and gardens, which, in the aftermath of the industrial revolution we have come to look upon as absolutely essential to the 'healthy' (good) environment. This is not due to a disregard for health, but because 'field' sports are essentially a foreign concept. The emphasis was on individual sports like gymnastics, wrestling etc. which did not require large grounds or specialised equipment. "Ahmedabad was to see reproduced the quarrels between improvers and conservatives, a reforming party and a muck party - that had occurred in England several decades before." 6

3.12 Social Structure:

Ahmedabad, historically, has been a city based on trade. It had little religious significance and did not turn to large scale manufacturing until 1861 when the first textile mill was established. Not unlike the cities of medieval Europe, Ahmedabad was controlled financially by guilds of merchants and craftsmen - a strong hereditary plutocracy - though it was not administratively independent. "It is said that Ahmedabad used to hang on three threads: gold, silk and cotton..." 7 The pol or residential neighbourhood within the city was also based on this structure of guilds. "The guild could embrace members of several castes and a caste members of several guilds; in some cases they were co-terminous." 8

Within the pol there was no visible segregation based on economic status 9 - eligibility to get a house in the pol depended on membership of the caste or guild. Typically the family residing in the pol house would be an extended family which had probably occupied the property for several generations. (This is true in many cases even today). In recent times however, the richer families have moved out to modern developments on the fringes of the city and have either sold off the houses or retained them within the family by leasing them to relatives who wished to (or were forced to) stay on. The economic structure of the pol has gradually been transformed into a predominantly lower-middle-income group, from one which was fairly balanced in terms of rich and poor 10. It was in this manner that each community provided for its underprivileged families. The provision of public housing arose as a distinct problem only with increasing industrialisation and migration from the villages. With the movement of affluent families and each new generation out of the walled city, many of the pols have not been able to preserve their homogenous character and have had to open up to people from other communities, castes, and religions. There is no denying the fact that the quality of life in the pols has degenerated considerably in the last

12. See, Kenneth Gillion *Ahmedabad*. "The foreign rulers had to contend with differences in values and customs which compounded the usual ignorance prejudice and self interest which urban-improvers have to face. In England the reformers were usually right, they worked within English society and they understood it. But in India...their nostrums were not always appropriate to the cultural patterns into which they would have to be fitted."

several years, and that though the system survived through centuries of change, we cannot really claim that it is still a viable system of urban housing today.

However, we can enumerate certain distinct advantages that the pol as a 'community' offered:

a) A sense of security which comes of 'belonging' to the community and sharing the same values. "The pols provided privacy to a group and warm or oppressive cosiness to an individual impossible in a modern city."¹¹

b) Interdependence between families which lessened the pressure on the nuclear family.

c) A place for all classes within the structure and knowing that common needs will be taken care of i.e. each section of the community (rich or poor) depended on another for some of its needs.

d) At a time when the government did not undertake any efforts in town planning or improvement of civic amenities, the non-formalised 'government' of the pol council raised the necessary funds, put issues to the vote, and executed community projects.

A society based on co-operative living as idealised by Ebenezer Howard and Le Corbusier was not an idea foreign to Indian conditions -it had existed for centuries. But, the modern city sector based on Le Corbusier's recommendations is a far cry from the pol.

3.13 Mechanisms of control:

Until the initiation of urban improvement schemes in 1817 (under the British)¹² civic issues were taken care of locally by the pol-council. The pol-council consisted of the heads of the guild and the elders of the community (it was not an elected body). The council, through various measures, controlled admission to the pol, raised funds through taxation, repaired existing facilities and provided for new ones, and laid down the responsibilities and privilages of pol members and saw to it that they were observed. "It is true that they could act as a brake upon innovation and improvement .........but in the traditional situation their advantages were more obvious."¹³

Private property within the pol was, in a sense, looked upon as belonging to the community. Eligibility to buy or rent property in the pol depended primarily on the person belonging or not belonging to the same religion/estate/guild. As a member of the pol, it was the responsibility of the person selling or leasing the property to get the prior approval of the council on his choice of buyer or tenant. The council levied various taxes which also served as devices for controlling the membership of the pol. New members had to pay an entrance tax, the amount of which was twice as much for persons who were not of the same community. An annual membership fee was also charged, though, residents or tenants who

did not belong to the community were most often denied the privileges of membership altogether. In the event of the sale of a house, the council had the right to claim from 1/2 to 2% of the proceeds from the sale. Persons who had previously belonged to the pol and wanted to return, were always charged a lower entrance fee or none at all (many families that moved out of the pols preferred to retain their properties and thus the membership of the community). No tax was charged for moving within the pol\textsuperscript{14}.

Though these rules were not legally enforced, a person refusing to comply with them was faced with social boycott. He would be refused access to any of the community facilities (like the well etc.), would not be allowed to light a lamp in his house, would not be invited to community events and no one would assist him in case of a crisis in the family. Being a member also meant taking on certain responsibilities. For example, in case of a death in any family, each household was expected to be represented at the funeral by at least one male member of the household, or in the event of a wedding the family was expected to invite the entire community to dinner. "(The Pol council)......established and successfully maintained various public utilities and a well regulated system of reciprocity bearing on significant events like death, marriage, and such other occasions when one needs the help of the members of the community."\textsuperscript{15}

From the above it is obvious that:

a) Great emphasis was placed on preserving the homogeneity of the community, and persons of the same caste or guild were favoured in all respects.

b) Ownership of houses was encouraged as compared to tenancy. It was the owner who retained the membership of the community and could make use of the privileges. No tax was levied if the owner chose to return to the pol.

c) The interests of the community superceded the interests of the individual - for instance in the selling of a house. In fact, this also prevented speculative buying and investment in property and helped maintain prices at a reasonable level.

d) Codes of behaviour and responsibilities were enforced from within the pol through social pressure and not by an external agency or a court of law.

e) Profits from any transaction involving pol property (or private property within the pol) were ploughed back into repairs or provision of new facilities for the community.

With the city becoming more and more industrialised, the pols too had to respond in some manner to the pressures of migration. They responded in one of two ways: a) they relaxed controls on membership etc. or b) they remained rigid as far as controls were concerned, but increased the amenities and privileges for the community. In the pols where immigration was welcomed "...traditional informality and ready

17. There have been two external factors also that have influenced the later evolution of the poks:

   1) The Rent Control Act of 1940, which froze all rents prevailing at the time. This act was aimed at preventing the exploitation of the tenant by the owner, but, in effect it made any rented property practically irrecoverable for the owner. It was for this reason that tenants within the poks found it advantageous to stay on while owners who moved out preferred to retain their property unoccupied rather than lease it to someone else.

   2) The Urban Land Ceiling act of 1976 was aimed at preventing the concentration of the ownership of land and curbing speculation, and gave local governments the right to acquire surplus land for public projects. The act suffered greatly in its implementation. It virtually brought all land transactions to a stand still, an artificial shortage of land was created and prices shot upward, making it practically impossible for any middle class family from the old city to move out and buy property in the newer areas.

co-operation have been diminished." [whereas, in the poles which did not relax their rules] ...the traditional norms could be sustained in these poles, and their homogenous structure in turn provided strength to the rules......"16

The physical structure of the poles, its social structure and the mechanisms of control used to preserve these, have enabled the poles to survive as vital urban residential neighbourhoods through centuries of change.17 As mentioned earlier, the new co-operative housing societies that developed on the west side of the river after the first bridge was constructed, (and later versions of these), were also based on community or religious groups and administered in a similar manner. Only, the physical form of the neighbourhood changed with the adoption of the free standing 'bungalow' within a compound - but the internal courtyard remained. Very soon the courtyard disappeared altogether, and blocks of 'flats' were seen as the answer to making economic use of the land and still having plenty of air and sunshine and wide open green.

3.2 Analysis: Values in the Traditional Environment.

"The fundamental good is the continuous development of the individual or the small group and their culture......If development is the process of becoming more competent and more richly connected, then an increasing sense of connection to one's environment in space and time is one aspect of growth. So, that settlement is good which enhances the continuity of a culture and the survival of its people, increases a sense of connection in space and time and permits or spurs individual growth......."18

The intention here is to re-cognise certain values in the built environment which are part of our cultural constructs, and the assumptions made are:

a) these values are manifest in the development of the 'pols',

b) the importance of these values has been unconsciously diminished and a new set of borrowed values superimposed on them which are taken to be superior or more desirable or more progressive,

c) the kind of urban development that has taken place based on these borrowed values appears lacking in many respects.

The 'pols' are taken as the model of urban development based on traditional values.

Christopher Alexander's 'A Pattern Language' is an example of an effort made to identify those qualities in the human environment which are 'timeless', in that they appeal to something fundamental in all of us, and in trying to rationalize why this is so. Though the objection most often raised is, that it is too dogmatic, I feel that it has at least filled one of the gaps between how we as designers react with our
19. This organization appears to neglect some obvious issues which are usually considered crucial to any discussion of urban form, e.g. density, circulation, etc. These are of course important, but usually evolve out of one or all of the three issues to be discussed in this section. For example, density as a pre-determined number is somewhat meaningless since it really depends on the size of the neighbourhood (dependant on the technological and economic assumptions we make), the form of the building units the manner in which they can be grouped, and the organization of outdoor space. The Argument of density being based on the 'carrying capacity' of infrastructure and services is not really applicable in the case of a city being designed anew.

20. The word 'barsati' which is used for the top-most room of the house, comes from the word 'barsat' meaning rain. It's simplest form is an open pavillion on the terrace for enjoying the rain.
senses and with our minds. It is an additional tool that we can now learn to use. I do not intend to create another 'pattern language' of the pols. What I want to focus on are three major areas in which, I feel the emphasis in contemporary works is entirely misplaced and which are basic to the organisation of a neighbourhood in a city like Gandhinagar today:

a) The relation of built form and climate. The difference between the notion of protection from the elements and the concept of working with the climate (as in the traditional neighbourhood).

b) The notion of outdoor space. The difference between outdoor space seen as a garden or park or playground and outdoor space as an extension of the house.

c) Community relationships. The difference between the image of the nuclear family in affluent societies and the nuclear family in the Indian urban middle class - its dependence on the neighbourhood community.

3.21 The Relation of Built Form and Climate:

Few would argue with the fact that the traditional courtyard house and the neighbourhood form that evolved from it are very well adapted to the climate of the region, i.e. they seem to work in perfect harmony with the climate. This idea of using the climate to one's advantage is very different from the notion of 'protection' against the elements. The courtyard in the pol house (deep in section, and widest at first floor level with the upper floors projecting slightly into the courtyard) serves to moderate the micro-climate and sets up cross currents of air that ventilate and cool the rooms surrounding it. The cistern of water below the floor of the courtyard aids this process by cooling the layer of air closest to the ground. The verandahs around the courtyard and to the front of the house allow doors and windows to be kept open even when it rains and provide enjoyable living areas which are shaded and cool in summer, covered but not enclosed for the monsoon and can catch some sun in winter. The main street of the pol is deep and narrow, oriented north-south and functions in very much the same manner as the courtyard in moderating the micro-climate. Though the facades of the houses catch the sun at different times of the day, the street itself gets the direct rays of the sun for only two to three hours a day keeping it cool and pleasant for the most part. The deep narrow and sometimes winding street also acts as a funnel for the wind.

The building materials used are mainly brick and wood (both 'soft' materials) and stone for the flooring - these are good insulators and do not radiate heat like concrete. During the monsoons, after the first rain when the rain water was allowed to run off and wash everything clean, the water was collected and stored in the cistern underground - a year's supply of drinking water. Certain elements of the pol house, like the roof eaves, the channels carrying water from the roof, the courtyard floor, etc. were formed and patterned
21. See, Anthony King, *Colonial Urban Development*, p. 111. "The immediate neighbourhoods of large cities, specially in the leeward direction are not satisfactory localities for our troops. The sanitary conditions of all Indian towns cannot be described as less than vile."

22. See, Andreas Voelwesen, *Living Architecture: Islamic Indian*.
to accentuate the sound and visual effect of water - flowing, dripping, standing still. It is necessary to realise that we must work with the climate in a situation where most of the housing being developed is for the middle and lower income groups (the majority of the population), who cannot afford to artificially condition their living environments. (At a very general level this is also true for a society which is becoming increasingly aware of the need to conserve energy).

During the eighteenth and early nineteenth centuries, neighbourhoods like the pols were severely criticized by the British for their lack of 'fresh air' and sunlight and the image of the house in the country surrounded by greenery was popularised in the layout of the cantonments and civil lines. This foible of dense neighbourhoods and enclosed space was based on the belief that the source of common diseases like malaria (literally impure air) was to be found in odorous environments, exhaled air etc.\(^{21}\). Today, with a sounder (less biased) knowledge of medicine and the means for providing good drainage, water supply, garbage disposal etc. we might stop and consider once again the relative advantages and disadvantages of the traditional neighbourhood form. It is interesting to see how each element of the pol house always performed more than just its primary function and worked in concert with the whole environment. It is this complexity of function and use that seems lacking in the 'designed' developments when compared to the traditional neighbourhood. To enumerate some of the characteristics of the 'climatically adapted' form of the traditional neighbourhood:

a) A skilful use of spaces with varying degrees of enclosure and openness to suit different seasons and times of day.

b) The use of architectural devices and natural elements to moderate the micro-climate.

c) The use of pockets of shadow and sunlight causing the movement of cool air through enclosed spaces.

d) The use of 'soft' building materials and minimal exposure to the sun, wind, and rain.

e) Conserving and optimising scarce resources in the environment - earlier it was fresh water, today it should be energy (solar heaters?).

3.22 The Importance and Use of Outdoor Space:

As has been mentioned before the emphasis in the pol house and its neighbourhood was on the outdoor space and not on the enclosed areas within the house. The reasons for this are not merely climatic. The explanation, I feel, lies in the fundamental difference between the notion of outdoor space in the traditional neighbourhood and that which was introduced by the British and later popularised in schools of design. Outdoor space at the level of the neighbourhood traditionally, was an extension of the living areas of the house. It was not a garden or a field or a park. Andreas Volwahsen draws attention to the fact that horticulture was not practiced in India at all prior to the Muslim invasion.\(^ {22}\) Trees and plants were
7. Detail from a Mughal miniature painting showing Babur the first Mughal emperor supervising the building of the Bagh-e-wafa (garden of fidelity).

8. Page from a late nineteenth century document dealing with issues of health in the military barracks which illustrates clearly the preoccupation at the time with the quality of the air and environment.


24. See, Ebenezer Howard, Garden Cities of Tomorrow.

25. See, Le Corbusier, Radiant City.
cultivated for worship or medicinal purposes. The Mughal garden, even where built by the ruler for the public, was a large walled-in complex with clearly demarcated boundaries, a geometric layout and a complex system of irrigation. It was not a part of the residential neighbourhood, but was either close to the palace, or a mosque, or a tomb etc.

The English garden on the other hand is “nature” in all its untamed glory surrounding the structured, ordered, enclosed space\textsuperscript{23}. The bungalow (a type more suited to the hot-humid climate of east India) always sat in the middle of a garden surrounded by a compound wall. Nineteenth century social reformers like Ebenezer Howard emphasised the need for a small garden for every family for a cleaner, healthier environment and saw virtue in each man being able to ‘work’ his own land\textsuperscript{24}. Later still, Le Corbusier saw in an industrial society with increasing hours of leisure, the need to provide for sports and recreational facilities within easy reach of residential areas. (He too shows a similar concern as Howard, for health and a ‘sanitary’ environment). He placed his residential towers on pilotis in the midst of uninterrupted stretches of green with stadiums, swimming pools and sports grounds in between\textsuperscript{25}.

Urban reform in Indian cities in the eighteenth century, under the British government, was aimed at mitigating the “unhealthy” conditions of living in the pols, and new development, invariably, was in the form of solid built units surrounded by open space for “adequate” light and ventilation.

The court yard the street and other outside spaces within the pol are much more important to the daily life of the inhabitants than the gardens and green spaces of Howard and Le Corbusier ever were. They are not just areas for recreation, but are the real living areas of the house and the neighbourhood. The court yard is where the family meets, where guests are entertained, where the cooking is often done, and where the family has its meals. The front verandah and the street are places for socialising, holding meetings, transacting business, and the place where the housewife does most of her chores. The rest of the rooms of the house are used either for storage (grain is stored for the whole year, even today) or as bed rooms, - even for this, people prefer to sleep out on the terrace for the four to five months of summer. Notions of privacy are very different from those of the western world. The walls overlooking the courtyard and the street are in most cases beautifully embellished with carved wooden brackets and columns, whereas the surfaces inside are almost spartan in their simplicity. There is no attempt to play with volumes and textures internally.(This may be due in part to the building materials and technology used).

Having made the distinction between the traditional notion of outdoor space and that which has come to be accepted as the norm, we might briefly enumerate some of the characteristics of open areas in the traditional neighbourhood:
a) A sense of enclosure instead of an emphasis on views and vistas.

b) Clearly demarcated boundaries and controlled points of access. This along with the size of the neighbourhood, contributes to the 'imageability' of a place.

c) It is the focus, physically as well as visually, of the surrounding areas.

d) Transition spaces with varying degrees of enclosure and openness.

e) The capacity to accommodate an overlap of different kinds of activity at different times of the day.

3.23 Community relationships:

Modern housing, both public and private, in the urban areas is designed for the nuclear family. The same is also taken as the basic unit for the organisation of the neighbourhood, but most of the assumptions made about how the neighbourhood will function (or should), are based on extremely generalized criteria which are supposedly true for any urban society today - generalized to the extent that we lose sight of the particulars which I feel are more important. Typically the pol house was inhabited by an extended family, i.e. the head of the household, his sons and their wives and children. (It was not unusual for a number of families within the same pol to be related). This system had the undeniable advantages (i.e. besides the obvious economic advantages of shared expenses etc.) of community living where responsibilities were shared, there was a division of labor, the very old and the very young were taken care of, and pressures on the nuclear family were minimal.

In the urban areas, the extended family has gradually broken down (however, it is still not quite the typical nuclear family, but often includes the grandparents or unmarried siblings). With this breaking down however, the simultaneous development of an external support structure (as in most developed countries) has not taken place. Where certain facilities have been developed, they are outside the reach of the average middle class family. For example, taking the case of day-care centers: they are either available to the very poor (run by social service organisations or similar bodies) or to the rich who can afford privately run centers. Social expectations and codes of behaviour have not changed with the change in family structure, and the strain of conforming to these is felt mainly by the middle class too. In such a situation, relationships between neighbours and within the neighbourhood community become very important. The community or neighbourhood, in many ways, takes on the supporting role of the extended family. The fact that a number of co-operative housing societies which have been privately developed in the newer areas of Ahmedabad, are organised on the lines of community or religion or regional origin, testifies to the need or preference for belonging to such a community. To enumerate some of the characteristics of the community:

a) The inhabitants come together on the basis of certain shared values. Even in today's neighbourhoods
27. Kevin Lynch's *A Theory of Good City Form*, Christopher Alexander's *A City is Not A Tree*, David Crane's *Chandigarh Revisited* are some examples of this attitude.

28. see, Kevin Lynch, A Theory of Good City Form. "The grain of a mix is fine when like elements or small clusters of them are are widely dispersed among unlike elements, and coarse when extensive areas of one thing are separated from extensive areas of another thing......grain is critical to the goodness of a place."

29. Namely the attitude to 1) Open Space and the relationship of the built form to the climate, and 2) Community structure.
organised on the basis of income levels, the underlying assumption is the same - that persons of the same economic stratum share the same values - only their coming together is largely involuntary.

b) There is a degree of interdependence between residents.

c) The community has a certain amount of autonomy and issues concerning the neighbourhood are settled jointly.

d) The community has some form of leadership (either a council or committee or some such body) which keeps the residents informed, settles petty disputes, etc.

e) Residents are answerable to the community for private decisions which might affect the neighbourhood.

An analysis of this nature, while it does lead to a deeper understanding of the complexity of traditional structures - whether a house or neighbourhood or city - that have developed over time, simultaneously negates the effort by trying to break this complexity down into a structured form in the hope that it will lead us to a 'formula' for the 'design' of structures that 'work'. That the problem lies in trying to 'design' at one stroke structures that would otherwise have grown gradually over the years is a fact that has long been recognised by theorists. But if we must continue to design, what we achieve through a study such as this is adding a set of 'local variables' to the set of 'global variables' that we usually incorporate in our designs as a matter of course. It is at least one step towards making the texture of our cities and settlements less 'coarse'.

3.3 Modern Neighbourhood: Restructuring the Gandhinagar Sector.

Through the discussion in the preceding chapters, we have built up a picture of the predominant influences on the planning of cities in modern India, - taking the case of Gandhinagar - and isolated certain key issues which appear, always, to remain unresolved due to the conflicting and often entirely misplaced values that such planning decisions represent. The discussion in this section is limited to the neighbourhood or sector, but it is pertinent to the entire 'designed' city, since it deals with approaches and not specific solutions.

What we have arrived at, are three differing 'images' of the neighbourhood or residential unit, represented by, Lutyens and New Delhi, Le Corbusier and Chandigarh, and the traditional neighbourhood - the 'Pol'. The differences between these seem most pronounced in: a) their attitude to outdoor space - which in part is determined by their attitude to the relationship of the built form to the climate; and b) the community structure that they assume. As mentioned earlier, though Gandhinagar comes several decades after New Delhi and Chandigarh, it seems to have made many of the same mistakes that those two cities
have been criticized for. And this, in my opinion, is largely due to the fact that while it accepted a number of ideas - rooted in a foreign culture - that were tried out in these two cities, it failed to modify these with ideas derived from the local traditional urban structures that have evolved in response to specific needs. In this section, I will take a closer look at a typical residential neighbourhood in Gandhinagar, and working within the frame work of what exists, try and explore some of the ways in which this environment might be modified to achieve a better sense of 'fit' within its climatic and cultural context.

We have to assume at the outset that:

a) neighbourhoods are desirable in a city today. "...the notion of neighbourhood planning is being promoted....for a number of reasons....all of them compatible with each other, but cited independently. These include the need for a "locality" and identification with a locality, the need for cultural identity and a homogenous milieu, quality of life, preference for small scale settlements, preservation and conservation of the architectural and settlement heritage, the need for walking opportunities for health and educational reasons, the energy shortage, the need for reduction of car use for everyday goods and services, congestion and threatening conditions in central areas, the need for access and participation in everyday life of various categories of people seldom considered in planning before, such as the disabled, children, and the old...."30

and b) that in India, despite rapid urbanisation, social organisation in terms of religion, caste, language, family is not changing very rapidly.

3.31 Outdoor Space:

Looking back at the description of the Gandhinagar sector in section 2.214, and at the plan, the impression one gets is of "buildings within the landscape." The issues, as far as the nature of outdoor space is concerned, seem to be those of: 1) scale 2) definition 3) enclosure and 4) the function they perform. Since all of these are interrelated and would lead to a lot of repetition if treated separately, I will discuss each issue as it comes up within a specific solution that is proposed.

In proceeding to analyse the nature of outdoor space in the Gandhinagar sector, we might begin by looking at the scale of this neighbourhood as compared with the other examples we have studied and with some 'ideals' that might exist. The Gandhinagar sector covers an area of one kilometer by three fourths of a kilometer, and "...will accommodate, on an average, a residential community of about 7000 to 17000 persons, with the necessary facilities like schools, shopping, playgrounds, parks etc. The notion of neighbourhood as it has come to be understood by architects and planners, implies a certain amount of
9. The Gandhinagar sector as it exists today, diagrammatically represented.

10. The sector seen as composed of four to five neighbourhoods with the common facilities forming the seams in between.

11. A possible arrangement of housing units adopting a system of courtyard houses and party wall construction.

12. View of the shopping area within the sector.

31. A neighbourhood it is assumed must have its own primary school, clinic, day-care, and shopping center.

32. Ref. footnote no.57 in chapter 2.0 of this study.

33. Le Corbusier, City of Tomorrow, p. 174.

34. See, Christopher Alexander, A Pattern Language.


self-sufficiency with regard to services and public facilities, and forms an independent physical unit with a definite boundary. While most pro-neighbourhood theorists seem to agree on the fact that beside the individual's need to identify with a social group and a locality, the purpose of the neighbourhood is to provide greater accessibility to public facilities and services, there does not appear to be any consensus on what the size of such a unit should be in terms of area or population.

Though the idea of neighbourhoods has usually been associated with suburban development or 'New Towns', it does appear in Le Corbusier's early urban schemes like La Ville Radieuse - a grid of elevated motorways 400m by 400m. The residential units however, transcend the grid forming a continuous belt of highrise apartments zigzagging across open parkland. Within the 400mX400m block and between the buildings are the tennis courts, swimming pools, playing fields, etc. The Chandigarh sector owes more to the superblock designed by Albert Mayer with Clarence Stein and Mathew Nowicki than it does to the block of La Ville Radieuse. The superblock developed by Le Corbusier for Bogota however, does bear a greater resemblance to the Chandigarh sector in size, concentration of services and internal green spaces. The sector, in Chandigarh, developed on the basis of the golden section and the speed and mode of travel, covers an area of 960,000 sq. yds. with a population ranging from 5,000 to 20,000. "The magnification of the site unit is in proportion to the evolution that has taken place and to the means at our disposal".

In comparison with this, the Pol, covers on an average, an area of 13,000 sq. yds. with a population of 900 to 1000 persons, while Christopher Alexander's "Identifiable Neighbourhood" is restricted to an area of 90,000 sq. yds. and a population of 500, based on anthropological and behavioural studies. Another solution yet is presented by the work of Caminos and Goebel who do not see it so much as a problem of absolute numbers as an index of interrelated factors i.e. the percentages of public, semi-public, semi-private, and private space, the ratio of length of service lines to the area they serve, the gross density and the net density. The Gandhinagar sector, (750,000 sq. yds. with a population of 7000 to 17000) while it claims to "have a basic and fundamental resemblance with the community structure presented by the poles...." obviously goes by Le Corbusier's recommendations of scale. The attempts of the planners at trying to reconcile these two obviously distant images of "neighbourhood" are apparent in the insignificant reduction in the size of the sector while keeping the population practically the same. The size of the sector - 1km X 3/4km - is neither justified by its internal requirements of pedestrian movement (if similar to the poles), nor by its external requirements for motorised traffic (if seen from Le Corbusier's point of view). "Most perplexing of all is its [Chandigarh's] hierarchy of roadways with V1's and V2's intersecting every half mile or so. By 1950, anyone who had ever driven a car knew that wouldn't make for speedy traffic. (But perhaps in Paris Le
13. The pattern formed by private housing developments along the periphery of each sector.

14. Changes that might be made at the edges of a sector.

15. Government housing blocks visible from the main road on the periphery of the sector, Gandhinagar. The vacant land in the foreground is for private development.

16. Plan and sections of a 'Tube House' developed by Charles Correa as a prototype for a low-income housing scheme sponsored by the Housing and Urban Development Authority.


40. Ref. footnote no. 28 in this chapter.
Corbusier took Taxis?"

But what if we were to stop thinking of the Gandhinagar sector as 'a neighbourhood' and thought of it as five or six neighbourhoods? Does the change in terminology make a difference? Suddenly we are able to visualize a group of 150 to 200 units and each group, separated by the existing network of internal circulation, begins to take shape as a separate entity - a neighbourhood. The 'loop' distributes slow moving traffic within the sector and access to each neighbourhood from the loop is controlled. The schools, shops, workshops, cricket stadium etc. - which were concentrated at the heart of the sector - now form the seams acting as connectors between neighbourhoods very much in the manner in which the houses at the edges of the pol transform themselves. This kind of arrangement 'stretches out' the services making them more easily accessible to everyone. Residents at the edges of the sector might even prefer to use the facilities of the neighbouring sector. (In fact, studies conducted in Chandigarh show that residents rarely use schools within the same sector.)

"Social neighbourhoods - meaning places where people are acquainted by reason of living nearby each other - may normally be quite small....The service areas of most facilities will be much larger, and need not coincide as long as those facilities are easily accessible to every one. The physical unit, named and recognisable, to which people refer their location and their sense of place, can be different again." Looking at the sector as a group of neighbourhoods separated along the lines of internal movement, the rectangular sector unit itself seems to become a completely arbitrary subdivision of the city plan.

In the residential sectors that have been developed so far, government housing is concentrated within the loop, while the land on the fringes is allotted for private development. The pockets of private development at the corners of each sector appear to form another 'sector' around the point where four sectors come together. Looking at the city plan in this manner, we discover a secondary pattern overlapping the first, however, the huge empty stretches of 150ft. streets cutting across it, do not really allow this secondary sector to function as one. Without radical changes in the existing infrastructure, the edges and junctions of these streets could be modified to seem more 'friendly'. The layout of individual lots at present indicates houses at right angles to the main road. These could be changed to face the road, the road itself could be subdivided to provide two lanes at its edges for slow traffic, vendors, bicycles etc., with fast moving traffic in the middle, the trees could be moved onto the dividers effectively reducing the formidable width of the road, and the houses moved to the edge of the sector to allow for an internal courtyard. This would definitely allow for greater interaction at the edges and between sectors than exists at present. This overlap of patterns blurs the transition from one sector to the other and helps tie the whole city together to give it a "finer grain".

The housing units, at present, are free standing blocks, three storeys high. i.e. one pair of units with a stair-well in between, and three such pairs stacked one over the other, six units in all. The blocks are grouped along meandering pedestrian paths which usually run through them from one end to the other.

"The street pattern in the residential groups is as informal as is found in the pol free of fast traffic ....."41. Once again the allusion is to the pol while the image is definitely that of the "objects in space". It is a strange hybrid of the British 'New Towns' kind of public housing and Corbusian "towers in the green" - not unlike the residential development in Chandigarh. The housing in Chandigarh however, demonstrates an effort in trying to use the courtyard house and developing longer blocks of two storeyed housing - like the British walk-ups - which made for a more structured clustering. Jane Drew, one of the architects responsible for the housing at Chandigarh, in an article on British 'New Towns', speaks positively of some of the innovations at Peterlee New Town, Durham: "The lining of the roads has been reduced either by setting housing units at right angles to the pavement, staggering or facing them in different ways, .....The overall principle of fronts of houses facing the road has been abolished...Continuous housing has been countered not merely by introducing green-spaces at random within the housing area, but by dividing the area as a whole into distinctive housing communities separated from each other by substantial open spaces entirely free from building."42 These experiments at Peterlee present precisely the same strategies that, today, in Gandhinagar can only be seen as detrimental to the quality of the environment.

Though there is a precedent, the advantages of or reasons for the housing in Gandhinagar being the way it is, are not obvious. The report on Gandhinagar provides an explanation: "In order to achieve economy in development costs and facilitate maximum benefits from social integration, the residential units are planned in a compact form; consequently, larger open spaces and playgrounds are available and accessible to the people within walking distance."43 I doubt very much that it would make a considerable difference to the building cost if the same number of units were to be placed on the ground within the same total area. In fact, shared party walls, loadbearing construction and minimizing the use of concrete would serve to offset the additional cost of foundations. As far as "larger open spaces and playgrounds" are concerned, providing most of the housing at ground level would make the open space within the cluster more usable, better defined, and with a greater sense of enclosure (more secure for very small children); while larger playgrounds (for slightly older children) are already provided for in those attached to the schools, gymnasia, stadium, etc.

The question of the degree of enclosure and privacy that these common areas within the cluster should provide is debatable and varies with the culture, life-style and economic status of the residents. The strength of the traditional neighbourhood obviously lies in a strong sense of enclosure.
17. Five categories of government housing designed for Gandhinagar.

18. Views of the category 'C' type of housing.


Christopher Alexander on the other hand advocates: "Arrange houses to form very rough but identifiable clusters of 8 to 12 households around some common land and paths. Arrange the clusters so that anyone can walk through them without feeling like a trespasser." On the other hand one of the positive aspects of the poks, as I feel, that they do make you feel like a trespasser.

The housing units vary in total area and the number of rooms provided - from one category to the other - but the actual size of the rooms does not change significantly. Typically, the units are arranged in pairs on both sides of a central staircase and stacked-up to three storeys. Though one of the reasons behind this kind of arrangement is the obsession with sunlight and air that started with social reform in the late nineteenth century under the British; in reality, merely exposing the whole building to the elements does not really serve the purpose. Apart from trying to provide cross-ventilation within the units wherever possible, there is no real attempt at trying to work with the climate of the region or to learn from the local vernacular. This is one aspect in which the designers seem to have ignored the precedent of Chandigarh where climate was taken as the dominant factor in determining houseform. For, as Maxwell Fry put it, ",...There is no surer way to a suitable architecture and one that is in accord with the deepest realities of the country; for it is climate that dictates agriculture, moulds customs, and affects every religion." In Gandhinagar, the residential unit has been shorn of all those elements that in the traditional house worked to moderate the micro-climate, accommodated every use, and added variety and texture to the places within the unit and the neighbourhood. i.e. courtyards, verandahs, terraces, and overhangs. Redesigning the housing units around courtyards would - as mentioned earlier - allow a more concentrated grouping of houses around a common space or a street. The courtyard house also lends itself well to incremental growth over time. As an alternative to designing five to six categories of housing, (which differ only in the built-up area provided) one could consider providing for housing units which could grow by adding a room on the ground floor or another storey as the economic capacity of the residents increased. Such a change, of course, assumes a change in the policy of the government from renting housing to its employees to either selling or granting of long-term leases. This is not entirely infeasible, since, most state-government employees would rarely, if ever, be transferred to another city as all the government machinery is concentrated in Gandhinagar. Though mobility within the bureaucratic structure is slow, a change of this kind would rule out the necessity of the resident having to move out to a different kind of housing and a new neighbourhood if his income level rose above the ceiling level. This is one of the factors that could be used to reinforce the community structure of the neighbourhood. Variations on the courtyard house and how it might be adapted for self-help housing have been developed by several architects for competitions sponsored by the Housing and Urban Development Authority.

Thus, working within the constraints of the existing framework and of what has been constructed so far
46. See, Norma Evenson, Chandigarh, p. 45.

in Gandhinagar, certain changes made at the sector level could contribute a great deal to improving the neighbourhood unit physically. These changes relate to:

a) the scale of the neighbourhood in terms of area and population;
b) the location of facilities like shops, schools, religious buildings etc. and the treatment of the edges between neighbourhoods;
c) treatment of the boundary of the sector and blurring the 'grain' of the city;
d) the arrangement of housing units and clustering; and
e) the form of the housing units themselves.

3.32 Community Structure:

Regarding the structure of the community within the neighbourhood in Gandhinagar, we have seen earlier, that the housing is categorised by income level and a mix of two to three housing categories is attempted in each sector. Apart from their income level and nature of employment, the residents of the neighbourhood have very little else in common. Maintenance committees formed within the neighbourhood are subsidised by the government to maintain public amenities. Comparing this with what we have seen in the pols, the issues seem to be: 1) social homogeneity, 2) voluntary grouping as opposed to involuntary allocation of residence, 3) ownership or some stake in development, 4) autonomy or some degree of control.

Besides being a convenient unit of sub-division of the city for planners and architects, the term neighbourhood has come to denote a number of things: a healthy residential environment with a greater degree of interaction between residents than was possible in the industrial city, more or less self-sufficient in terms of the facilities available to its residents like schools, workshops, etc. a democratic structure through which decisions are taken jointly, and the local political unit.

Though the idea of the neighbourhood had developed in the 1920's, and was first formally defined by Clarence Perry - who took the primary school as the determining factor for scale and size and organized the residential units around it - it did not really come into widespread use until after the second world war, and was tied in with the need to reduce high residential densities, provide more open space, and decentralize the urban structure. "The widespread opinion that such principles originated in the Charter of Athens (1933) is inaccurate......The Charter merely codified principles developed by pioneers of modern planning in the twenties and among them were many persons without any relation to the CIAM group....." For these reasons it also came to be associated with a more socialistic political ideology and centralized planning. It [the concept of neighbourhoods] appears in such disparate places as the

49. Charles Correa, *View From Benares*, p. xi
massive new capital of Brazilia, the suburban New Town of Columbia Maryland, the political and economic organisation of the new China, and the Model Cities Program in the United States." Implicit in the creation of neighbourhoods is the ideal of the "small town", that, since most of the residents' needs will be met in the neighbourhood itself they will not need to move out too much and that with daily contact, a sense of community will gradually develop for mutual support.

But, in addition to all of the above, neighbourhood planning in India, in the twentieth century, had special implications:

a) The system of segregating housing by job status was a legacy of colonial rule which persisted in most of the cantonments and government centers even after independence.

b) India was struggling with social reform along with political changes and the 'evil' of the caste system was one of the uppermost issues. The caste system was tied in to a traditional occupational structure, but the modern city was already changing this with all the new kinds of jobs it offered and it seemed appropriate to reorganise society on a base other than that of caste or religion. Also, in an India that was just gaining independence after centuries of colonial rule, when "great leaps forward" were anticipated, anything less than a radically different approach from what was 'tradition' would have been downright regressive. With the exception of Chandigarh and Gandhinagar, most of the new towns that developed in keeping with the decentralisation policy of the government, in the two decades following independence, were industrial towns in which segregation of housing on the basis of job status became the norm. But these were single employer townships. In Chandigarh and Gandhinagar the idea was taken up to organise residential communities at the scale of the city. Despite the 'colonial' overtones of this method of residential planning, it was not seen as a symbol of oppression by either the planners or the decision makers in the government; (even in the case of Chandigarh which came so soon after independence.) "The 1950's must have been a very naive time and many of our planners took Chandigarh to be a portent of the future, with the result that scores of new towns were built in its likeness."49

The project for Gandhinagar was initiated in 1960, though work on the master plan did not really begin until 1967. By the end of the fifties, Europe and America were beginning to doubt the principles and goals that city planning had adopted during the phase of reconstruction after the second world war. There was a general feeling of discontent with the new towns which had promised a new way of life - a new society; attitudes to the city were changing and planners were criticized for an over-simplification, a one-sided understanding of city life; a tendency to think "in terms of linear and moncausal action without any understanding of side effects". In the planning profession itself, the need was felt to reassess its goals with the gradual realisation that "physical planning" alone would not work and what was needed was "comprehensive" planning. This meant, the input of various agencies in the process, a

widening of the scope of planning "...which undertook to influence not only spatial development but also the course of society and economy........Indeed the planner became a prisoner of the discovery that, in the city, everything affects everything else." But, India's faith in the "master-plan" remained. This can perhaps be explained by the fact that even in those countries where these 'upheav·ls' in planning theory were taking place, they were largely in academic circles and it was a few years before the effects were felt in practice; also the highly centralized planning machinery in India is probably better suited to the "master-plan" approach.

But, if Gandhinagar does suffer from this kind of one sided view of the city and an over-simplification of social life, - which is nowhere more apparent than in the organisation of its sectors - given the social and political framework of present day India, what are the alternatives? There is practically no data on the residents' perception of their environment in Gandhinagar since it is still rather young and no sector has been fully developed, however, a brief review of some of the observations on life in the Chandigarh sector based on early surveys presents a close parallel.

The most obvious question regarding the organisation of the sectors in both Chandigarh and Gandhinagar is that of neighbourhoods being organised on the basis of income or job category. It was found that in Chandigarh, there was a minimum of social interaction within the sector in terms of neighbours visiting each other or entertaining informally. Also, residents, particularly in the low-income housing groups resented this kind of segregation because it emphasised the gap between the privileged class and the less privileged and gave the children of the upper class housing a false sense of superiority. This kind of categorisation and grouping of housing, besides being the most obvious method of down-playing caste and religious differences, is apparently based on the assumption that persons of the same income level share the same values and are more comfortable living with each other. "But while such segregation is selective and voluntary among the high income group, it is largely involuntary among the poorer sections of society." The fact that the groups of housing formed within the sectors are entirely involuntary - without even a limited choice of location - also accounts for the lack of social interaction within the sector and for the apparent apathy and lack of civic sense. It was found that the residents of a sector would never get together to improve the condition of their environment, or undertake the maintenance or repairs of common facilities or open space. This is hardly surprising considering the fact that: they had very little in common besides proximity and the same income level, they had no political power or opportunity to determine the future development of their neighbourhood, and being tenants and not owners there was very little incentive to invest in improvements. It was the government that really retained the powers that formerly belonged to the 'council' of the traditional neighbourhood. Though ease of access to services and the provision of facilities within walking distance, in each sector, is one of the

main reasons behind the organisation of neighbourhoods in the modern city, it was found that, in Chandigarh, less than 50% of the school going children went to school in the same sector that they lived in. This is because the standard of all the schools is far from uniform, and also education in all schools is not free. The children of high-income residential areas often travelled to schools in other sectors that had a higher level of education since they could afford it, while children from the low-income residential areas often had to travel in order to get free education. This definitely contradicts the basic premise of neighbourhood development - that of children not having to cross a major street on their way to and from school. They cross several.

To sum up, Norma Evenson’s comment on the residential and social structure of Chandigarh is rather telling and surprising to anyone within that society: “In a city like Chandigarh, however, the failure of the residential sectors to become social entities is a circumstance not necessarily to be deplored....Chandigarh is a city much in need of a civic sense but it is doubtful that the desired urban unity would be aided by increasing the social insularity of the sector.”

Stepping back to the study of the traditional neighbourhood, we can see that many of the factors that were important to their survival are precisely those that seem lacking in the sectors in Chandigarh and Gandhinagar:

a) The pols had a fairly homogenous population based on relationships that are much more important and real to the individual in Indian society than relationships based on mere proximity. An observation by Gould on the pattern of rural-urban migration in Indian cities is interesting in this regard: “....most peasants who migrate to the city do so along avenues laid out by kinship ties in the narrow sense and caste ties in the broader sense......The quest for a personal tie overrides all the usual distinctions between affine and consanguine, lineal and collateral, relative once the peasant steps beyond his rural environment.” (This is not unlike the pattern of migration visible among certain Indian communities to the U.S. today). The decision to organise the neighbourhoods in its new cities on the basis of income groups - instead of taking advantage of the existing social structure - is not difficult to understand of a government that had committed itself to secularism and socialism, but a less rigid method of allocation of housing which would give the residents some choice of location within the neighbourhood could be worked out.

b) The organisation of the neighbourhood and subsequent growth were entirely voluntary - by individuals wanting to locate close to their kin or within the caste group. In Gandhinagar, even if it is found necessary to locate the employees of one particular government body (say, the State Transport Corporation for example) in a given sector, if as suggested above, the residents could be given a choice
of location within this sector, and if this could be combined with the earlier suggestion for ownership of land and incremental housing, - it would give us sufficient reason to hope for a more 'involved' residential community.

c) Probably the most important factor in maintaining the pol as a homogenous unit was the pol-council, the administrative arm of the neighbourhood, which imposed controls and specified the responsibilities of its members. In Gandhinagar, these functions are performed by the government. Regulations regarding the buying and selling of property though very similar to those of the pol-council are geared to preventing speculation and ensuring that growth takes place as per the master-plan than to preserving the community structure. Some of the regulations specifically dealing with private residential areas are striking in their similarity to those of the pol-council : "1) Lands sold or allotted ..... for residential or any other purpose......shall not be sold without the prior approval of the government....2) In cases where such permission is given, government may recover the whole or part of the difference between the price paid......and the sale price. 3) Land shall be utilised only for the purpose for which it is allotted or sold. Construction on the lands shall be in accordance with regulations framed by the chief town planner and architectural advisor.....4) Construction work shall be completed within a period not exceeding three years from the date of taking over the land..." ...etc. These regulations deal with private individuals wanting to buy land in Gandhinagar. While, a government employee, or minister of state might be allotted a plot of land if he wished to buy property in the city, this is more the exception than the rule. There is a ceiling on the amount of land he can buy depending on his income level, and requests for a plot of land bigger than the size he would normally be entitled to "...will be considered by government only in exceptional circumstances." The government also encourages the kind of development it considers desirable or necessary (like educational institutions or co-operative housing societies) by providing added incentives to buyers, i.e. at lower prices and more flexible terms. This is very good from the point of view of organising residential neighbourhoods since it is encouraging precisely the kind of 'voluntary' coming together that has been so important in the formation of the pols. The motives of preventing speculation and not allowing the concentration of property, are commendable but on the whole, these regulations have been formulated to aid the 'completion' of the city in accordance with the master-plan. Such blanket rules and regulations, governing the development of every plot of land in the city despite the fact that the city is supposed to be divided into 'neighbourhoods', is what really contributes to the bland anonymous landscape. Some amount of autonomy with regard to the physical development of each sector - either in terms of building or landscape - and to its social structure could ensure a more distinctive, recognisable city fabric.

These attempts at "conservative surgery" for Gandhinagar would have been helped greatly by a detailed
"diagnostic survey" of the city. But such data does not exist. However, these suggestions even if not directly applicable will serve to emphasise the direction that, I feel, further growth within the sectors of Gandhinagar could take, for "...if development is the process of becoming more competent and more richly connected, then an increasing sense of connection to one's environment, in space and time, is one aspect of growth."
4.0 Overview:

The central issue of this study has been the 'designing' of cities in India. India has built several new towns and cities in the twentieth century the majority of which are industrial townships. The examples considered in this study represent the minority which are the new state capitals and centers of government, which, despite their smaller numbers, have had a greater impact on the view of city planning in India today. Most of these new developments seem to be based on similar ideas and have produced similar environments which have repeatedly been criticized for lacking a sense of 'fit' with the local physical, social and economic climate. But, there has been no concerted effort or visible movement towards defining the qualities that an environment with a sense of 'fit' might have or towards studying the towns and cities that we have developed in this century and re-evaluating the ideas that we have adhered to so consistently.

What I have tried to do in the preceeding pages is to take a recently 'designed' city which is still being developed, and understand the concepts on which this city is based and the concepts and values out of which traditional structures have evolved - assuming that these structures represent what we refer to as an environment with a sense of 'fit'. I have also tried to demonstrate how some of these traditional concepts and values relating to the local climate and the social structure (both of which have changed very little) might be woven into the larger - more general - ideals of the 'designed' city. The attempt has not been to suggest that the poles still are the best solution for urban residential neighbourhoods in the cities of Gujarat (India), or that social aspirations and values have not changed, but to try and isolate some of those qualities of the poles which I feel are a part of the culture and the region and which planners have lost sight of while paying attention to the 'universal' criteria of city planning theory. Kevin Lynch in qualifying his list of "performance dimensions" for a "good" city says: "The presumed generality of this list lies in certain regularities: the physical nature of the universe, the constants of human biology and culture, and some features which commonly appear in contemporary large scale settlements, including the processes by which they are maintained and changed." Utopians like Le Corbusier and Howard also believed that such a generalisation was possible and would work. My proposition is that an understanding of these 'universal' criteria modified by the kind of 'culture specific' criteria that I have tried to develop is what is needed if we are going to continue to "design" new cities.

There are a number of issues very important to the subject which have been alluded to but have not been discussed here at length - for example, the fact that cities still continue to be 'designed' in India; which can be seen as an outcome of a governmental system which favours centralised decision making or the question of whether the new urban environment can promote changes in the social structure or should
follow social change. These are issues which could form topics for further research on the subject and which would make a study such as this one, more complete. As it stands, the study represents an effort towards an evaluation of the planning of cities in India, in this century, and a possible direction for the immediate future.
Bibliography:


----------


----------


----------


----------

*The Radiant City: Elements of A Doctrine of Urbanism to be Used as the Basis of Our Machine Age Civilization*, trns. Pamela Knight, Eleanor Levieux, Derek Coltman, London, Faber, 1967.

----------


Percey, Clayre

Raju, Soraswati
The Social Meaning of Urban Neighbourhood in India, Ekistics 283, July/August 1980.

Sarin, Madhu

Searing, Helen

Sitte, Camillo

Volwahsen, Andreas

Volwahsen, Andreas

Wurman, Richard Saul

Anon
Sources of Illustrations:

0.0 Preface.


1.0 Introduction:

2.0 Comparative Analysis:

24, 25, 30, 31, 32, 33, 37, 41, 42, 44, 45B, 

14, 15, 27, 28, 45A, 

16, 17, 18, 39, 40, 

14, 15, 27, 28, 45A, 

16, 17, 18, 39, 40, 

Author.


Howard Ebenezer, Garden Cities of To-morrow (Being the Third Edition of "To-morrow: A Peaceful Path to Real Reform), London, S. Sonnenschein & Co. ltd., 1902.

Irving Robert Grant, Indian Summer: Lutyens Baker and Imperial Delhi, New Haven, Yale University Press, 1981.


Le Corbusier, The Radiant City: Elements of A Doctrine of Urbanism to be Used as the Basis of Our Machine Age Civilization, trnsl. Pamela Knight, Eleanor Levieux, Derek Colman, London, Faber, 1967.


**3.0 The Neighbourhood Unit:**


