STREET DEVELOPMENTS: CASE OF AHMEDABAD, INDIA

by

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Diploma in Architecture, School of Architecture
Centre for Environmental Planning and Technology
Ahmedabad, India
1978

SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE
' DEGREE OF

MASTER OF CITY PLANNING
AND
MASTER OF SCIENCE IN ARCHITECTURE STUDIES

at the
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

February 1982

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Submitted to the Department of Urban Studies and Planning
on February, 1982 in partial fulfillment of the requirements
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Master of City Planning

and

Master of Science in Architecture Studies

ABSTRACT

This study identifies and analyzes the existing street patterns
of the cities in India. It focuses on the city of Ahmedabad
through a comparative analysis of traditional streets vs.
contemporary streets. The streets are evaluated in their
social, physical and economic condition. The major emphasis
of the study is on design guidelines, that of the past and
present, for physical development. The laws which develop
hierarchy of the streets, create streets in three dimensions,
decide density and level of services, are examined in the
socio-economic context of the city of Ahmedabad.

The study identifies and shows the relationship of social and
economic aspects with physical development. It concludes with
some observations and comments on the street developments. The
study is intended to serve as a reference for those who want
to go for indepth study of building regulations and street
development in arid/semi-arid climatic conditions.

Thesis Supervisor: Julian Beinart
Professor of Architecture

STREET DEVELOPMENTS: CASE OF AHMEDABAD, INDIA

VINAY SHAH

ACKNOWLEDGMENT

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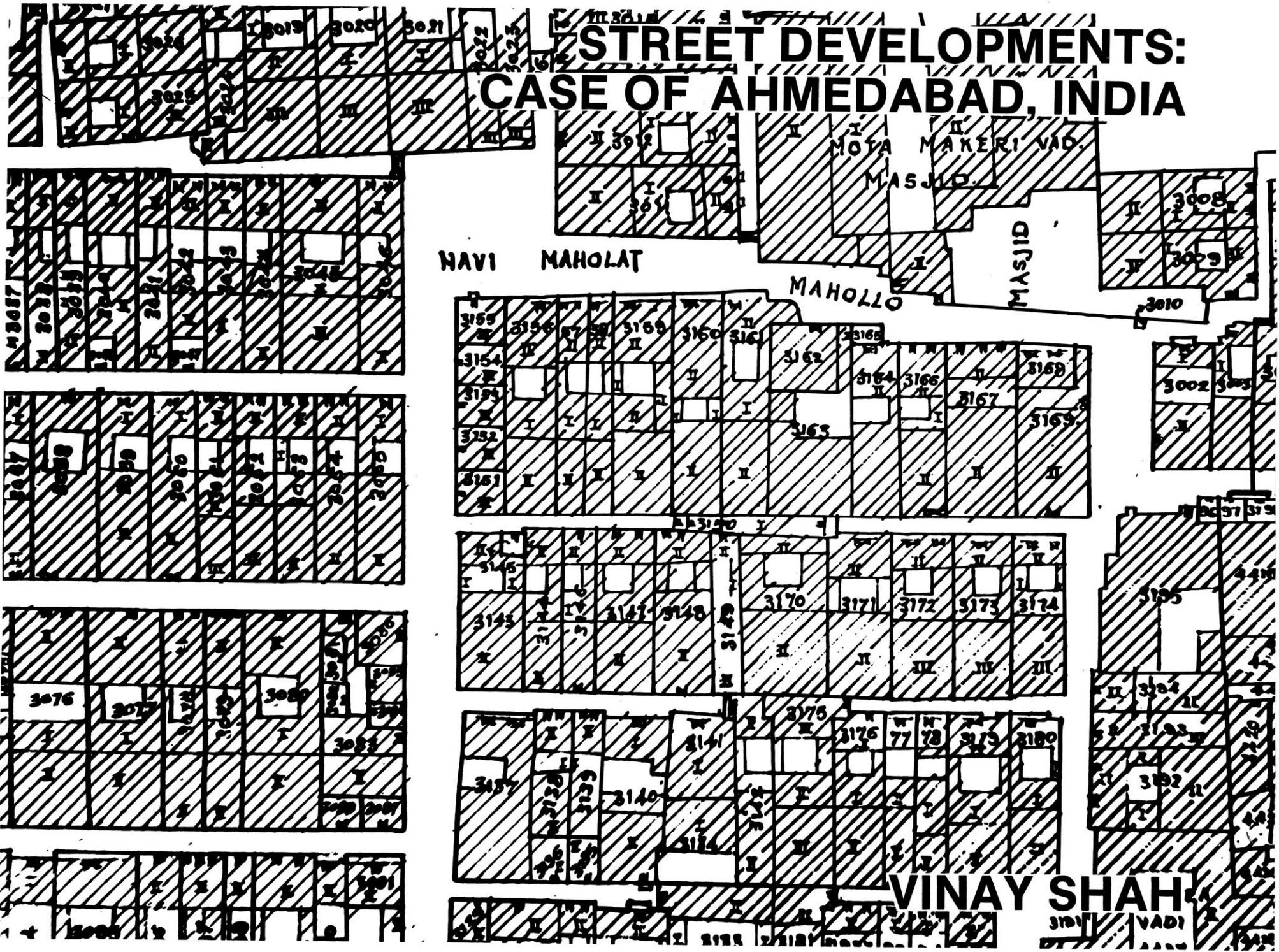
I am extremely grateful to:

Vinay Shah
ENVIRONMENTAL DESIGN
School of Architecture and Planning, M.I.T
February 5, 1982

Cover: Part plan of walled city Ahmedabad 1940
-Source: Ahmedabad Municipal Corporation

INTRODUCTION

Urbanization has been occurring at a very rapid pace in India over the last few decades. This process is rapid due to various forces, but rural-urban migration has been one of the major contributing factors. Cities have grown to sizes unperceived by the planners of the past and beyond the scope of traditional planning methods. In fact, planning today does not serve the needs of a large portion of the society--planners are criticized for vast expenditures on development of garden suburbias and projects like "new capitals" that are built according to "high standards" and at a great cost.[1] Especially when a large portion of the population will not be able to afford the services which an urban center has to offer.

Though the necessity of planning for the population in relation to their socio-economic requirements has long been acknowledged, negligable efforts have been made to study the needs, efficiency and deficiency of the present modes of planning. In this era of rapid urbanization the importance of understanding the needs, developing design guidelines, and channeling available resources in the proper direction can hardly be unjustified. Immediate attention is needed to stop the physical decay of the existing urban environment and ensure proper future developments.

[1] Twenty percent of India's population is concen-

trated in 142 cities, of which 8 are major metropolitan cities. The rest of the 669 million people live in villages and smaller settlements. The smallest of the smaller settlements have populations of less than 1,000 people. There are 565,000 of these small settlements with some 36,000,000 people.[2]

On the average, 45 per cent of the nation's population occupy 50 sq. ft. per person. About 72 percent of the houses lack ammenities like bathrooms and water closets.[3] It is natural for this population to migrate, not only for economic reasons, but because of the social and other [5] services available in urban areas, too. Thus India needs to focus more on proper urban developments, having entered the era of urbanization and being in the social, physical and economic situation whereby urbanization seems inevitable.

Appropriate urban development needs proper development policies, economic planning, transportation facilities and so on which respond to the needs of the society. The multi-use of streets in India is a good example of what a proper development policy must encompass.

In India, as well as in some other countries where a large portion of the country is in a semi-arid arid climatic zone, streets have served various purposes and functions to its population. [2] Processions occur in India characteristically strolling through the streets of the city. Windows and doors of buildings open up

1: Sarin, M. - The Urban Poor: Chandigarh
2: Census of India   3: Ibid

1

CITIES IN INDIA
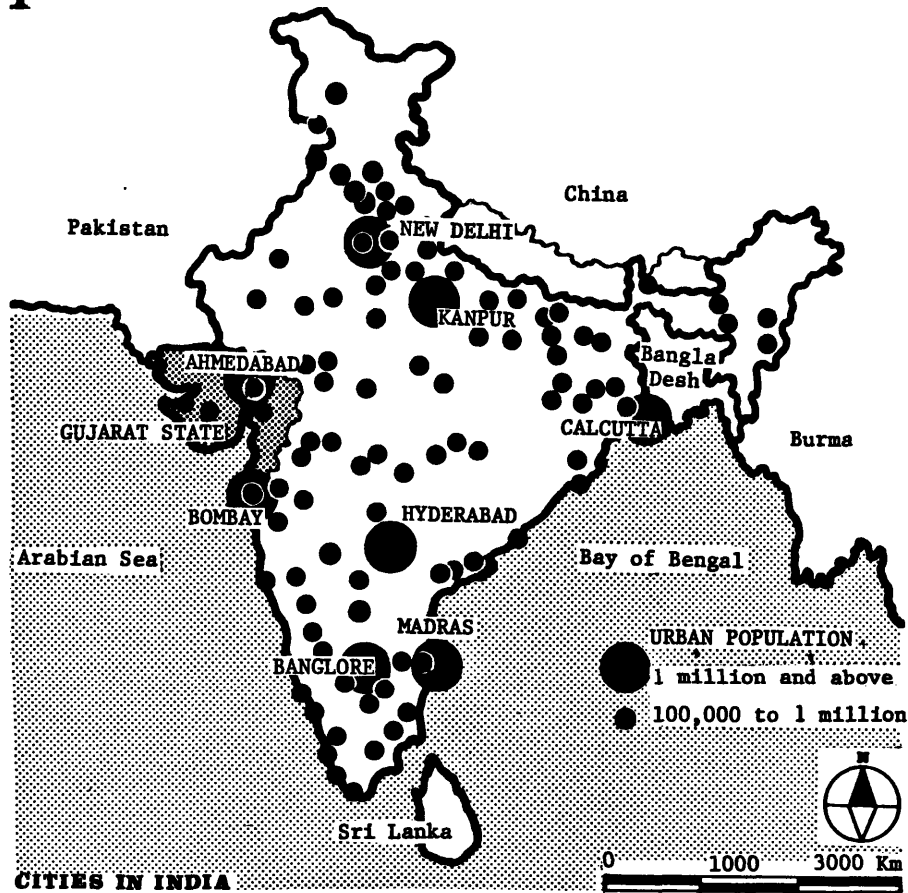
GROWTH OF URBANIZATION

	1901	1941	1951	1961	1971
Urban as % of total population	10.09	13.9	17.3	18.0	19.9
Population of Towns (mn.)					
Class I	5.9	15.7	26.1	38.2	60.7
Class II	3.0	5.2	6.9	9.4	12.5
Class III	4.3	7.8	10.4	14.6	17.8
Class IV	5.7	7.2	8.8	10.3	12.4
Class V	5.3	6.8	8.2	5.7	5.2
Class VI	1.6	1.5	2.0	0.7	0.6
TOTAL	25.8	44.2	62.4	78.9	109.1
% of urban population in					
Class I	22.9	35.4	41.8	48.4	55.7
Class II	11.8	11.8	11.1	11.9	11.4
Class III	16.5	17.7	16.7	18.5	16.3
Class IV	22.1	16.3	14.0	13.0	11.3
Class V	20.4	15.4	13.2	7.2	4.7
Class VI	6.3	3.5	3.2	1.0	0.5
TOTAL	100.0	100.0	100.0	100.0	

Note:Class I towns are towns (called cities) with a population 100,000 and above; Class II:50,000 to 99,999; Class III:20,000 to 49,999; Class IV:10,000 to 19,999; Class V:5,000 to 9,999; Class VI:less than 5,000.

City	Population 1971 Census (000)	Sex ratio females per 1000 males	Density per km²	Per cent increase 1961-71
Calcutta	3,149	638	30,276	7.57
Greater Bombay	5,971	716	13,640	43.80
Delhi	3,288	806	N.A.	59.47
Madras	2,469	904	19,293	42.81
Hyderabad	1,607	928	9,494	43.70
Ahmedabad	1,586	833	17,053	37.88
Bangalore	1,541	877	11,462	35.02
Kanpur	1,154	769	4,413	31.01

Source: Yagnik, V. - Thesis, M.I.T. 1980
Census of India

and residents come out thus interacting with the street activity.

3 On commercial streets, the shops open up into the street. The commercial environment dominates. The poor use sidewalks to open up petti shops and have thus found a means of living in the urban environment.

4 The residential streets, located in sectors away from the major circulation arteries, become an extension of the living spaces. Streets substitute for play grounds, clubs, and for the physical needs of the living spaces to an extent. It is evident that a dynamic environment has to be created to achieve this multi-functional layout.

The factors influencing street layout are three fold:

a. Social
b. Economic
c. Physical

a. Social Factors

The social condition of a particular locale is reflected in the street layout. Social factors affecting the use of open space and streets are:

1. Composition of inhabitants
   - The social structure is reflected in the composition of the inhabitants. Religious standing plays an important role in the social intimacy of India.

2. Organizations
   - Institutes established by the residents not only reflect their needs as they perceive them, but mirror the "intimacy" and "togetherness" between the residents.

3. Services
   - The physical configuration of spaces is influenced by various services available to the residents of a neighborhood.

b. Economic Aspects

Economic aspects are important in the layout of streets. The economy of the users influences the use and maintainance of open spaces, as evidenced by the following:

1. Income distribution
   - Income distribution among groups of residents residing in a neighborhood has a more direct impact on the space organization than other factors. It is a good indicator of the capacity of the users to purchase services.

2. Occupation
   - Housing location is important in relation to distance from the work place. The time and effort one can spend in community activities also depends upon the type of occupation.

3. Mode of transport
   - The modes of transportation have a direct relationship with the economic capacity of the residents. It also influences the type of street spaces required by the users.

4

Religious procession-Chariot
Procession- on the main avenue
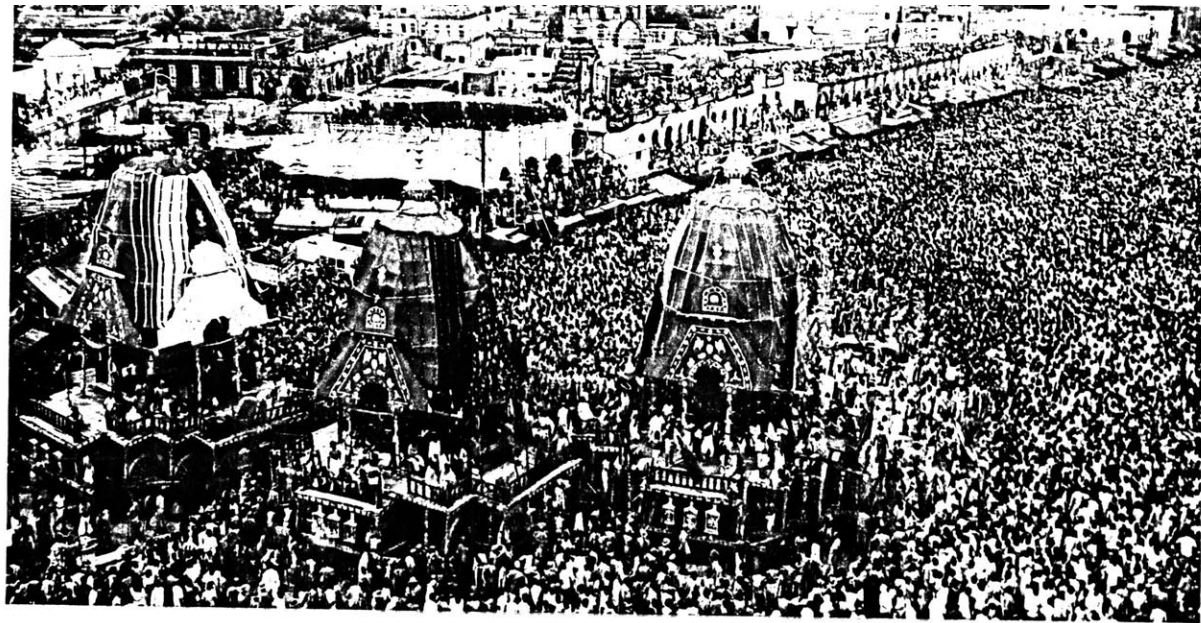of the city of Jaggannath Puri
(Top)
Photograph: Dasa, B.

Commercial activities extend-
ing on a street in Ahmedabad
(Bottom Left)
Photograph: Shah, V.

A dead-end street being used
for sleeping in the old city
of Ahmedabad (BOttom Right)
Photograph: Chavda, V.

c. Physicial

Physical planning of streets, which reflects
the social and economic situation of the
society, has an immediate impact on promoting
or discouraging a particular type of street func-
tion. The planning of streets is easily controlled
by laws. Design factors which affect the en-
vironment of street layout are:

1. Hierarchy
    - Functional sequence from commercial to
    residential, the transition from public
    to private spaces, from accessible to
    limited access streets, creates a
    hierarchical sequence.

2. Spatial Shaft
    - The three dimensional space created
    using the width of the street, facades
    of the building, overhangs, the inter-
    play of shadow and light, expansion and
    contraction, stimulates the perception
    of the users and promotes interaction
    between the user and his environment.
    Climate plays an important role in the
    user's interaction.

3. Density
    - The number of users on a street is
    dependent on the density. Densely
    built neighborhoods increase the use of
    open space which is comparatively less
    than in a sparsely built neighborhood.

4. Services
    - The level of services and the mode
    of providing them is not only indicated
    in the physical environment of the
    neighborhood, it bears the socio-
    economic influence.

Recent developments have eliminated these charac-
teristics and functional segregation of the
street to a large extent. The problems of
contamination and chaotic transportation which
surfaced have arrested the attention of planners
of the 19th and 20th century that they
have failed to understand aspects of street
planning, other than circulation and infrastruc-
ture.

Under the present situation few intellectuals
feel the need to step back into the past and
borrow the wisdom of the ancient treatise of
planning, the treatise which reveals the art and
science of building cities.[1] However, any con-
troversy of Ancient vs. Contemporary is not the
major one in the present situation. Immediate
attention is required to develop the appropriate
standards and planning manuals to suit the
economic, social-cultural and physical conditions
of India.

The objective of this study is to clarify the
relationship between the physical, social, and
economic environment and insure that the
importance of this relationship is clearly known.
Since it is impossible to develop a primer for
design developments within the limited time
and scope of this study, the focus is on street
development, with a comparative study of tradi-
tional vs. contemporary street layout. The laws
chosen are those that develop the hierarchy of
the streets, generate a street in three dimension,
and decide density and level of services in a

1: Havell, E. - The Ancient and Mediaeval Architecture of India

5

neighborhood. The appropriateness of the laws
is being tested in the present socio-economic
situation.

The study is divided into three parts. Part I
is a brief account of planning developments in
this socio-economic environment. It lists major
considerations given in the planning of streets
and laws developed therein. It identifies
major design development factors showing their
influence on the environment of the neighborhood.

The second part begins with the introduction to
the city of Ahmedabad and its social, physical
and economic condition. Streets, in reference
to the socio-economic condition and major physi-
cal attributes defined in part I are reviewed
in the case of Ahmedabad. The third part
summarizes the information presented in Parts
I and II. An attempt is made to put forward
suggestions for required changes in the laws
and make recommendations for further studies.
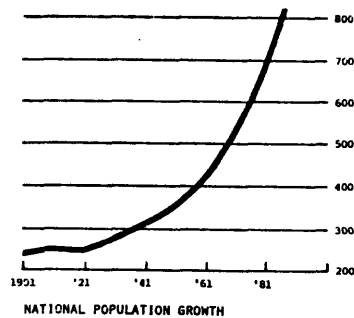
STANDARD OF LIVING INDICATORS

	Per capita GNP (US $)	Passenger car	Radio	Population per Tele- phone	Physici- an	Hospital bed
India	110	872	48	500	4,795	1,571
Australia	2,870	3	5	3	847	83
Brazil	460	40	16	42	1,953	274
Burma	80	926	67	1,000	8,975	1,165
Canada	4,140	3	1	2	684	100
Egypt	220	241	8	91	2,004	472
France	3,360	4	3	5	747	139
W.Germany	3,210	4	3	4	561	87
Israel	2,190	17	5	5	390	173
Italy	1,860	5	4	5	553	95
Japan	2,130	10	2	4	898	79
Kenya	160	112	21	143	7,829	774
Rep.Korea	290	470	8	43	2,133	1,823
Mexico	700	38	4	29	1,445	549
Pakistan	130*	359*	71	500	4,018*	2,570*
Philippines	240	133	22	111	9,840	822
Sri Lanka	100	145	24	200	3,698	332
Sweden	4,240	3	26	2	734	67
U.K.	2,430	5	3	3	787	110
U.S.A.	5,160	2	1	2	645	127
U.S.S.R.	1,400	n.a.	2	20	421	91

*relates to Pakistan after
the creation of Bangladesh

NATIONAL POPULATION GROWTH

Source: Tata Publications, Statistical outline of India 1975

PLANNING

This section identifys the planning trends, to
which India has been exposed. With a brief
introduction to traditional design norms and
changing planning profession, the section focuses
on the laws which control the physical development.

As the purpose of this part is to create a base
for analysis of the physical development of streets,
detail account of desing norms or the laws of town
planning like safety codes, zoning regulations,
is not given. The section elaborates on the laws
developing hierarchy and spatial shaft as well
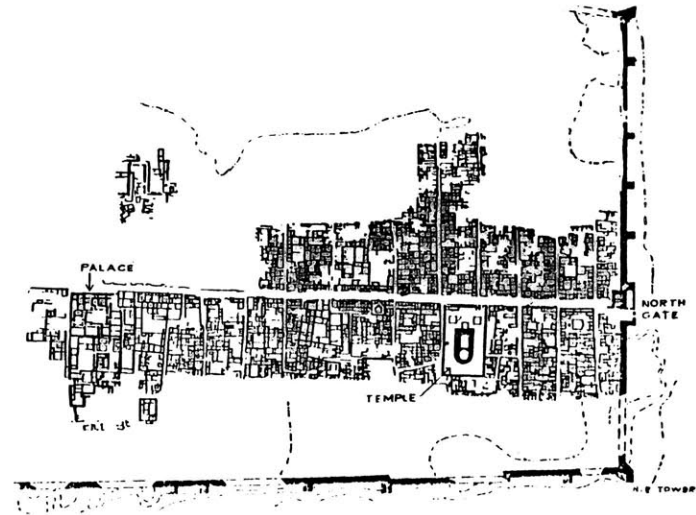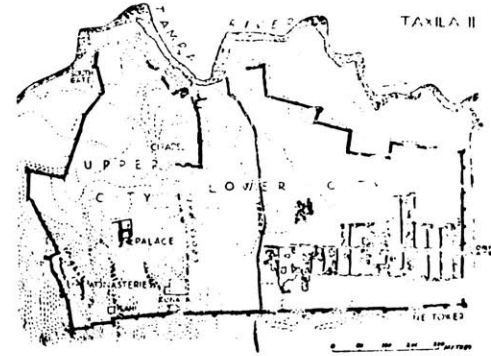as determining density and level of services.

6
MOHEN-JO-DARO
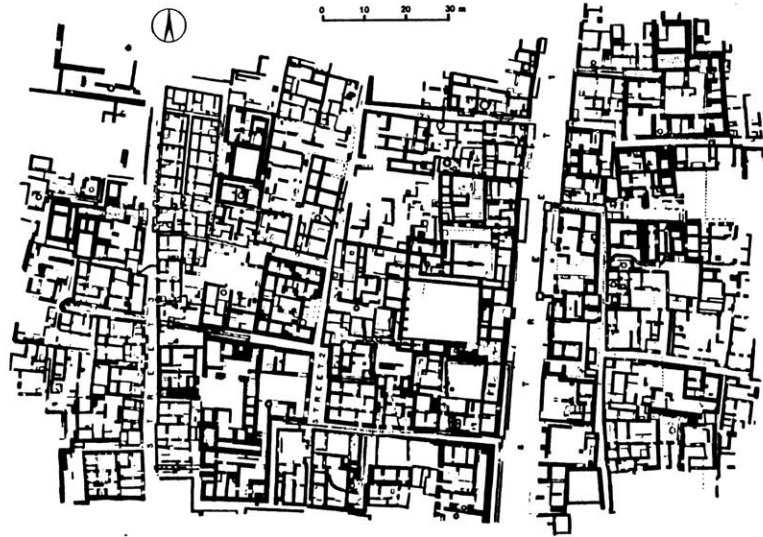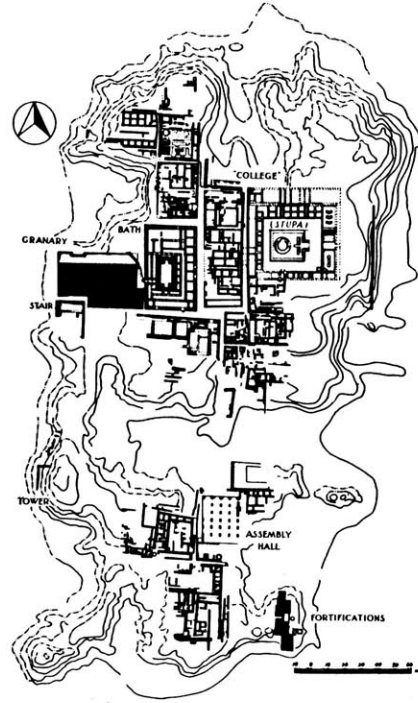
7
TAKSHA SHILA

Source: Mortimer Wheeler, R. Sir - The Indus Civilization

EARLY EXAMPLES

Town planning is an old art in India. Vastu Shastras, the treatises on architecture and planning, presented a collection of thought which reflects the development of the planning profession. Street layout and spatial organization of the street were two of the important aspects of design. The earliest evidence reflect-
[6] ing the existence of organizational principles of planning are the excavations in the Indus Valley, dated around 3,000 B.C. Mohen Jo Daro, situated on the bank of river Indus, presents a outstanding street layout of the Indus Civilization. The layout, though a gridiron, presents a hierarchy of the organization pattern. Public buildings such as an assembly hall, services such as a well constructed public bath surfaced with bituman, and granneries; are at the top of the hierarchy.[1]

The streets are linear and major streets cross each other at a right angle. The street gradiant is used for surface drainage. An extensive drainage system is worked out using the street gradiant and channels.

[7] Another example that throws light on the extent to which the formation of ancient cities was "institutionalized" through conscious planning is the discoveries made after the excavation of Taksha Shila, the university town. A series of excavations at Taksha Shila gives us glimpses of the art of city planning existing at the beginning of the Christian era. The location of major buildings on a point higher than other sites and dwellings on gradual downward sloping sites helps solve the problem of drainage and reflects the social hierarchy existing at the time. Creation of "super-blocks" with the formalized pattern of streets, in turn subdivided by side streets lined by dwellings, shows evidence of developed planning principles.[2]

It is futile to look for the connection between these archeological monuments and Vastu Shastras. The important observation here is that the Indus Valley developments existing at the advent of nomadic tribes identified as belonging to the Aryan ethnic group, reflect the socio-economic structure and democratic set up of that society.

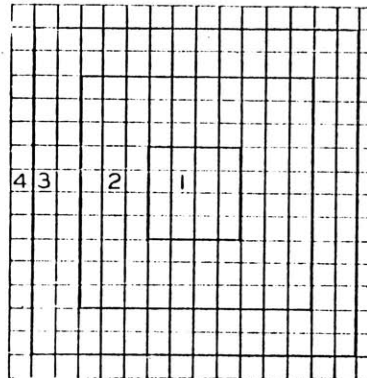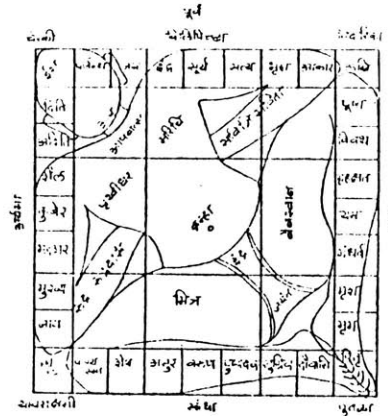1: Mortimer Wheeler, R. Sir - The Indus Civilization
2: Ibid

8

SITE DEVELOPMENT STAGES

A

B

C

D

E

F
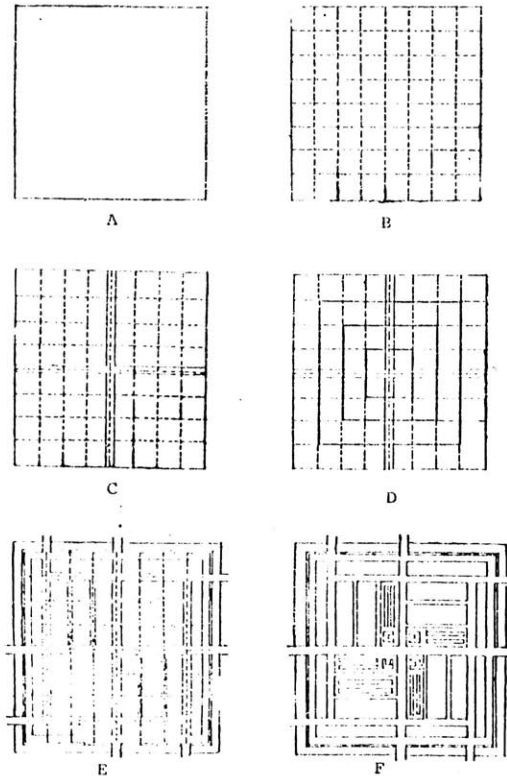
Various stages of the establishment of an Indo-Aryan village.

A. Marking the outlines of the Vastu-purushamandala.
B. Division into plots. [Vastu-padavinyasa.]
C. Layout of the principal streets.
D. Division into hypothetical rings of Brahma, Daivika, Manushya and Paisache.
E. Division into wards by means of branch roads. Erection of outer wall, gates and the moat
F. Erection of various edifices according to site-planning and folk planning principles.

9

VASTU PURUSHA

VASTU PURUSHA MANDALA

Roga	Ahi	Mukhya	Bhallata	Soma	Bhujaga	Aditi	Diti	Agni
Papa-yaks-man	Rudra						Apa	Pary-anya
Sosha	Rudra-jaya	Prthividhara		Apa-vatsa		Jayanta
Asura						Indra
Varuna	Mitra	Brahma		Aryaman		Surya
Kusuma-danta						Satya
Sugriva	Indra	Vivasvan		Savitr		Bhrsha
Dauva-rika	Indra-jaya	Bhrngaraja	Gandharva	Yama	Brhatksata	Vitatha	Savi-tra	Anta-riksha
Pita-rah	Mrga						Pusan	Amila

| 4 | 3 | | 2 | | 1 |

Typical division of a Vastu-purushamandala into various spheres.

1. Sphere of Brahma.
2. Sphere of Daivika.
3. Sphere of Manushya.
4. Sphere of Paisacha.

VASTU SHASTRAS

The Aryans, generators of Vedic civilization, conquered Dravidian civilization of the Indus [8] Valley about 3,000 B.C. The learnings of the predecessors were gestated and developed for about 1700 years before the first planning manual came into existence.

The amalgamation of the two ethnic group-cultures, followed by the successive invasions from the north-east by the Shuks, Kushans and Turks leading up to the formation of the Mughul empire, had significant influence on the structure of the cities. Planning norms responded to the socio-economic structure that existed during the period. The intermingling influence of different factors such as spiritual, physical, social reached such a complex stage that any effort to separate religion from planning norms or planning norms from social structure became impossible.

Vastu Shastras established not only the physical but the spatial, as well as socio-economic hierarchy through the Caste System. The Caste System, which has implications even today, was devised by the Aryans to establish a hierarchy by creation of socio-occupational groups. The group designations subsequently became personifications of a ranking system, not only of the inhabitants of the settlements but also of objects, including locations of city components. [9] The Caste System consisted of four divisions or Varnas which were, in the descending order of social status: Brahmins (intellectuals), Kshatriya (warriors), Vaishya (merchants) and Shudra (laborers).[1]

Apart from having locational implications in the distribution of city population, the categories of the Caste System were used as a principles for the designation of "high ranking areas" ranging down to "low ranking areas."

This method of division also corresponded to the hierarchy of various gods and finally to the cosmic order; for instance, the central space in a town diagram was attributed to the Brahma, the "ultimate," while the peripheral sections represent the lower gods.

However, the symbolic representation of the hierarchy--the social and religious order-- became fixed in the forms laid out earlier. A dark skin Dravidian slave, Shudra, can not rise up to a higher caste as was possible in the Caste System originally. Although the symbolic presentation of the logical principles is one of the reasons for the rigid social form existing today, Aryans can not be accused of generating the system in its present form. Aryans presented the arts and sciences through symbolism and prescriptive methodology to provide an abstraction to the masses who were not expected to intellectualize on the issue.[2]

1: Shah, V. - Ancient Planning Principles - India, Paper
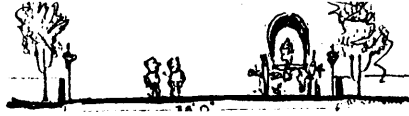2: Ibid

10

RAJ MARG

60'·0"

MAHA MARG

48'·0"

RATHYA

36'·0"

VITHI,MARG

24'·0"

KSHUDRA MARG

4'·6"

Source: Reddi, S. - Building Regulations

Hierarchy

The traditional art of planning was not only slow but dealt with design and size of cities on a different scale. The establishment of hierarchy was one of the most important tasks. Streets were named according to their function, with a development of pattern according to settlement diagrams prescribed in the treatise. The spatial sequence was prescribed through design codes.

Towns were connected with other towns by highways with trees planted on both sides, resting places and drinking wells located at regular intervals.

[10] Towns were to have streets as follows: Raj Marg, Rathya, Maha Marg, Marg, Vithi, and Kshudra Marg.

Raj Marg is the main avenue of the town leading to the temple or king's palace. Rathya is a carriage street, which should run north/ south and east/west direction with footpaths on both sides. They should be of width 8', 16', 24', 32' or more and one, three, five, or seven in numbers. There should be Maha Marg (large roads), Marg (roads), and Vithi (streets) running length and breadth wise. The width of Maha Marg should be equal to Vithi of largest width in town. The Vithi in center should be equal to Maha Marg. The width of Marg should be equal to or 3/4 or 1/2 of Vithi and Kshudra Marg (narrow lane) should run straight between Vithi and Maha Marg. The width of the lane should be 3/4, 1/2 or 1/4 of the Marg.

Segregation of different street functions was apparent. Since the environment was a pedestrian dominated one, it was recommended that the residential quarter be located off the streets for conveyance. The rule mentions that the architect should avoid such location of heavy traffic as it ruins the prosperity of the residents. Even the ceremonial route, Mangal Vithy, should not cross streets reserved for conveyance, to attain efficient circulation and uninterrupted ceremonial processions. The ceremonial routes should not pass through places of sacrificial offering so as to avoid the slightest possibility of offending any other person by disturbing his rites and rituals.

Spatial Shaft

The width of streets and the height of the buildings were designed in proportion prescribed in the treatises. One perceived the street in three dimensions. Width and height of the building, as well as its projection on the street are laid out in the codes. The codes considered houses on both sides of streets as a part of the spatial shaft. The breadth of a building on the main street is recommended to be 24', 32', 40' or as required.

The plinth was to be in proportions of 1/5, 1/7 or 1/9 of the height of the building for one story buildings. The projection of plinth should be in proportion to its length. One seventh or 1/9 of the length of a dwelling is a good proportion for the depth of a plinth. The projection over the plinth could be less in the length if desired.

It was recommended that the houses on a street have one to twelve stories but they should correspond with other buildings on the same street. This was to ensure a unique and continuous facade. Moreover, it was recommended that the houses have a step back profile as the height of the structure increased. This was not only to assure structural stability, but to reduce shadow on other adjacent buildings. The width of the street was to be decided on the basis of the population of a village, as well as its function. Roads for chariots, beasts of burden, general pedestrian traffic and access to dwellings were clearly defined and correspondingly designed.

The measurements, starting from an atom to a 6'-o" long yard stick, were used in explaining various street widths, formulating a system of proportion. These measurements were classified under various categories, using human dimensions, and were applied in relation to the object of measurement. The flexibility achieved was immense and so was the possibility of misuse.

Main street in the old city neighborhood
Photograph: Chavda, V.

Density

An unstable political situation and the complexity of the social structures played their part in deciding the density of a settlement. Tightly woven settlement patterns with narrow lands resulted from this situation. Neighborhoods under control of the residents provided enough flexibility in a broad spectrum of city design. Environmental control was achieved by means of Vastu Purusha Mandala, land use pattern, allocating different areas to different professional groups. Factors such as importance of a site in reference to social and economic status are also presented through the symbol of Vastu Purusha Mandala.

A system of proportion is derived to suit individual needs. The length of a building is recommended one and one half, two or three times its breadth. There is hardly any rule directly governing density of a neighborhood. This made the dense neighborhoods, and narrow and crooked streets possible. It also made administration of the growing city a very complex task. As the finite administrative details were left to the residents of a neighborhood, the city administration had little control over the density of any development. However, proper development was assured by the rules of proportion which were followed religiously.

Services

Control over the design of finite rules, regulations and guidelines for the development and maintenance of the neighborhood was in the hands of the residents. The dispersed administrative structure led to a variety of methods for achieving an adequate level of infrastructure and social services through community effort. The symbolic design guidelines represent the need for storm drainage by recommending a site sloping north/northeast. In sparsely populated towns extensive drainage systems are not a requirement. An accessible location to everybody for a drinking well is recommended. A dwelling is designed with an underground tank to store rain water for use in dry seasons.

Even though buildings are attached to other buildings, each one has adequate light and ventilation. The cardinal direction for the orientation of street layout are preferred so as to assure proper sun and shade in the street. Radial street layouts were discourage, for reasons of defense, traffic and climate. An open space at a junction of streets or in the center of a layout was recommended for public meetings. Thus pockets of open spaces were created to suit the needs of the residents.

The building Bye-Laws presented here are inferred from different verses of the ancient treatises translated by various authors. Major reference used in this study is, "Architecture of Mansara" (in Sanskrit) - translated by Acharya, P. 1933.

11

12

1784

1862

1914

1939
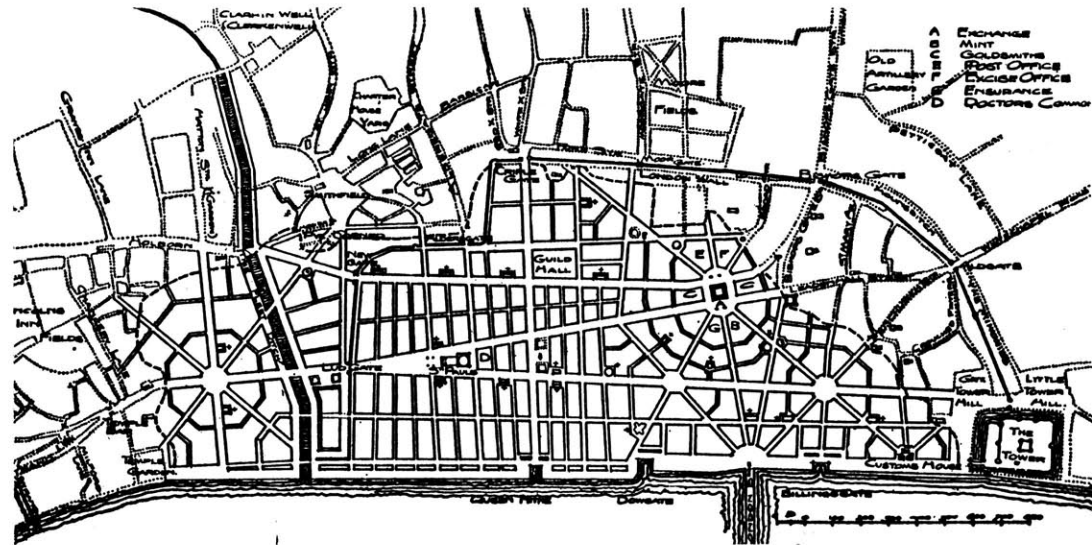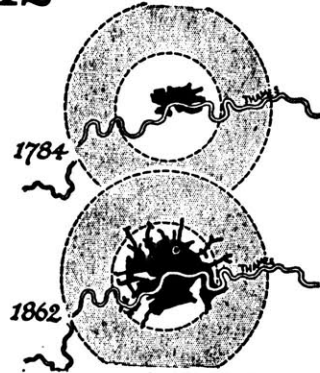
CHANGING TREND

Tradition continued in the slow moving stature of the society until the introduction of a new mode of living. The exposure given to India by the British initiated a movement, a movement of social change, which in turn created a physically dynamic society. This, in turn, resulted in the adoption of new methods of planning.

The roots of modern town planning in India lie in the social-political movement of the continent of Europe. For example, a town [11] in medieval Europe changed its face so slowly that at any point in time the town was static. The town was given a definitive architectural definition with sufficient margins to absorb future growth in an era of slow moving reality.

The method became less and less appropriate as the tempo of change became more rapid. The changing political situation, dynamic social conditions, and proliferating industrialization associated with the growing economy of the cities required a new system of planning.

[12] Growth of London is one example of the impact of change. New methods of planning became apparent in plans developed in the 18th century for the development of London.

With mechanization of the coal, iron and textile industries, which began there, the production of goods increased manyfold. For example, the cotton industries produced 273,000,000 pounds in 1872 in comparison to 3,800,000 in 1775.[1] This drastic increased production, in turn, increased trade, which was reflected in a higher demand on various services, particularly on communication's network in these countries.

The invention of the locomotive, automobile and other means of transportation had a major influence on future planning. Many roads were replaced by turnpikes. Railroads were laid out connecting many industrial areas.[2] These changes filtered through the British administration in the Indian peninsula. The immediate impact of industrialization and the changing network of communication was felt by the industrial cities.

The first to be affected was the economic structure of these cities. Growing industrialization continued to influence the growth of Indian cities later on.

1: Benevolo, L. - The origins of Modern Town Planning
2: Ibid

13

A POSTER

A DRAWING SHOWING OVERCROWDING

Source: Benevolo, L. - The Origins of Modern Town Planning

MODERN PLANNING

In the industrial era - era of rapid change -
migrants poured into industrial cities from
all directions. Industralization created a
demand for housing development near work
places and industries. This helped the city
expand beyond its limits. The developers,
pressed by the high demand, showed little
interest in the environment of the dwellings
they erected. Since it was economically
advantageous to build quickly, they
disregarded any environmental issues.[1]

A series of workers quarters were constructed
on muddy soil, with damp cellars and inade-
quate living spaces. Although it is difficult
to ascertain the economic capacity of the
occupants of those dwellings, it is obvious that
they were not well provided for. The houses
were unclean and the streets muddy. The un-
tidyness of the dwelling environment took
constant attention of the intellectuals.[2]

A new society, culture and social order was
generated as a result of this situation. The
industrial workers union evolved as a social
organization, organized in search of better
working environments and to achieve political
strength to back up their demands.

An acute shortage of sanitary facilities was
the second most important issue after trans-
portation demanding immediate attention. The

never ending growth of the city boundaries,
creeping out into the country, resulted in
the uncontrolled construction which made the
sanitary conditions unbearable.[3] Inadequate
sanitation was not a problem of the sparsely
populated villages in the country but remained
a major issue in the overcrowded, vast number
of new buildings on the fringes of the city.
Open sewers running along the road side,
rubbish piling up in the corners and inter-
mingling carts, pedestrians, animals and later
on automobiles became common sights in the
neighborhoods.

This hopeless situation became the starting
point for a social and political revolution.
A socialist organization began to take shape,
complementing the work in the factory with
study and leisure. The socialist reformists
like Owen, Simon, and Cabet suggested a con-
figuration of political, social and technical
issues to formulate new town planning manuals.

However, planning was settling into an economic
mould which desregarded the social, and to some
extent political, implications. The situation
reached a point where all factors became separ-
ate elements. For example, within the limits
of political discussions, the underlying social
problems and their implicit connection with
planning could find no place.

1: Engels, F. - Condition of the Working Class in England in 1844
2: Saarinen, E. - The City, its Growth, Its Decay, Its Future
3: Clapham, J. - An Economic History of Modern Britain

The British implemented new programs of public works to improve the sanitary problems that emerged during the industrial revolution, such as Cholera epidemics. To assure safe and quick military movement they also instigated two legislations as the forerunner of modern town planning legislation. These were sanitary legislation and railways/public work legislation.[1] The British realized the political importance of improving the living environment and sanitary conditions of British colonies in developing countries after the experience of the socialist movements of Europe. Thus India was exposed to the modern movment of planning.

14

ARTERIAL ROAD
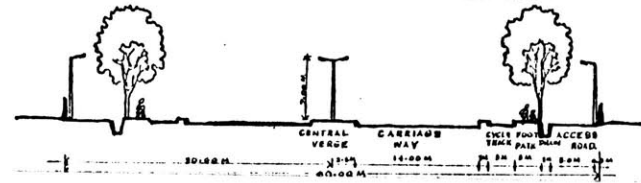
SUB-ARTERIAL ROAD
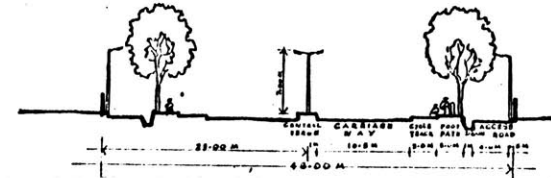
MAJOR ROAD

FEEDER ROAD

RESIDENTIAL ROAD

COLLECTOR ROAD

1: *Benevolo, L. - The Origins of Modern Town Planning*

Source: *Reddi, S. - Building Regulations*

Hierarchy

Rapid commercial growth had a devastating
influence on city development. Commerce became
the focus of growth. Transportation and sani-
tary facilities influenced the street layout
to a large extent. Street planning became a
technical and practical matter. The social
order, village structure, spatial hierarchy
and other traditional factors became unimportant
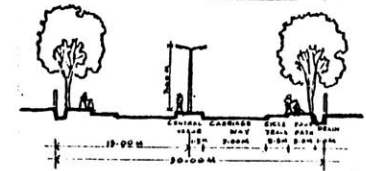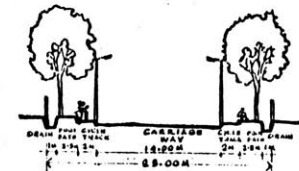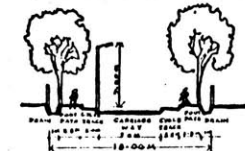in town planning. Technical aspects of infra-
structure and transportation influenced the
profession to such an extent that the movement
of social reform--changes in the social struc-
ture based on kinship and the Caste System--
hardly caught the attention of the planners.
Streets were designed and designated for the
capacity and function of handling traffic.

Planning manuals today require that a city
be connected to other cities and towns via
highways, railroads, etc. Cities are directed
[14] to have roads as follows: arterial road,
sub arterial road, major road, feeder road,
collector road, and residential road. The
width of large thoroughfares, arterial, sub
arterial, and major roads is decided by the
city authority, depending upon the projected
need of the neighborhood.

The internal road in a layout must be 20'
wide, if less than 250' in length; 25', if less
than 500'; 30' if less than 1,500' in length.

Roads with lengths of more than 1500' have a
prescribed width of more than 35' when found
necessary by the local authorities.

A road, if a continuation of an existing road,
has to correspond in width. It also must ful-
fill the standard of width stated earlier.
Roads, their junctions, curves and corners
of the junctions should be as directed by local
authorities to maintain a smooth turning radius
for vehicles and to allow wide angle vision at
the turns.

A dead end street should have a 44' diameter
circle at the end of the road to facilitate
the turning of a vehicle. The requirement can
be waived if the road is less that 150' in
length or dead end plots have at least 30'
frontage over such a road.

Segregation of different functions is imple-
mented by zoning bye-laws.

Spatial Shaft

A building is set back 15' from the front edge
of the lot boundary leaving such elements as
lamp posts and trees to create the three di-
mensional street. The width of a street is
decided by its length, and the number of
vehicles expected to pass through it in a
day. The building code details the relationship
of length and width of a street.

The building heights are governed by a floor
space index. Thus most of the residential
buildings can go to the height of 35' without
using an elevator. A fire code restricts the
maximum height of the building to 100'.

The plinth of a building is recommended to be
1'-6" from the crown of the road to prevent
water entering the house in case of heavy rain
and flooding in the surroundings of the house.
An over head projection of 4', such as a bal-
cony, is permitted in the margin.

The code clearly defines the dimensions, leav-
ing little leeway for the residents to encroach
upon the public property or abuse the codes
in extreme conditions.

Density
Administrative details and central control
became necessary to administer the large areas
of metropolitcan cities. Zoning laws and a
floor space index replaced the symbolic rep-
resentation, Vastu Purusha Mandala and other
such symbols. Laws, easy to administer with
central control, were preferred to guidelines
which required grass roots control to ensure
proper development and adequate services.
Town planning schemes were developed with
emphasis on administrative efficiency and
economic implementation.

Main street in a suburban residential development
Photograph: Patel, N.

The density of a neighborhood is controlled by the floor space index. A minimum lot area requirement of 240 sq. yds. with 50' frontage defines the maximum number of dwellings in a given area. To limit the possibility of over-building and not leaving open spaces, a building is required to have its ground floor area not more than 1/3 of the lot area. The floor space index is usually higher in commercial areas allowing denser development than residential ones.

Zoning is used as a segregating instrument for land. It can be used efficiently to eliminate polluting industries and factories from the residential and commercial areas, thereby reducing health hazards.

Services

The changes that occurred in the last two centuries have eliminated the traditional methods for the provision of ammenities, replacing them with a new system. Transportation problems and sanitary issues dominated the profession of planning. New methods of providing infrastructure and services required a central administration. Administrative control and ease of accessibility became the prime theme of the planning codes.

The provision of social services is left to the neighborhood with one exception. A common plot of approximately 15 per cent of the total plot area in a housing society must be left open for public gatherings and social festivities. Schools and provisions for playgrounds are encouraged in large scale developments.

Roads are used for surface drainage and are laid out accordingly. Building codes require that permission to occupy the building be given after laying out and constructing roads, providing services such as water supply, drainage, storm water drainage, street lighting, foot paths. However, the authorities may postpone enforcement of the law if the owner agrees to execute the work at his own expense before a future date which is agreed upon by the authorities.

Kitchen, bath, toilet, as well as a space for a staircase, can be common if a lot is shared by two or more dwellings. But the lot has to be of certain dimension prescribed elsewhere. To attain efficient ventilation and ensure adequate light in a building, a margin of 10' is required around the building. The code specifies that the window area of a room has to be 10 per cent of the floor area. The city authorities encourage vegetation and plantation around a building to create a cooler microclimatic environment.

The building Bye-Laws are drawn from various building codes, town planning legislation and different repoets published by the planning authority for the state of Gujarat and the city of Ahmedabad.

15
Aerial Photograph
AHMEDABAD - 1940

Source: Ahmedabad Municipal Corporation
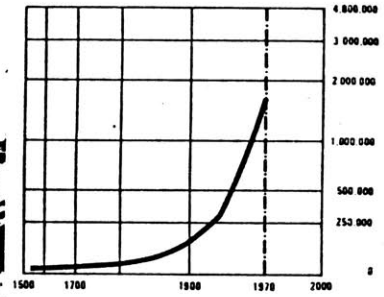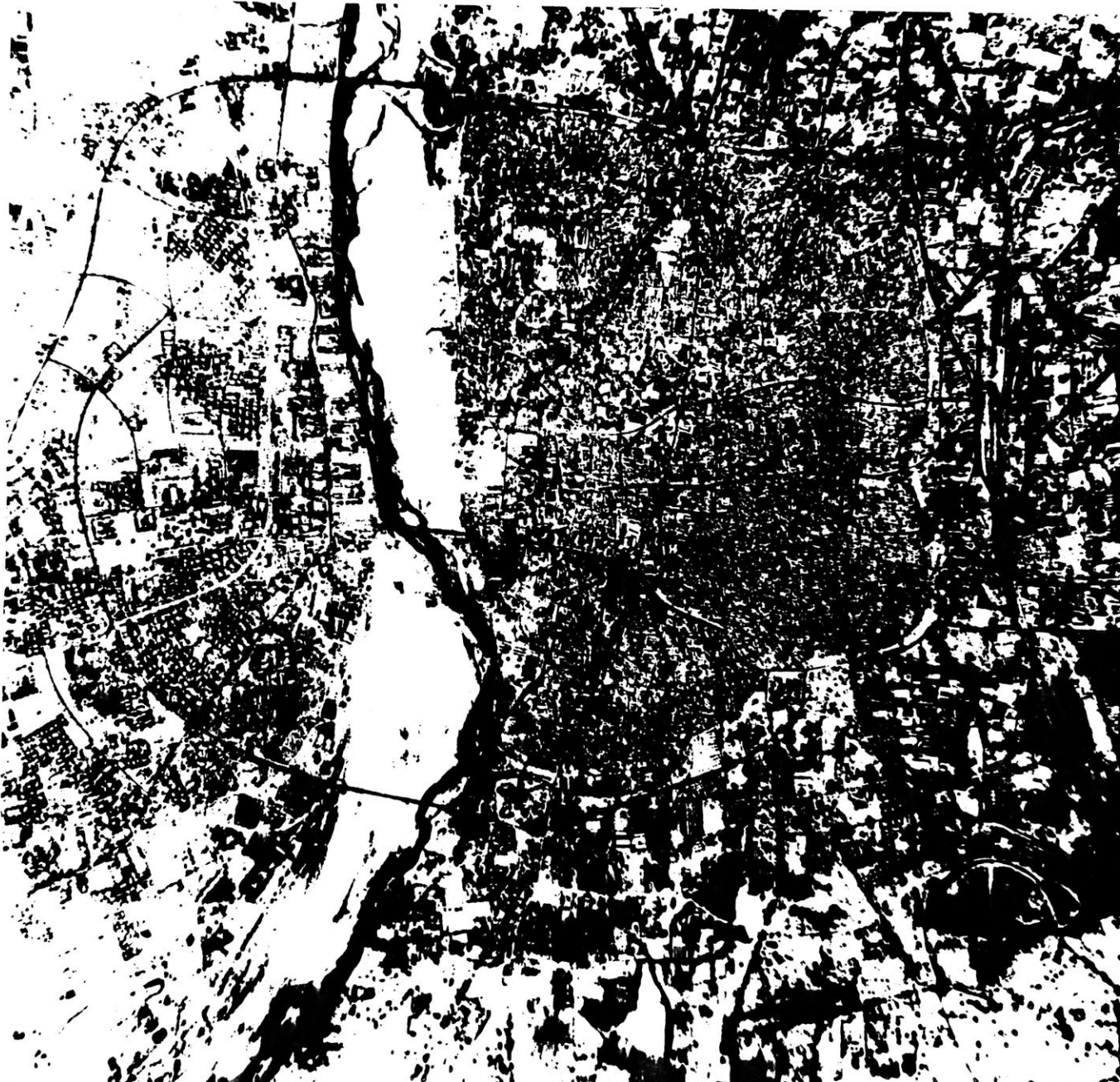
POPULATION
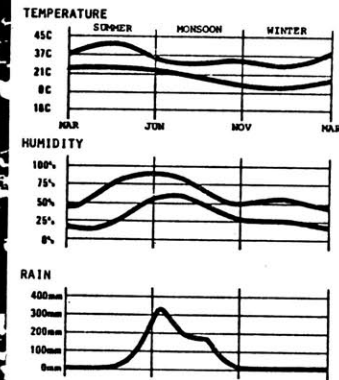
CLIMATE
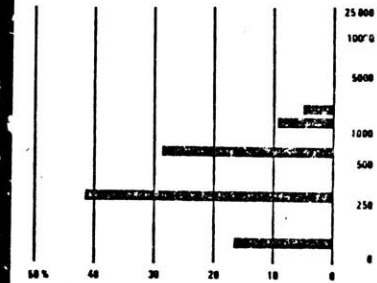
INCOME

Source:
Patel, N. - Thesis, M.I.T. 1976

AHMEDABAD

INTRODUCTION

The city of Ahmedabad is located on latitude
23°04' North and 72°38' East at an altitude
of 175' above sea level. The largest city of
the Gujarat State is located 350 miles North
of Bombay and 600 miles South of New Delhi.

[15] The climate of the city is hot and dry most
of the year. It falls in the semi-arid zone.
The city is divided into two parts, east and
west, by the River Sabarmati which flows north-
south, but is dry most of the year. The
summer is harsh with the high temperature around
44°C and winter is mild with 6°C temperature
at its lowest. Monsoon, one of the three
seasons, brings about 33" of rain. The sun
shines for more than 300 days in a year. The
monsoon is also a hot season with short, heavy
showers making the summer last for almost 8
months.[1]

This section is an introduction to the city of
Ahmedabad. It lists major historical events of
the city which affected the growth and development
of the city.

The intention is to identify major changes which
influenced the development of streets in the city.
As the purpose of this section is to prepare a base
for the comparative street study, detail account
of the history is not given. Within the scope
of the study, changes such as political, are not
emphasized. The focus of the study remains on
social, economic and physical changes.

1: Census of India - Speicl Report, Ahmedabad

26

Plan
AHMEDABAD - 1809

Source: India Office Library - Records

Plan
AHMEDABAD - 1975

'NICIPAL LIMIT SHOWN THUS ... ...

RIVER SABARMATI

CANTONMENT

OFFICERS LINES

AIR PORT

CHANDOLA TALAV

16
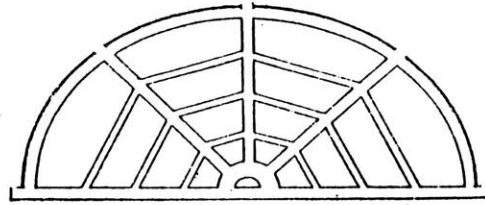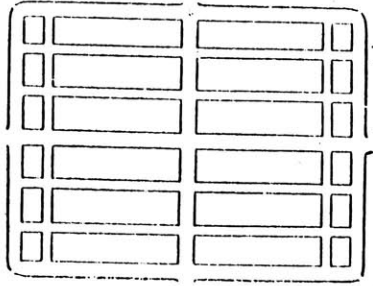
DANDAKA (Staff)　　　　　KARMUKA (Bow)　　　　　SARVATOBHADRA (Ambience every where)

AHMEDABAD

HISTORY

The city of Ahmedabad was established by King
Ahmed in the year 1411. The site selected was
close to the existing commerical settlement
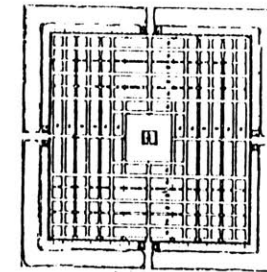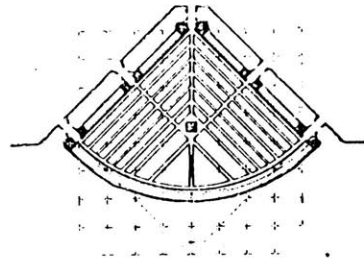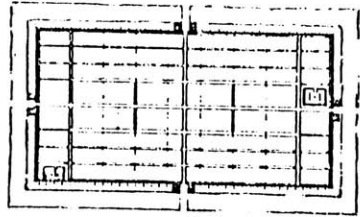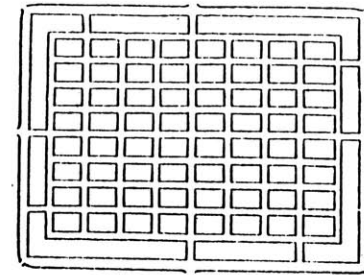called Asha Palli. Thus, though the city was
established for political reasons, the population
remained essentially commerce-oriented, with an
economy based on a flourishing trade, along with
export-import conducted through the port of
Cambay. Weavers and jewellers, inlayers of
ivory, ebony and sandlewood were a few of the
skills which flourished under Muslim rule.[1] The
city, situated on the junction of highways
connecting northern to southern India and
connected to other countries through the sea
port of Cambay, enjoyed certain economic advan-
tages.

It is believed that the planning of the city
was based on Hindu cannons, drawing inspiration
from existing cities such as Patan. (Patan -
the former seat of the ruler before establish-
ment of Ahmedabad). Historians debate the dif-
ferent type of settlement diagrams derived
from the ancient treatises on which the city
16 was planned. Few conclude that the city is a
"sarvatobhadra" (Happiness everywhere) type of
settlement. Few brand it a "Dandak" (staff)
which gradually developed into a "Karmuka"
(Bow) type of town.[2]

The city developed along the river bank in a
rectangular form. The sites near the citadel

were considered the best in reference to loca-
tion, defense, and accessibility, hence were
allotted to those in favor with the rulers. The
administrative structure of the city was largely
drawn from the Muslim community which occupied
the sites near the citadel. Hindus occupied
the rest of the eastern side of the city.

The development of the town was slow in its
early stages until the rule of Sultan Mohmud
Begada who initiated the policy of allowing his
commanders to establish townships and collect
revenue in exchange for services to the Sultan
when required.[3]

This policy of a dispersed administrative
structure for development became so successful
that the city expanded rapidly. The fort wall,
a later addition to the city, was constructed to
check its growth and accounts for the irregular
shape of the city.

The city which prospered under the careful maneu-
vering of the Muslim Sultans, underwent a series
of invasions by Marathas in the 18th century.
During the Maratha reign of 110 years, from
1708 to 1818, Marathas promoted the physical
decline of the city.[4] They showed least interest
in its economic prosperity. The fort wall was
broken and the streets deserted. Many edifices

1: Gillion, K. - Ahmedabad
2: Bhatt, P. - Ahmedabad in Time and Space
3: Ahmedabad Gazateer
4: Ibid
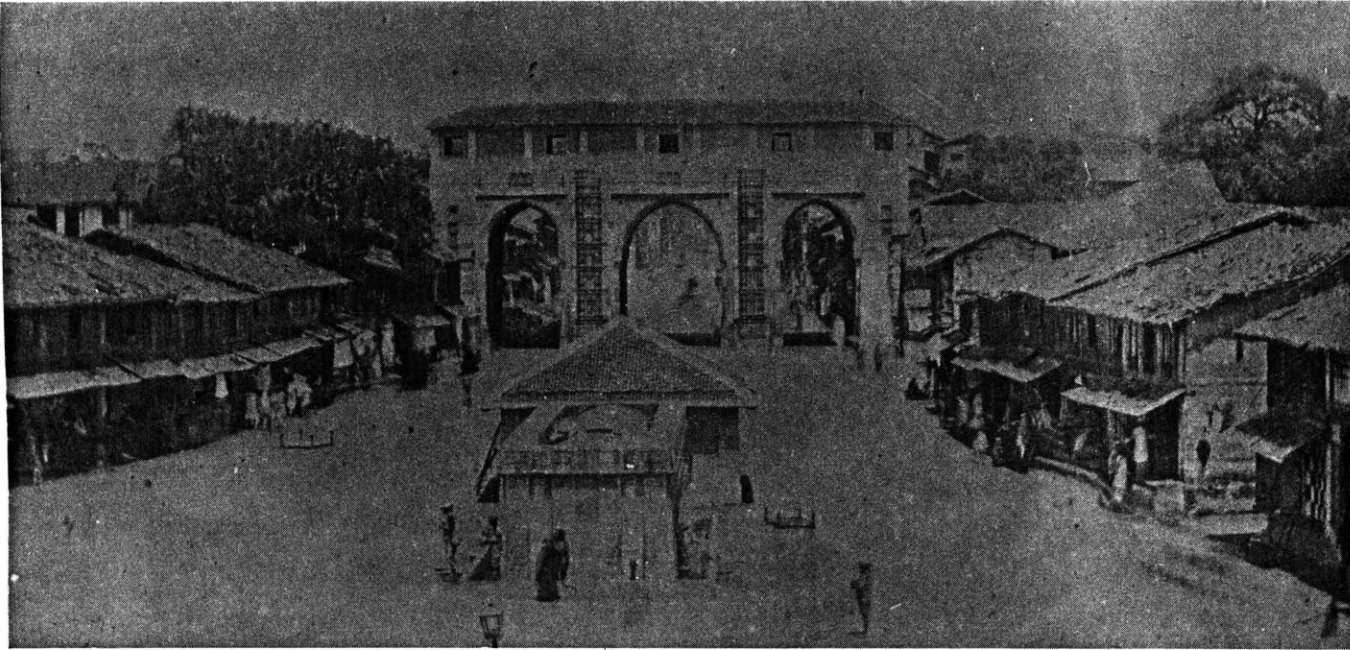
View of a street with three gates
and surroundings in 1896 (Top - Opp. Pg.)
The same street in 1979 (Top)
Photograph: VIKSAT

Dense development - East part of the
city with chimneys of textile mills
in distant skyline (Bottom - Opp. Pg.)
Low density - West part of the city
with trees and vegetation
(Bottom)
Photograph: Shah, V.

17
PATTERN - INCOME
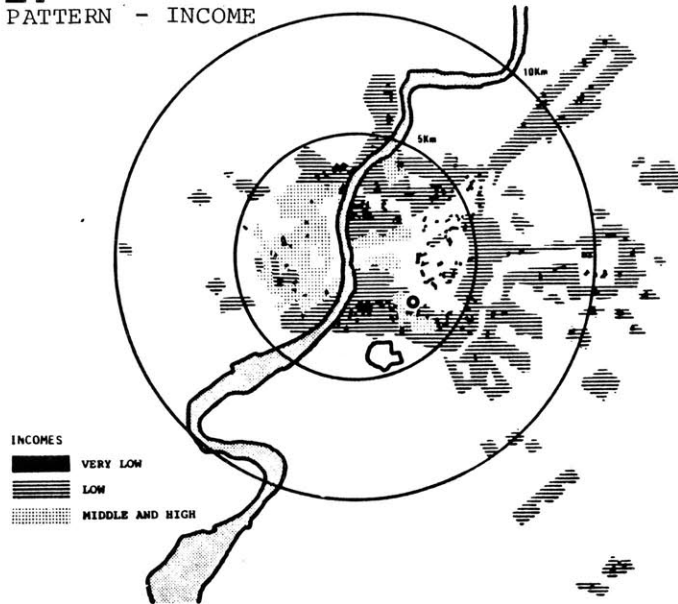
INCOMES

	VERY LOW
	LOW
	MIDDLE AND HIGH

- DENSITY
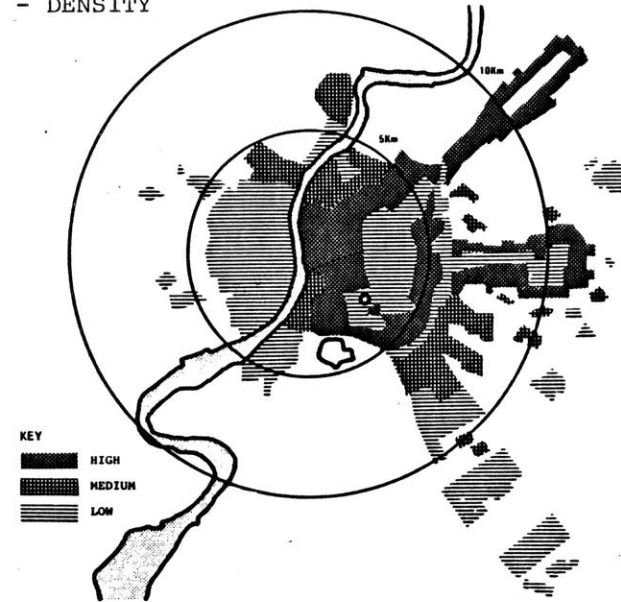
KEY

	HIGH
	MEDIUM
	LOW

- GROWTH
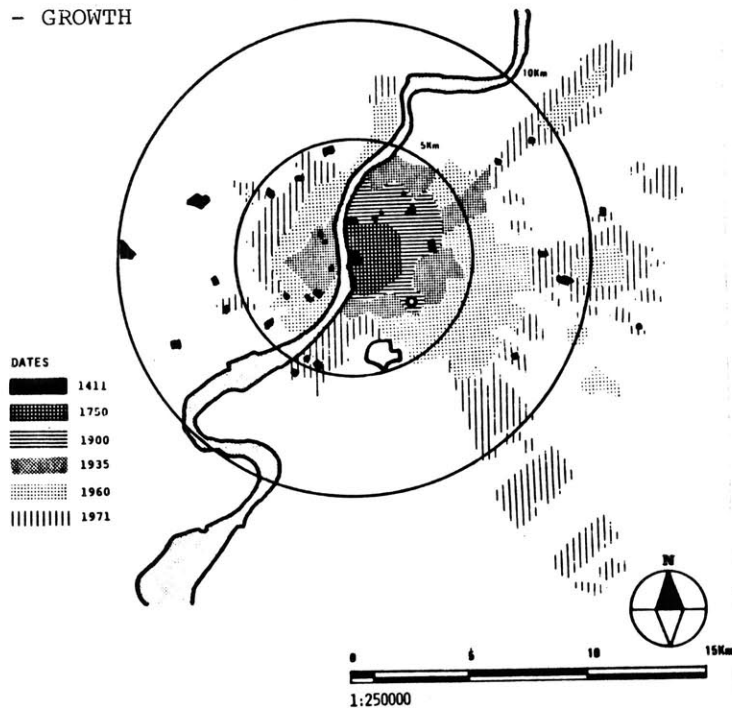
DATES

	1411
	1750
	1900
	1935
	1960
	1971

1:250000

VARIATION IN DENSITY

Year	Density of Population per square kilometer	Variation per cent
1872	21,977	---
1881	22,552	+ 2.62
1891	13,608	− 39.66
1901	13,094	− 3.78
1911	9,970	− 23.86
1921	11,301	+ 13.35
1931	19,135	+ 33.93
1941	11,276	− 25.50
1951	15,029	+ 33.24
1961	12,363	− 17.72
1971	17,053	+ 37.95

Source: Chavda, A.V. - Thesis, M.I.T. 1977
Census of India - Statistical Outline, Ahmedabad

were in dilapidated condition. Monumental edifices became filled with dirt, weeds and cow dung. Shops and houses were constructed on and around the edifices. The roads became dusty, ill maintained and narrow. In the rainy season they became muddy creating unhygenic situations.

The old principles of town planning were neglected. The security of life and property became the main aim in the building industry of that era. The city authorities neither controlled nor interferred with the gradual erection of buildings and encroachments agreeable to the social habits of the immediate residents.

In 1818 the British took over control of the city and the city started to revive under their stable administration.[1] Industrialization was felt with the introduction of a textile mill in the year 1861.[2] Investment in trade and industries increased. This rapid industrialization, growth of the textile industry, as well as other ammenities and the attraction of technological development intensified the growth of the city. The western bank of the River Sabarmati was opened up with the construction of a bridge in 1870.

Traffic problems in the center city had become so serious that in 1934 the municipality decided to build a road from the west to the east of the city to relieve the center city.[3] But two more bridges constructed over the river in 1939 and 1940 encouraged more suburban development. The residents of the walled city moved out to suburbs. The new area opened up by the construction of the bridges became predominantly an upper income residential area. A dwelling in the suburbs, with a new life style, became a symbol of social and economic status. The city administration encouraged the development of a garden suburbia with imposition of the new town planning code.

ISSUES-CHANGES

It was around the turn of the 19th century that the first suggestion for "planning ahead" was made. The unplanned location of mills, huge British bungalows and large reserves for containment were only a partial reason for higher land prices and for the scarcity of urbanizable [17]land near by. The scheme of green belt around the city to ensure proper development was inadequate to control the growth. Instead of controlling, it encouraged more haphazard development beyond the Green Belt. Workers squatted on any piece of open land. Their priority in choosing the place remain the distance of commuting to their respective employment places. The mills were surrounded by huts of straw and mud, built by the mill workers.[4]

1: Jhote, R. - Gujaratnu Patnagar - Amdavad (Ahmedabad - the Capital of Gujarat) in Gujarati
2: Ahmedabad Municipal Corporation - Draft Development Plan 1975
3: Gillion, K. - Ahmedabad
4: Bombay Government - Special Reports on Slums

Social change remained slow and was largely limited to education, particularly women's education. Organizations of reformers focused on preventing child marriages, liberating caste rules and financing worthy causes in the humanities. Though women's liberation and education opened up a new direction of social change, society retrenched its steps to an extent because of events such as communal riots.

Also the economic and political ups and downs enhanced social ties. The population of the city which is estimated at around 25,000 in the 15th century reached a figure between 250,000 and 500,000 by the end of the 17th century.[1] With the decline of the city in the 18th century, the population reached its bottom figure of 80,000. After that point, the city has continuously grown. At the turn of the 19th century, the population of the city increased to 200,000. The growth of the city remains rapid and reached figures of 1,149,918 in 1961; 1,591,832 in 1972 and 2,000,000 in 1981.[2] Boundaries of the city were extended to include an area of 10 sq. miles in 1911 from less than 3 sq. miles in 1872 recording an increase of 400 per cent in 40 years. With the recent extension, the city covers 40 sq. miles.[3] The city authorities hope to achieve a better environment with the second draft development plan prepared for 1975-1985.

18

HOUSEHOLDS BY LIVING ROOMS

Households	Census Year 1961			Census Year 1971		
	Total households	Total members (%)	No.persons per room	Total households	Total members (%)	No.persons per room
TOTAL	100.0	100.0	3.11	100.0	100.0	3.22
One room	65.3	57.2	4.35	57.5	53.7	5.14
Two rooms	23.0	26.5	2.87	27.5	28.3	2.84
Three rooms	5.5	6.8	2.05	7.8	8.7	2.04
Four rooms	2.8	3.9	1.73	3.9	4.6	1.65
Five rooms and more	3.2	5.5	1.31	3.2	4.7	1.28
Other (unspecified number of rooms, no regular rooms,etc.)	0.2	0.1		0.1	0.0	

CIVIC ADMINISTRATION STATUS

Period	Status	City Area (acres)
1817-1873	Non-Statutory Committee	1,414
	Statutory Municipal Committee	1,414
1873-1926	City Municipality	5,921
1926-1950	Borough Municipality	12,964
1950-	Municipal Corporation	22,985

Area within fort walls: 1,361 acres

1: Ahmedabad Gazateer
2: Census of India
3: Ahmedabad Municipal Corporation - Administrative Reports

Source: Ahmedabad Municipal Corporation - Special Reports

CHANGES - SOCIAL

The prevailing social conditions and traditional
social divisions at the time of the city's
establishment were reflected in the spatial
pattern of the city. Muslims, being the ruling
class, stayed closer to the citadel and Hindus
having strong affiliation to the caste system,
developed residential neighborhoods popularly
known as "Pol." This separation by community and
caste was furthered by grouping of families. The
ways of living, dress, religion all were reflected
in the spatial pattern. Within the community,
classes enjoyed social and domestic advantages
by adhering to their respective groups.

The social structure has changed very little.
When the municipality acted in the early 20th
century to widen the streets, the displaced
[18]residents preferred to move into other already
dense parts of the city because of sentiment and
for reasons of security.

Guilds - Mahajan - of each caste attained a
strong foothold in the closeknit communities
and exercised social control over the society.
Mahajan was responsible for such tasks ranging
from the responsibility to represent the
community to the city administration, to mainte-
nance of hygenic conditions and the social envir-
onment of the neighborhood. Individuals were
not allowed to act in a fashion unacceptable to
the society at large.[1]

The stable political situation of the 19th
century and the prosperity brought about by
increasing trade and industrialization loosened
up the social ties to an extent. The British
enhanced the process by establishing a formal
administrative structure (like courts and
offices) thus weakening the grip of the guild
on the society. The establishment of formal
educational institutions, press, and other such
organizations furthered the process of social
awareness. However, the society was not
satisfied with the new system of administra-
tion (although the growth of the city demanded
the formation of a formal administration--hence
the formation of the municipality to deal with
the issues of the city). Consequently, a council
was formed to deal with the immediate problems
such as repair and maintenance of fort wall and
roads.[2] The council still maintained the responsi-
sibility of presenting the citizens' priorities
to the British administration.

There were major recreational places such as
Hauj-E-Kutub (Kankaria Lake) and various parks
in the city. However, in the former social
structure of the city where smaller community
places were better utilized, the extensive
provision of amenities for a large group of the
public was never demanded. Daily services were
provided by residents with mutual understanding
and common effort. The growth of the city

1: Ahmedabad Gazateer   2: Ibid

and changing social conditions required an effi-
cient program of education, health and recreation.
Planning and provision for libraries, museums,
stadiums and play grounds, parks and gardens,
auditoriums and art galleries was necessary in
this situation. Also, the need for institutions
to provide social services was felt.

CHANGES-ECONOMIC

Since the city was the major trade center in
the vicinity, as well as the seat of the ruler,
it enjoyed a higher economic yield. There is no
accurate information available about the income
of an individual of that period, but it is
speculated that it was much higher than a sub-
sistance income level. With the construction of
the first textile mill in 1861, followed by
many others, the seeds of an industrial era
were planted. Trade and industry flourished.
Industrial growth helped increase per capita
income of the city. Urban per capita income
was twice that of rural per capita.
Per capita income of the city increased from
1/4 Rs. (4 Anna and 1 Pai) in 1897 to 350 Rs.
in 1971.[1]

Five per cent of the city's population earns more
than $1900 per annum, 9 percent between $1100
and $1900, 29 percent between $600 and $1100
and the rest (some 53 percent of the total)
falls in the low and very low income groups

earning less than $600 per annum.[2] The increa-
sing trade and the advantages generated through
it, are more or less shared by the social groups
of the individuals involved in trade. Upward
mobility came to the group as a whole leaving
many people without these advantages.

[19] Textile mills grew from 9, with 7,541 workers
in 1891, to 29, with 16,887 workers in 1901.
The number of mills increased over the years
as well as modernized. Many subsidiary indus-
tries started developing. In 1971, 1729 fac-
tories were registered employing a work force
of 152,986 persons. The number of subsidiary
workshops was closer to 9,000 employing
100,000 people.[3] A significant change came
in the occupational pattern of the city.
Three major groups surfaced. Forty percent
were involved in the manufacturing industries
and 22 percent in services, thus constituting
68 percent of the total working population.
Twenty-seven percent of the working population re-
mained in trade and communication.

Transportation and communication became impor-
tant to the commuting work force. Public
transport is one of the major options. Six
hundred thousand people commute daily by
public transport which consists of more than
400 buses. There are approximately 500,000

1: *Census of India - Census Summary, Ahmedabad 1971*
2: *Ibid*
3: *Ahmedabad Municipal Corporation - General Department, Records*

cycles on the road, another major option for commuters.[1] Forty thousand motor cycles, 17,000 cars, 9,000 autorickshaws and 3,000 trucks with other vehicles and taxis make the total vehicles on the road some 70,000. The city also has quite a few animal driven carts and carriages. It is also connected to other major industrial cities and trade centers by railroads, highways and air service, thus enhancing its growth.

19

NUMBER OF MILLS, SPINDLES, LOOMS AND WORKERS (1861-1971)

Year	No. of Mills	Average Number of Workers Daily Employed
1861	1	63
1879	4	2,013
1891	9	7,451
1900	27	15,943
1914	49	32,789
1922	56	52,571
1939	77	77,859
1950	74	124,232
1959	71	130,916
1971-72	67	119,376

REGISTERED FACTORIES AND WORKERS

Year	No. of Working Factories	Average No. of Workers employed daily in Working Factories
1964	895	16,2096
1965	939	16,2105
1972	1191	15,0373
1973	1287	16,7950

CHANGES - PHYSICAL

King Ahmed started to build the city with constructution of the citadel, three gates, the Friday Mosque and the ceremonial avenue which connected these elements. The rest was allowed to develop gradually. The city developed with seventeen major roads formulating the main network of communication.[2] The main streets of the city, as noted by various travellers, were wide, tree-lined avenues running north-south and east-west.

The avenue connecting the Bhdra Fort (citadel) and the Friday Mosque was more of a processional route than a circulation artery. The Friday Mosque and its vicinity became a major public place. The streets around it served a commercial function. With the growth of the city, the commercial usage spread along all main streets of the city. Residential streets remained segregated from public functions. It is believed that corrupted administrators, during the Maratha reign, took bribes and allowed encroachment on the streets and public places.[3] Many citizens took advantage of this situation. They encroached upon the streets, creating curves and windings to ensure security and ease of defense. Many residential developments had a separate entry gate which, when enclosed, assured the community complete seclusion and security.

1: *Ahmedabad Municipal Corporation - Traffic Study 1971*
2: *Shankerlal Amritray - Amdavadno Jivan Vikas (Expansion of Ahmedabad city) in Gujarati*
3: *Jhote, R. Amdavadno Parichay (Introduction of Ahmedabad) in Gujarati*

In the late 19th and early 20th centuries the municipality undertook the job of widening existing streets and constructing new ones by removal of bottlenecks and purchase of new land. The administrative help of leading citizens was secured in purchase of the properties. Along with other minor roads, three major roads, one from the center to the northern periphery and two from east to west were built. New streets were laid out to cope with the immediate problem of traffic in the city. The municipality decided to open up the city by demolishing the fort wall, which was no longer a necessity for defense, and make a ring road around the city. This ring road became the first ring in a series of ring roads to be developed later on in the 20th century.

The political instability of the 18th century and before augmented the close ties of families. This was reflected in the density of neighborhoods. The available figures for house occupancy show 35,280 houses in 1872, an increase from 29,000 in 1824.[1] The quality of the housing environment deteriorated after industrial development. Out of 84,400 houses recorded in 1911, many were shared by families who occupied a one-room shelter or a hut in the popular settlement.[2] As per the 1971 census, 653 familes out of 1,000 live in one-room households.

18

The density kept increasing as the houses were divided and subdivided to fulfill the growing demand for housing. The average density in the walled city reached 220,000 persons per square mile with certain neighborhoods having a density

as high as 350,000 people per square mile by 1971. However, the suburban development remained at a low density with about 15,000 persons per square mile. Though the suburbs were more sparsely populated (7% of the population occupied 35% of the urban land) 60% of the city expenditures were made in this area in the last 25 years.[3]

The formal administrative structure of the city, after its establishment in 1834, initiated efforts to provide a water supply network as one of its major programs. Provision of such infrastructure remains a focus of the city administration. As early as 1890 the municipality started laying out an underground drainage system to avoid serious problems of contamination surfacing in the existing system of the soak well. The city was introduced to a telephone system in 1897, electricity in 1915 and a bus service about 1921.[4]

20

20   TABLE OF INFRASTRUCTURES

	City Roads		Street Lights	Sewer Lines
	All roads (kms.)	Unsurfaced roads (kms.)	Total	Length of sewer lines (kms.) (at end of yr.)
1961	777.4	322.6	12735	380.4
1962	803.2	322.6	13549	417.7
1970	813.4	148.7	19987	674.6
1971	811.6	123.9	21028	726.3

1: *Ahmedabad Gazateer*
2: *Census of India - Census Summary 1911*
3: *Ahmedabad Municipal Corporation - General Department, Records*
4: *Gillion, K. - Ahmedabad*

Source: Ahmedabad Municipal Corporation - Special Reports

STREETS: TRADITIONAL VS CONTEMPORARY

In this section a traditional residential
development, designed and developed under the
influence of ancient planning principles and
traditions, is compared with a suburban develop-
ment administered by modern building bylaws and
town planning schemes.

The intention is to bring to light the funda-
mental properties of each set of principles and
determine the influence of each as a preliminary
investigation towards understanding as well as
testing the validity of the ancient and contemp-
orary planning principles.

As the scope and purpose of the comparison is to
understand the principles and initiate a similar
inquiry in more depth, various issues like site
selection, land values and financing are not
touched upon.

Streets have been reviewed with respect to phys-
ical and environmental issues.

INTRODUCTION

TRADITIONAL STREETS

The socio-occupational groups of the past and
the prevailing political situation formulated
the streets of the wall city Ahmedabad in its
present condition. It was unusual to have the
workplace away from one's living quarters in
those days. However, the market places were
separated from the living places.

Though the character of a street remained the
same, the shape and size of streets were trans-
formed radically in the political chaos of the
17th and 18th centuries.[1] Narrow and winding
streets with crooked curves and unusual turns
are the result of this situation.

The integrity of the socio-occupational groups
which formed the caste system of today has left
a clear influence on the development of a resi-
dential neighborhood, a "pol." Usually a pol is
formed by a grouping of families of one caste
and occupation.

PLAN - OLD CITY DEVELOPMENTS

1:10000

1: Bhatt, P. - Ahmedabad in Time and Space

Source: Chavda, A.V. - Thesis, M.I.T. 1977

TRADITIONAL

PLAN - NEW CITY DEVELOPMENTS

N

0   100   500m

1:10000
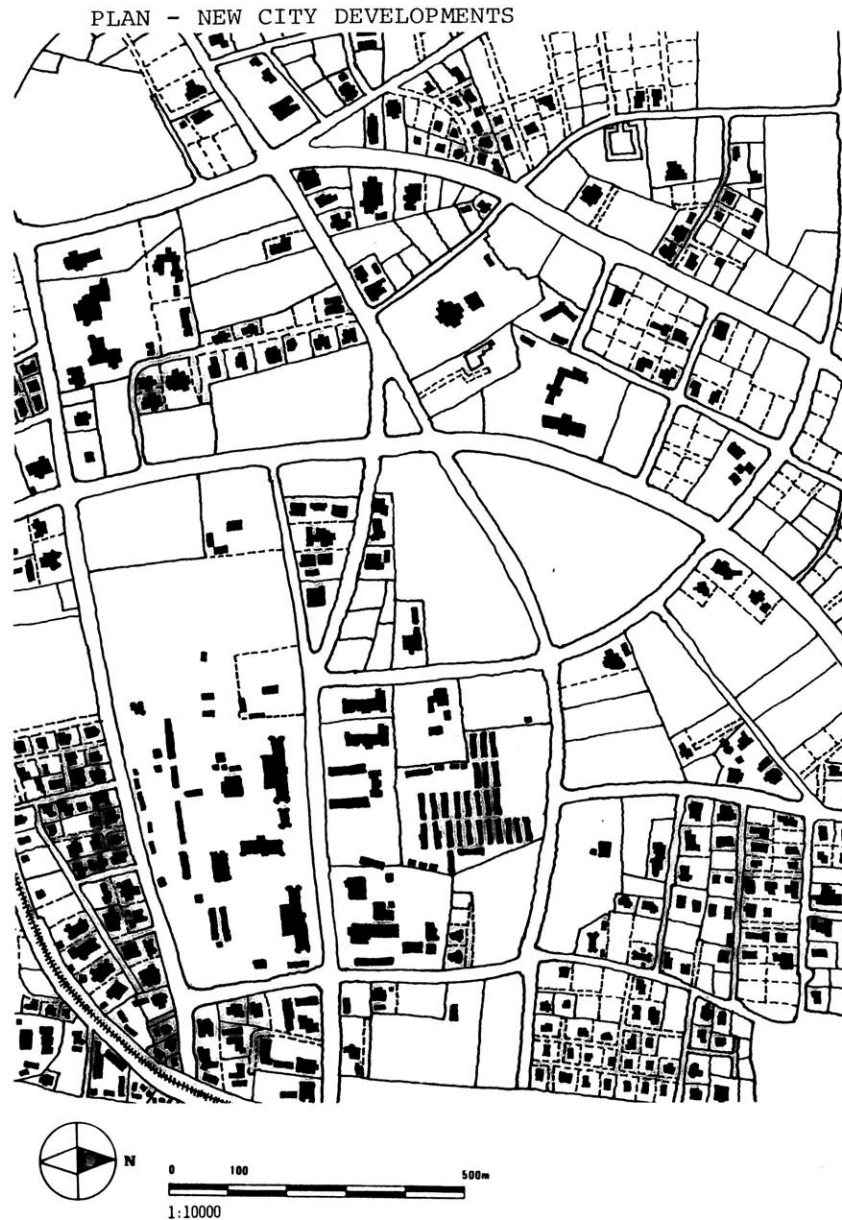
CONTEMPORARY STREETS

The city of Ahmedabad, although an urban center
in its vicinity for more than four centuries,
started growing physically after the construction
of the first bridge over the river Sabarmati.
As the migrants poured in from all directions
to the center city, the city population in-
creased at a very rapid rate; the citizens
occupying the center city started moving out
to suburbs which opened in the late 19th
century on the western bank of the river.[1]

The British influence reached its peak, at that
time, affecting various fields, including those
of architecture and planning. The city author-
ities, under British influence, developed new
building codes and town planning legislations.
Streets were planned with a grid-iron pattern
in mind.

The societal structure which affected the
development of the walled city also influenced,
to a lesser degree, the suburban developments.
People tended to form co-operative housing
societies in the manner similar to the tradi-
tional one.

Source: Ahmedabad Municipal Corporation

1:   Shukla, H. - Ahmedabad Guide

CONTEMPORARY

21
SOCIAL

Composition	LAKHA PATEL'S POL # of Persons	BRAHMIN SOCIETY' # of Persons
Population	500 (100%)	355 (100%)
Brahmin	102 (20%)	284 (80%)
Patel	329 (65%)	21 (6%)
Vaishya	48 (10%)	45 (12%)
Muslims	4 (1%)	
Christian		
Jain	8 (2%)	3 (1%)
Other	9 (2%)	2 (1%)

22
ECONOMIC

Occupation	LAKHA PATEL'S POL Working Pop.	BRAHMIN SOCIETY Working Pop.
Total	102 (100%)	90 (100%)
Business	16 (15%)	22 (25%)
Service	71 (70%)	49 (55%)
Household	10 (10%)	9 (10%)
Arts/Crafts	3 (3%)	1 (1%)
Profession	1 (1%)	6 (6%)
Other	1 (1%)	3 (3%)
Income Group		
Higher		
Upper Middle		32 (35%)
Middle	26 (25%)	46 (50%)
Low	62 (60%)	5 (5%)
Very Low	10 (10%)	
Mode of Transport		
Automobile		3 (3%)
Motorcycle	16 (16%)	23 (25%)
Cycle	36 (35%)	13 (15%)
Public Transport	35 (34%)	51 (57%)
Pedestrian/ Other	15 (15%)	

Source: Vinay Shah, Field Research

VEHICLES IN THE CITY
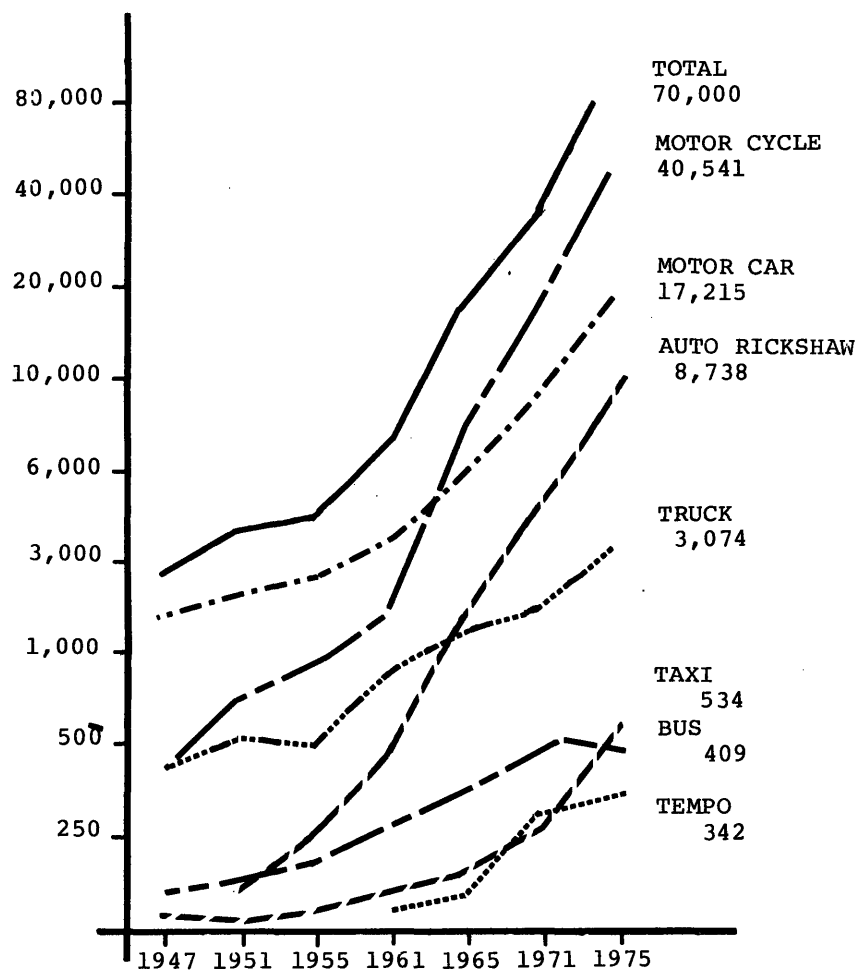
	LAKHA PATEL'S POL	BRAHMIN SOCIETY
Area		
Total	3.0 acres (100%)	12 acres (100%)
Built up	2.4 acres (80%)	3.2 acres (27%)
Streets	0.6 acres (20%)	2.4 acres (20%)
Other		6.4 acres (53%)
Dwellings	96 units	87 units

TOTAL
70,000

MOTOR CYCLE
40,541

MOTOR CAR
17,215

AUTO RICKSHAW
8,738

TRUCK
3,074

TAXI
534
BUS
409

TEMPO
342

80,000

40,000

20,000

10,000

6,000

3,000

1,000

500

250

1947 1951 1955 1961 1965 1971 1975

Source: Ahmedabad Municipal Corporation, Traffic Study

Source: Vinay Shah, Field Research

SOCIAL

Composition

The caste system has had a great deal of influence
on the residential neighborhood which of late has
taken a more complex and rigid form. Though in-
creasing education levels, changing economic
structures and occupations have loosened these
social ties, one still adheres to one's caste
group to a large extent. For example, a pol
named Lakha Patel's Pol after its developer who
was Patel by caste, is occuped by the majority
of the same community. Patels originally were
involved in agriculture. This particular pol has
65% patel, 20% Brahmin, 10% Vaishys and 5% from
other castes and religious groups. Thus each
neighborhood not only can be identified as Mus-
lim, Hundus or Christian, but can also be identi-
fied by the particular caste of its occupants
also.

21

Traditionally the King's Court allotted the lots
on the basis of an ancient system. Large plots
were sold to various communities which in turn
subdivided the plots between the families of
the communities. Each family purchased the lot
to suit its needs and according to its economic
ability to maintain the plot. This method en-
couraged the development of a multi-family unit
popularly known as "Khadki." An area so chosen
was subdivided with houses opening up on a small
dead end street. Because of a long relationship
with neighbors, the social ties were made strong-
er by the close spacing of dwellings. The ties

TRADITIONAL

were enhanced by social situations and unstable
political conditions. A close community evolved
developing spaces for use by selected groups of
people. The community places were developed for
the use of the community within close proximity.

Organizations

The system of "Mahajan" or guild system is dis-
integrating since it does not carry any admini-
strative responsibilities such as maintenance
of the streets and cleaning of public spaces.
New organizations have developed to fulfill
new requirements surfacing in the present develop-
ments. A selected administrative body of few
members is established to take care of the social
function and services of the neighborhood. Though
the whole neighborhood community does not parti-
cipate in the celebration of a birth or a marriage
as per the tradition of the past, for example,
the joy is however shared symbolically by distri-
buting sweetmeats throughout the neighborhood.
The neighborhood gathers to console the bereaved
family on the occasion of a death. The admini-
strative body takes partial responsibilities for
organization on such occasions.

Youth organizations to organize youth activities,
various clubs to organize games and women's
associations to look after women's specific needs
are too few to name in the recent development.

Composition

The social organization of residential neigh-
borhoods today reflects the influence of tradi-
tions. Recently formed societies and co-opera-
tive organizations hold concepts similar to the
Caste System, that of the old developments.
Professors' colony, occupied by professors,
Jain Nagar (township of Jains) occupied by
people who are Jain by religion, are just two
examples which identify the prevailing system.
The society named Brahmin Society is mostly
occupied by Brahmins. The society has 80 per
[21] cent Brahmin occupants, 12 per cent Vaishya,
6 per cent Patel and 2 per cent other castes
and religions. The occupancy pattern reveals
a close similarity to the old city residential
pattern.

The city authority has allowed developers to
purchase large pieces of land for development
which facilitates the citizens' action to
formulate co-operative housing societies. The
residents felt more comfortable with neighbors
of the same community, caste and religion.
This helped reconstruct old social ties. The
communal agitations of 1911[1] and those of latter
dates enhanced segregation by religion and
increased the community ties of the same group.

Organizations

A society forms an administrative body to take
care of such tasks as selling or purchasing of
plots from the society. In various societies
the range of the task covered by the administra-
tive body varies between organizing social
events and taking care of administrative details.
The occasion of a death is still one of the
most respected ones and each family of the
neighborhood is represented by a person in
gatherings for consoling the bereaved family.
Other occasions like birth and marriages are
becoming more and more personal. People of
the same community move away from each other
and establish different societies in far-
spread sectors of the city, thus finding it
difficult to keep in touch on the frequent
festive occasions. On the other hand the new
structure of neighbors and social ties is
quite loose in comparison to the close knit
system of the past.

Various clubs that enroll members, offer
recreational activities like card games,
entertainment like movies, and services of
food, have substituted small scale tradition-
al organization.

1: *Bombay Government - Special Reports, Communal Riots*

Services

The old system of building drinking wells, places
of worship and other such similar services by a
combined communal effort is still alive. The
water supply is obviously taken care of by the
city administration but other than that, the
society has taken responsibility for the provisi-
on of recreational activities such as film shows,
folk dances and educational activities such as lib-
raries and evening schools for adults. The pol
also provides large utensils for feasts and decora-
tions for the various festivities. Thus a sense of
close-knit community is generated by sharing
feelings and participating in various activities.

This community feeling is reflected in the variety
of activities occuring in open spaces, cul-de-
sacs and streets. The living spaces of the houses
are extended into these open spaces. The front
porch (although limited in size by a portion of
it being occupied by the water closet) is used
by housewives in the afternoons in order to extend
their household activities.
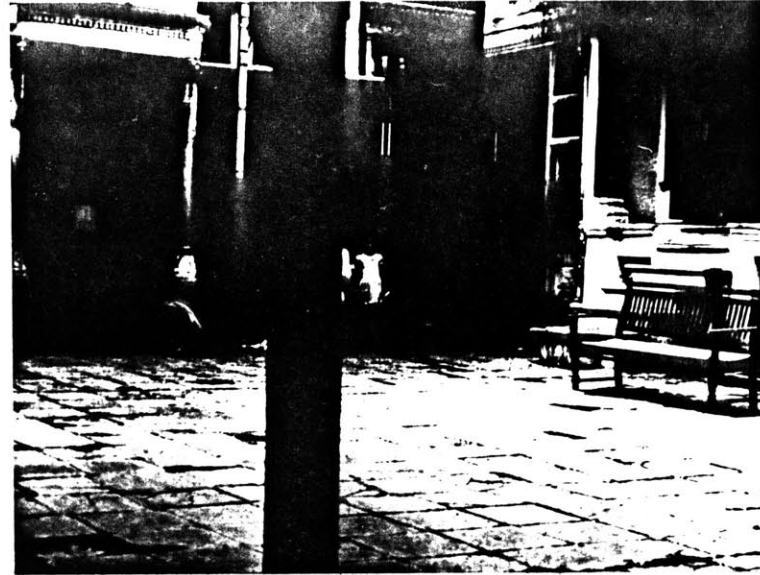
A courtyard, surrounded by dwellings, with elements like a
bench (Top)
Houses, with steps and porches, extending into
a cul-de-sac (Bottom)
Photograph: Patel, N.

Large tract of land (no man's land) (Top)
Long row of houses separated by a street (Bottom)
Photograph: Chavda, V.

Services

The community at a small neighborhood level
does not offer recreational services as
before. Commercial caterers have eliminated the
need for communal properties such as large uten-
sils for preparing food for festivities.

Loose social ties are also reflected in the use
of public spaces and street activities. The
physical separation of street and dwelling
with 15' of front margin and 20' separation of
dwellings by 10' side margin from the plot
boundaries is augmented by the social structure.
People know fewer of their neighbors as the
city keeps expanding. The communication with
neighbors, which was one of the major reasons
for outdoor activities, is loosing its meaning.

The common plot, which is usually 15 percent
of the plot area of the society, is a place for
get-togethers for occasional festivals and
for some occasional youth activities. It is not
attached to any dwelling and so cannot be used
as an extension of living space.

As noted before, since the streets are not pro-
tected from the sun, most of the daytime outdoor
activities are discouraged. Young children
also have to say in their respective houses
or enclosed spaces till late afternoon. Younger
children are not given permission to go on the
streets due to fear of their being run over.

ECONOMIC

Occupation

Neighborhoods were occupied by one occupational
group. The caste system -- categories of socio-
occupational groups -- was a major force in the
creation of settlement patterns. This pattern
changed with the changing economic condition of
the city. The craftsmen could not survive
in their small workshops working at home in the
age of mechanization, industrialization and mass
production. A new brigade of service workers
and laborers sprang up in the last century,
changing the occupational profile of the old
neighborhoods. Again reflecting on the example
of "Lakha Patel's Pol" one can see that the Patels
have joined other professions. The occupation
22 profile of the neighborhood shows 15% of the
population involved in business, 70% in service,
10% in household jobs and the rest of the popu-
lation in occupations such as teaching, arts
and crafts.

Income

Moreover, many of the original occupants have
moved out into the suburbs of the city and formed
cooperative housing societies. This has changed
the occupation patterns, as well as the range of
income in the neighborhoods of the old city.
The present population in these areas presents
22 a varied pattern of income. The largest portion
of the population falls in the lower income group,

having incomes of about $500 per year, which
is equivalent only to a subsistence level. This
group represents 60% of the total. Another 25%
of the population falls in the middle income
range and 10% in the very low income group.
Data for the rest of the population is not avail-
able.

Mode of Transport

The majority of the residents of these neighbor-
hoods do not own automobiles. Many work in the
center of the city within walking distance.
Others use bicycles or public transportation
(buses) to reach their work places. One hardly
22 notices motorcycles and cars are rare. 16% of
the working population use motorcycles, 35%
use bicycles and the rest use public transporta-
tion or they walk to their respective work places.
Top priority is given to daily needs, next a
place to live and everything else is secondary.
The population is anxious to increase the level
of services and infrastructure above that avail-
able to them today. The idea of wide streets
and tree-lined avenues does not appeal to them.

Occupation

The changing economic situation of the urban
area is reflected in the settlement pattern.
The old method of classification by occupation
was outdated long before industrialization
became a major force for urban growth. The
settlement reflects the new class of occupa-
tion -- that of the service man and laborer.
A glance at a society, for example, the Brahmin
society, does not represent the intellectuals and
administrators in the neighborhood as would have
been the case in the past. This particular
[22] society has an occupation profile showing 55
percent servicemen, 25 percent businessmen,
10 percent household jobs and 10 percent in
other occupations.   .

The suburban societies are formed largely by
the groups of people moving out of the old
city, who are economically more mobile than many
old city residents. This is reflected in
the overall economic pattern of the suburbs of
the city.

Income

A large proportion of these neighborhoods are
middle and upper middle income groups. On an
average one finds less than 10 percent in
the higher income category earning more than
$1900 per month, 15 percent in the upper middle
income bracket earning less than $1900 but more
than $1000 per month. Thirty-five fall in the
middle income range and 15 percent in the lower
income group with 25 percent falling in the
very low income group. The cooperative socie-
[22] ties generally formed by middle income groups,
represent a cross section of 35 percent in the
upper middle, 50 percent in the middle and
5 percent in the low income groups. Data for
the rest of the population is not available.

Mode of Transport

Though most of the autovehicles of the city are
used by the residents of these areas, the
majority of the residents of the sector use
public transport and bicycles to commute to
work. A glance at the Brahmin society suggests
that the majority of the population uses
[22] public transport to work. Three percent use
automobiles, 25 percent motorbicycles and 15
percent use cycles. The remainder of the
working population use public transport to
commute.

The residents, having established a stable
income for taking care of daily needs and other
necessities, look for other comforts and
services which the urban area has to offer.

PART PLAN - OLD CITY NEIGHBORHOOD

1:2500

Source: Patel, N. - Thesis, M.I.T. 1976

TRADITIONAL

PHYSICAL

Hierarchy

The set hierarchy of the streets established
beforehand, remained in the changing socioeconomic
situation. The streets in the walled city can
be broadly categorized in four ways:

(1) Thoroughfares: major streets which
run through the city in east-west and
north-south directions, connecting the
periphery to the city center, dividing
the city into various sectors;

(2) Commercial streets: these streets,
known as "Bazaars," markets, are concen-
trated in areas located in the center of
the city. Streets branch off from the
center which consists of religious places
and commercial areas, and penetrates dif-
ferent quarters, with stalls and shops
flanking both sides of the street;

(3) Residential/Commercial streets: many
streets which are occupied are residences
by artisans and professionals have work-
shops and shops on the ground floor to
produce and sell goods;

(4) Residential streets: "pol," "khanc -
ho," and "khadki" are the popular names
of residential streets. The streets, which
may be called residential neighborhoods,
contain houses, largely of one community.

The city, which earlier had few residential neigh-
borhoods, developed 372 pols by the year 1872.[1]
Pol is the word derived from the Sanskrit work
"Pratoli" which means "access" and pols are

1: Ahmedabad Gazateer

Hierarchy

Besides having major highways and connectors
between the cities, the roads in the suburban
city can be categorized in three categories
at large. They are:

> (1) Ring roads: roads of width 90'
> 120' circumnambulate the city. A
> series of these ring roads developed
> and in the process of being developed
> divide the city in various rings.
> (2) Main roads: major roads, about
> 60' wide, divide the rings into various
> sectors. The roads in commercial zones
> carry multi-story office buildings and
> other public buildings like shopping
> centers, European shops and other
> corner stores.
> (3) Secondary streets and approach
> roads: the sectors are further divided
> into various neighborhoods by the grid
> of secondary streets. The street net-

work created thus covers the residential
area. The developed residential neighbor-
hoods have a range of streets from 35'
or more wide when the length of the road
increases more than 1500' and 20' if less
than 250' in length. However, streets
narrower than 30' are rare in recent
developments.

Dead end streets are avoided to ease circula-
tion. Occasionally the major junction of roads
has a few shops which supply basic ammenities
or some hawkers selling cigarettes.

1:2500

Source: Ahmedabad Municipal Corporation

CONTEMPORARY

accesses to the residential neighborhoods. Later on, the entire residential neighborhood became a "pol."

Pols open up through entrance gates on the roads with widths of 12' to 24' and form a network of circulation in a sector. The city is divided into various sectors by a network of major roads, varying in width from 18' to 32'.

Spatial Shaft

Study of the physical organization of residential neighborhoods reveals a typical spatial hierarchy. The entrance gate segregates the public spaces, with roads connecting different sectors of the city from the residential spaces. Residential areas observe the hierarchy of semi-public space--an open space which is usually located near the entrance, to semi provate space-- a street lined with houses, leading into a gradually increasing sense of privacy, terminating in a private space, either a shallow dead end street or a cul-de-sac.

The physical hierarchy of the streets augments the spatial hierarchy since the width of the streets narrows as one penetrates the inner parts of the pol.

The street sections of the pol narrows as the houses project into the street limiting the exposure of the street to sun. It is recommended that a layout follow the cardinal direction to ensure a combination of shade and sun throughout

TRADITIONAL

the day. The combination of streets following the spatial hierarchy (expanding and contracting, creating a shaft which protects residents from the hot and dusty winds of the summer) along with the courtyard houses, creates a ventilation system for the dwellings.

The ancient system of deciding the height of a building and plinth is one of proportion. Height, which was used in the past to express social hierarchy, was restricted so that the average height of the buildings was two or three stories. The system of proportion prescribed earlier and followed religiously created a continuing facade. The plinths became a continuing and constant feature of the streets.

Density

The earlier residential developments, with 25 dwelling units per acre, grew denser because of the popular demand for housing in close porximity to work areas. Thus houses were divided and sub-divided, increasing the density of residential areas to 50 units per acre. At present, some 240 people occupy one acre area. One will not find any reference to density in the planning manuals of the past. The size of the lot is also prescribed as a system of proportion rather than a specific size or area lot. This gives an opportunity to everyone to build a house which suits their needs and economic capability.

24

Spatial Shaft

There are more than 1400 co-operative societies
registered with the city authorities, which does
not include the old city area.

A study of the physical organization of a
co-operative housing society reveals a two
step spatial hierarchy with a distinct divi-
sion of public spaces and private spaces,
defined by the streets and lots. Semi-private
space is a common plot--an open space--left
aside for general use in the layout of the
neighborhood. Thus the transition from public
space to private is abrupt and generally direct.

The residential streets which are 30' to 40'
wide with the 15' setback of the buildings
from the property line create a shaft of space
60' to 70' wide. The purpose of the wide
street and bye-law for the margin in front of
the buildings allows easy circulation, fire
truck accessibility and flexibility for future
expansion of the width of the roads. City
authorities plant trees to keep the streets
shaded. Since the street is a public area,
the residents feel very little for its condi-
tion, whatever that may be. This planting of
trees demands a huge amount of investment and
expenditure for maintenance in this semi arid
climate. The inability of the city authorities
to maintain this vegetation and neglect by
the residents have resulted in the failure of
the program.

The orientation of a streets is in directions
which developers find economically most advan-
tageous on their layouts.

Density

The size requirement for a lot housing a
dwelling which is 240 sq. yds. minimum, and
the floor space index largely decide the den-
sity of developments. The density comes to
an average of eight dwellings per acre, accord-
ing to present laws. The majority of the
population which falls in low, or very low
income groups thus has limited access to the
services which the city offers. The rural
migrants who migrated for economic reasons
can neither afford, nor are they willing to
pay, the high prices for a piece of real estate
just to have access to the services.

24

PLAN - LAKHA PATEL'S POL

1:1000

GROWTH OF COOPERATIVE HOUSING SOCIETIES

Year	No. of Societies registered as at the end of the year	No. of societies registered during the period
1951-52	110	---
1955-56	243	133
1960-61	679	436
1966-66	1022	343
1969-70	1419	397

DISTRIBUTION OF HOUSING SOCIETY MEMBERS BY CASTES
AND OCCUPATIONS

Caste	Number of Members	Percent-age	Occupa-tion	Number of Members	Percent-age
Patel	2,416	28.42	Cultivation	111	1.04
Brahmin	2,376	27.45	Business	2,790	26.21
Bania	2,053	24.15	Service	6,143	57.71
Lower-caste	898	10.56	Teacher	121	1.14
			Profession	211	1.98
Khatri	305	3.58	Housework	985	9.25
Muslim	136	1.59	Art & Craft	217	2.04
Jain	175	2.06	Not Working Not working	67	0.65
Christian	81	0.96			
Sindhi	59	0.69			
Schedules castes	3	0.04	TOTAL	10,645	100.00
TOTAL	8,502	100.00	Information not available	808	--
Information not available	2,951	---			

TRADITIONAL

Narrow and crooked street in the walled city neighborhood of Ahmedabad

Neglected steet in recent Middle Income Co-Op development of Ahmedabad

PLAN - BRAHMIN SOCIETY

1:1000
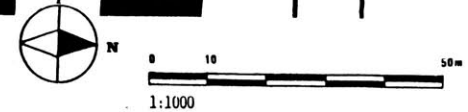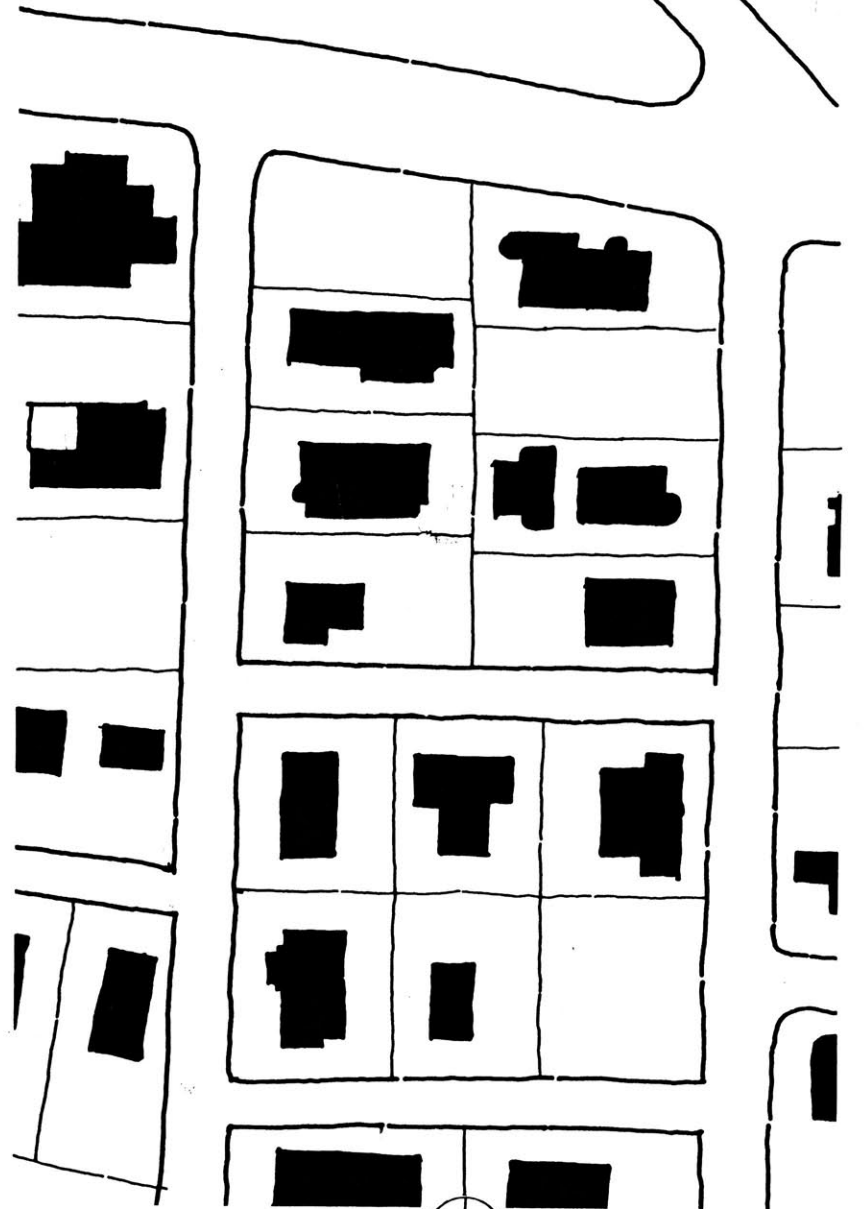
Source: Ahmedabad Municipal Corporation

CONTEMPORARY

Services

The high density development which occurred when
the city limits were within walking distance are
part of the problems of services and utility
today. Utilities were hardly mentioned in the
planning manuals of the past. Methods for
ensuring a proper level of utilities for a
small number of people were vaguely presented
in the manuals. For example, a site with a
grade of north/northeast was preferred due to
the wind movement in that area and to insure
adequate storm-water-drainage by means of a
surface drain.

The tradition of having an underground tank for
storage of rain water to use over the dry
season was abandoned as the city took over
control of its water supply. The underground
drainage and water supply system introduced
after 400 years of city development has restrict-
ed accessibility and limited use. The toilet is
placed in the front verandah of the house to
avoid extensive installation costs. Since water
supplies are often low due to limited pressure,
a faucet is usually installed in the front of
the house to maximize usability. This, in turn,
has resulted in narrower street space for circu-
lation.

The municipality remains responsible for other
services such as providing storm water drainage,
paving and maintaining the streets, and refuse
collection. Most walkways are not introduced
alongside the narrow streets and are kept to a
minimum in other streets to allow the maximum
possible width for vehicular movement. The city
authorities supply electicity to each registered
dweller on payment of a service charge and inst-
allation fees. Street lighting is a municipal
responsibility within the city limits.

TRADITIONAL

Services

New residential developments, which must go
through administrative procedure to procure
approval of the city authority after laying
out infrastructure, have adequate levels of
services. Paved roads, drainage, water supply,
street lighting and such services are provided
before the occupancy of the dwellings.
However, the developer can take advantage of
the laws allowing him to gradually develop the
services such as paved roads. Drainage and
water supply are a must before one occupies
a building.

The water supply is limited to a few hours a
day. The dwellings have their underground
water tanks to store enough water for use
during a day.

The municipality remains responsible for its
provision of electricity, storm water drains,
paving and maintenance of streets, and refuse
collection. The streets are wide. A 30'
wide street has 14' tar paving for vehicular
movement leaving an 8' shoulder on each
side. The large portion of the shoulder is
meant for a side walk. Having a limited
budget, walkways are left unpaved. A few
of the streets on the fringe of the city
are still unpaved.

A SECTOR – JAIPUR
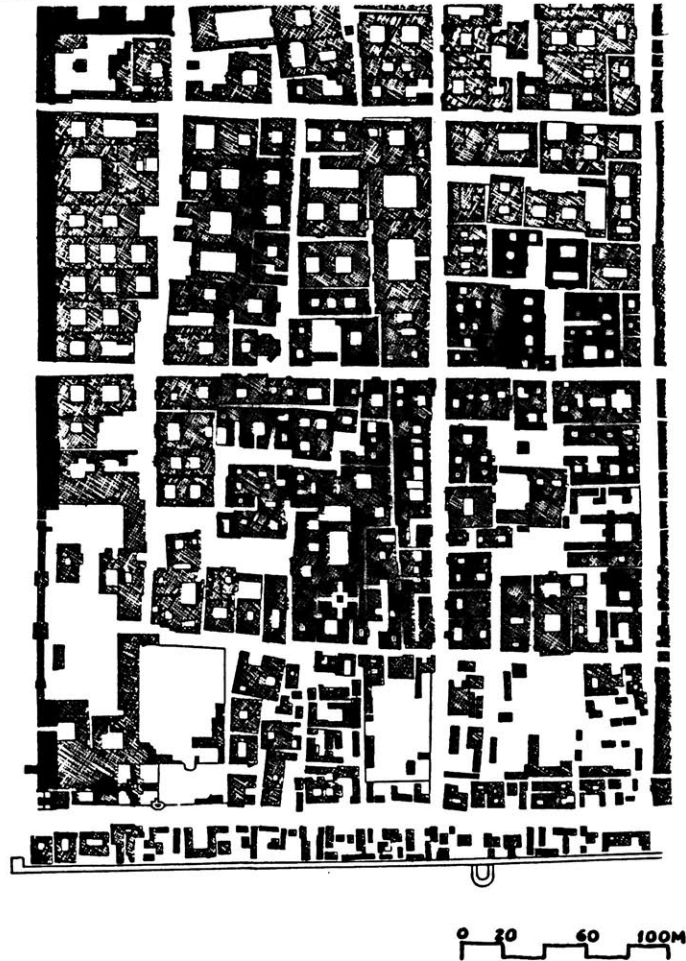
A SECTOR – CHANDIGARH

0 20   60   100M

0 100   300   500M
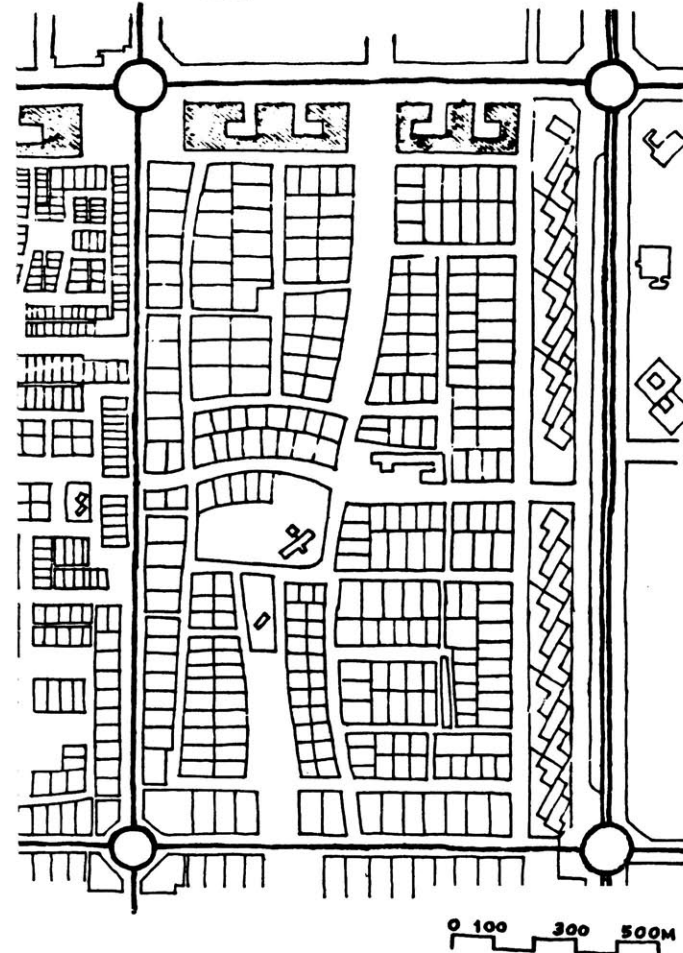
The plans represents a definite hierarchy of the streets.
The street pattern of Jaipur shows a 'branch pattern'
wherein streets terminates in a cul-de-sac or a dead
end. The streets of Chandigarh has continuous street
layout with controled access to major roads. The
difference in density is evident. Also note the variety
of pockets of spaces in Jaipur and its abscence in Chandigarh.

Source: Jain, K. - Jaipur
   City Administration - Chandigarh

OBSERVATIONS

It is observed from the study of streets in the preceding chapters that the social pattern has shown only marginal change over the years. Tradition has continued, with little alteration here and there. The Caste System is breaking its rigidity, but the traditional methods for grouping socio-occupational groups is becoming more common. Community efforts are still alive in one form or another in the old city neighborhoods for several reasons: a) length of acquaintance, b) socio-economic need for the successful continuity of community efforts, and c) physical configuration of spaces. The physical proximity compels residents to communicate and take an interest in each others' activity.

When similar occupational groups stay together, they have more common interests to share and thus unite to achieve their goals. Common economic interests and similar goals help generate social activities which are reflected in the spatial arrangement. The economic capacity to pay for social services makes a difference. The above does not tend to be true for high income groups because they have different means of communication as well as the economic means to pay for what they need.

Thus when the socio-economic situation has shown little change, it is appropriate to assume that the system of co-operative housing, thriving on the inspiration from the prevailing traditions, provides a reasonable solution for new developments. However the neighborhood studied, reflects a little success in developing a comparable environment to the traditional one. As other two factors - social, economic - have shown little change, the physical development guidelines used today can be considered as a major cause for the failure. It is an observation that national policies for economic development and other such programs providing services have far reaching effects on socio-economic conditions. The city authorities have little control over these issues. The city, however, does have direct control over the physical development through codes and legislation. The appropriate combination of socio-economic and physical guidance is required to have lively neighborhoods. The flexibility provided in the traditional design norms, which is a reason of the diverse and successful development of the old city neighborhoods, also needs due consideration in the present codes to create a dynamic environment in the new developments.
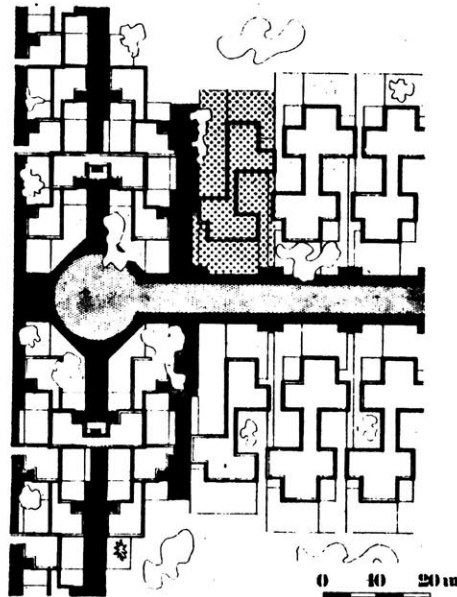
60

MODE OF TRANSPORT (In Use Today)
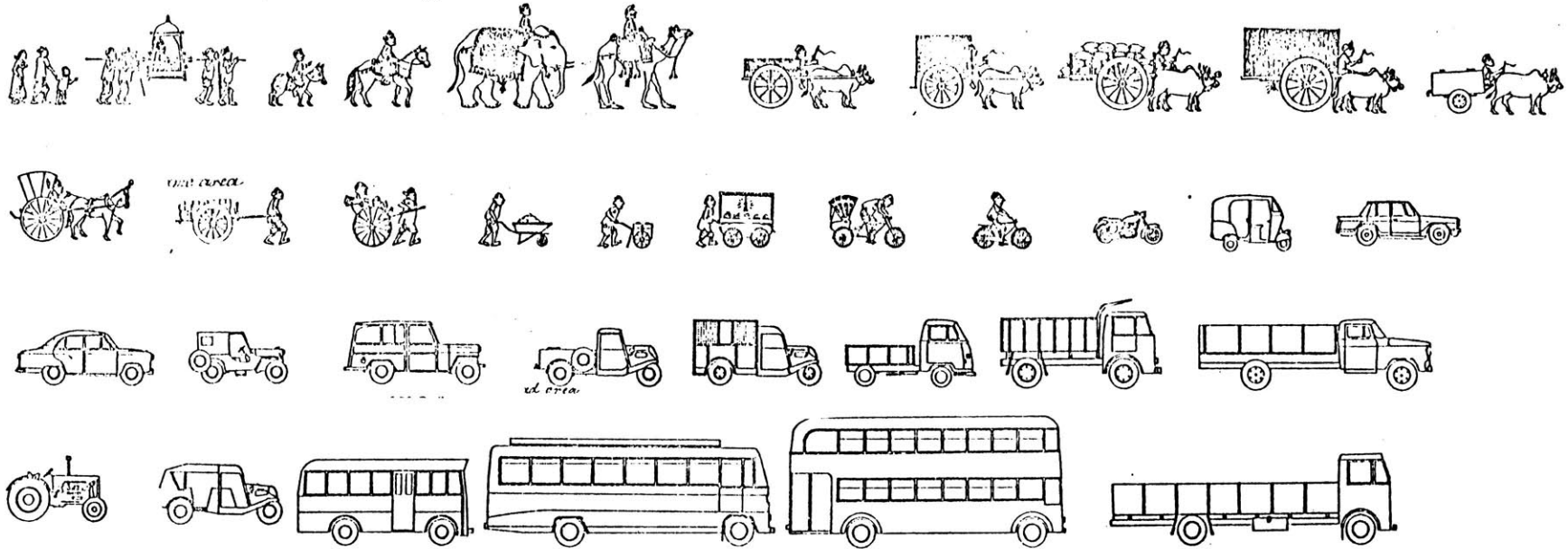
PART PLAN - TOWNSHIP G.S.F.C
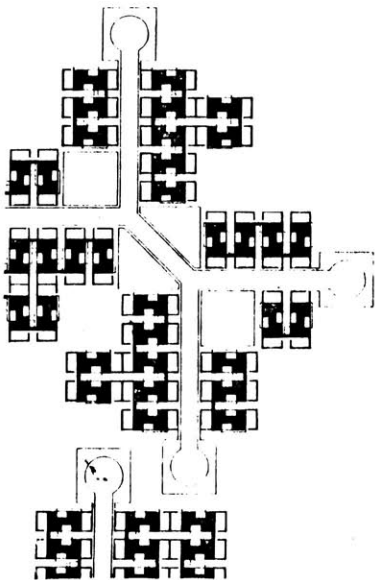
PART PLAN - TOWNSHIP I.F.F.CO

0 10 20 m

The industrations from industrial townships

The illustration from the industrial
township - G.S.F.C - located near Vadodara and
I.F.F.CO - located near the town of Kalol
represents two diffrent designs by architect
Mr.Doshi. Though the administration of the
G.S.F.C. spents a large amount in maintenance
of the vegetation on streets, one hardly notices
action on the streets. The architect resolves
the issue to an extent by creating a dead end
street and providing the residents with its
control.

Source: Reddi, S - Building Regulations
         Doshi, B.

A great deal of consideration is demanded by
the complex transportation situation which exists
today as a result of the urban rural environment
of the cities in India, where everybody has
suitable transport available. (This ranges
from pedestrians, bicyclists to double decker
buses and trucks.) Everone has acknowledged
the importance of segregation of traffic move-
ment, but no one has proposed a reasonable
solution. Each residential street in the old
city neighborhood has a very limited number
of thorough fares. Most of the residential
streets are dead end streets, which means that
strangers do not come to the neighborhood and
traffic is limited to thorough fares. Look-
ing at the number of pedestrians on the street
one feels the necessity for considering their
"domain." With about 500,000 bicycles and
about 20,000 private automobiles in the streets
of Ahmedabad, one definately should question
the appropriateness of present street planning.
One should think in terms of streets for
slow moving vehicles and streets with limited
vehicular access.

Residential neighborhoods need to be segre-
gated by means of functional hierarchy. The
existing arrangement of streets and the obser-
vations made in the traditional neighborhood
suggest that a dead end street (of approximately
200' to 500' in length with about 12 to 30 lots
opening onto it creates a lively and intimate
environment, with enough privacy. Fire fighters
can easily reach them in case of fire. However,
the probability of fire is very low in the

brick and concrete constructions. It is ob-
served that dead end streets are better for
control and have a reduced crime rate.

Though it is difficult to assert the degree to
which mixuse developments are appropriate, the
traditional method of mixing residential develop-
ments with non-residential developments at
appropriate places needs a serious consideration.
Dwellings are combined with workshops and shops
in the old city development. This has reduced
the commuting distance, inturn commuting time,
giving some leisure time to the residents
resulting in some street activity. The distance
of work place has played an important role in
the street development and its use by reducing
or increasing traffic on the streets, too.

Religious institutions play their part in
increasing communication between residents. A
temple or a mosque in a neighborhood provides
a common place to meet, discuss and voice their
needs and demands. An easily accessible location
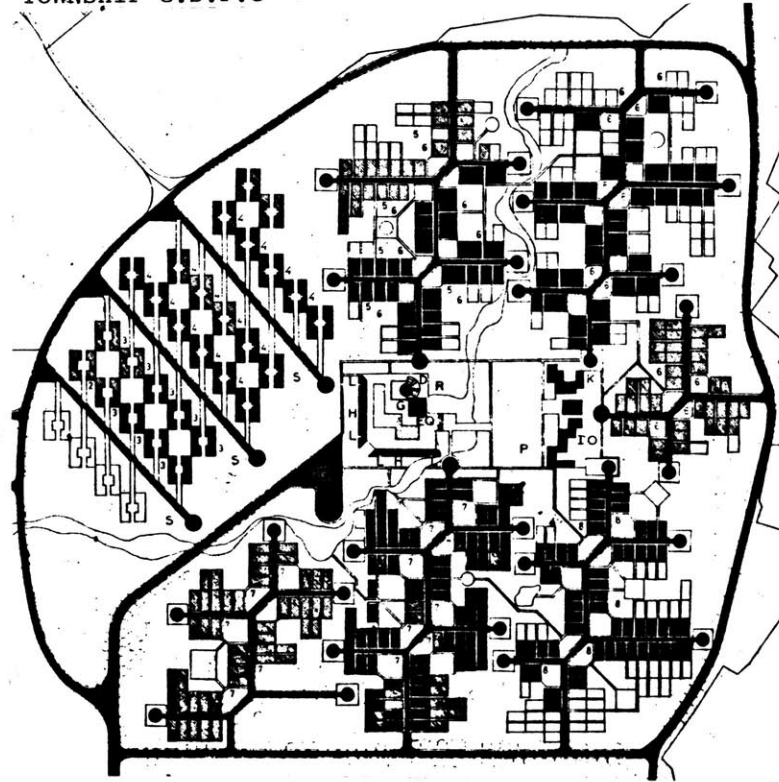of such institutions is desired.

62

JAIPUR
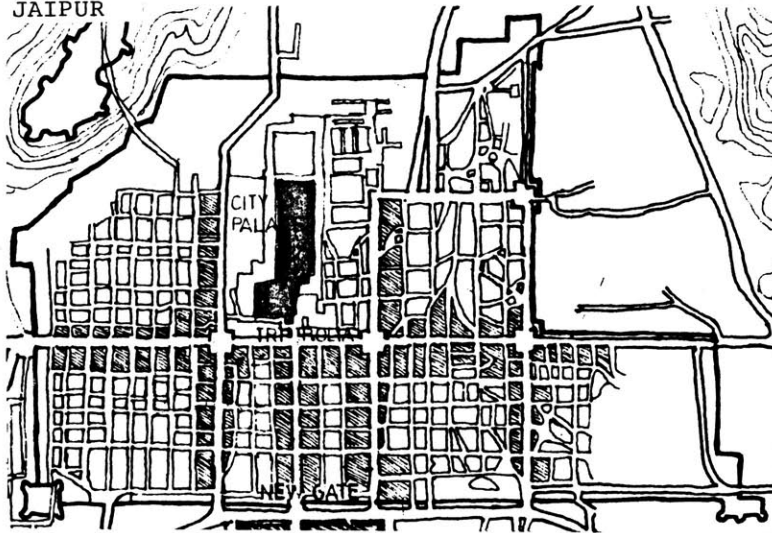
NEW DELHI
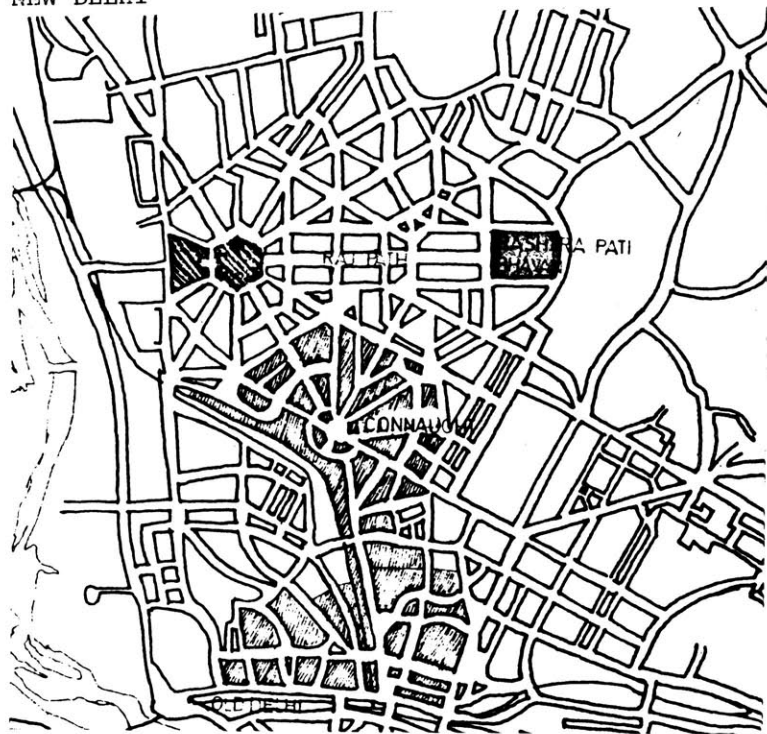
TOWNSHIP G.S.F.C

The central location of business district in G.S.F.C. Township
might work because the township covers a small area than a
city. The central buisness district in Chandigarh fails
to fulfill the need of the society due to its shear size and
proportion. Moreover the commercial activity adds life to
the residential neighborhoods (the case of Jaipur).
By eliminating this activity from a large portion of the city
and concentrating it at one point (cases of New Delhi,
Chandigarh) takes away the hustle, movments and life from
the residential neighborhoods. This also
creates traffic problem by increasing number of commuters
in a direction.

Source: Shah, V. - Unpublished Paper, C.E.P.T. 1978
         Doshi, B.

PLAN - PUBLIC HOUSING

PLAN - SUGGESTED ALTERNATIVE

0   50   100   150

1:2500

Walk ups

0   100   300m
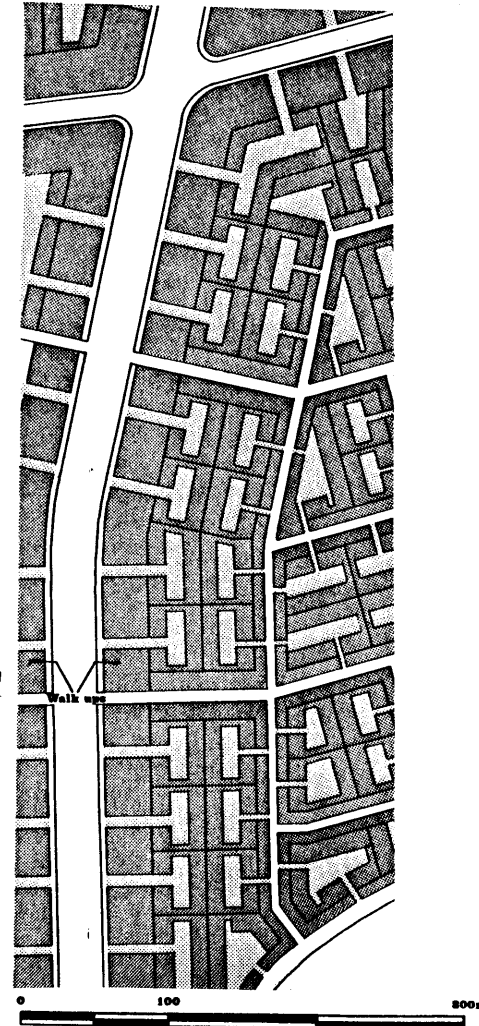
Wide streets, large open spaces and walkups in the
public housing project of Ahmedabad represents a serious
environmental porblem. The designer attempts to solve
the problem by reducing public land, large open spaces and
creating cul-de-sacs. He also recommends low rise-high density
developments to promote use of the open spaces by extention
of living spaces.

Source: Patel, N. - Thesis, M.I.T. 1976

PART PLAN – TANJORE FORT

A SECTOR – DURGAPUR

A SECTOR – ROURKELA
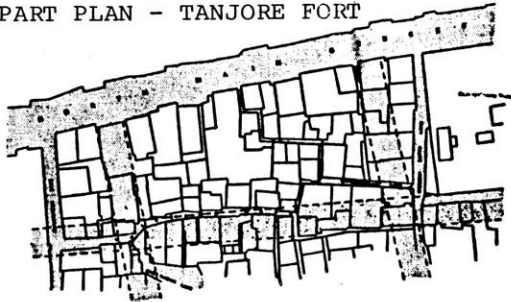
A. Portion of Tanjore Fort. The Municipal Council's proposals for the relief of congestion. Cost about Rs 30,000. Scale 1 cm. equals 100 feet.

References
Denotes Pukka house
Do   Thatched houses
Do   Houses in ruins without roof
Do   Roads and Lanes belonging to the municipality
Do   Private and other open places
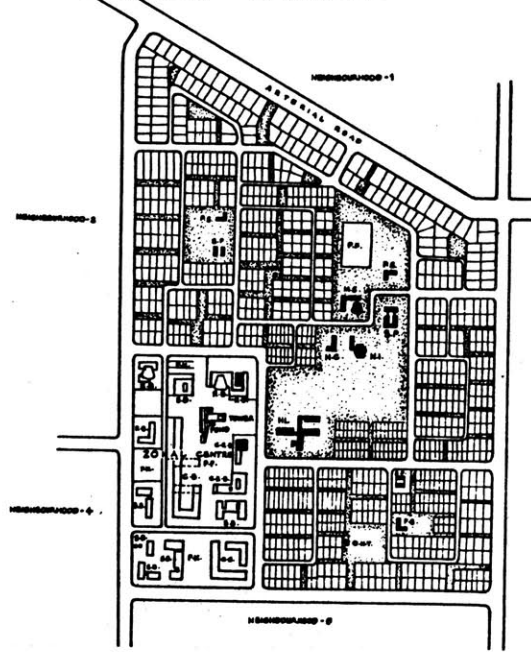Do   Vegetable gardens
Do   Portions to be acquired

B. Portion of Tanjore Fort. A 'diagnostic survey.'

Reference
Denotes Pukka houses
Do   Position of trees to be grown
Do   Roads, streets and other open spaces

C. Portion of Tanjore Fort. The congested area as it would appear after the application of 'conservative surgery.' Cost about Rs 5,000.

Patric Geddes once wrote,"Planning - to be successful must be folk planning". His "Folk-Place-Work" planning illustrates one way to improve environment of existing neighborhoods by the way of "conservative surgery". He recommended small pockets of open spaces. Tanjor Fort scheme illustrates his ideology. On the other hand the neighborhoods of Durgapur and Rourkela presents recent mode of planning. It is interesting to note that though all three plans show street hierarchy, the environment is quite different due to the width of the roads, system of access, size of open spaces, organization of open spaces and scale of development.

Source: Government of India - Town and Country Planning

"An automobile for every home" is a dream
India can not realize even in the distant
future. Because of this one should definately
question the existing width of the streets.
If a 30' residential street is wide enough in
the countries with a high rate of automobiles
where on-street parking is permitted, Indian
planners should think in terms of narrower
streets rather than wider. Moreover, expendi-
tures on maintenance of public spaces should
be weighed against their use. The expense
should be within the limits of the capacity
of the residents. By reducing public spaces,
a city can reduce the public responsibility
for maintenance. This should also increase
participation at the neighborhood level.

It is observed that an open space between
100 sq. yds. and 200 sq. yds. has the highest
activity in a middle income neighborhood,
with 5 to 10 houses sharing this space. The
size and shape of the space is decided by the
mutual understanding and the economic capacity
to maintain it. Since the residents have
control of their own environment, they create
a variety of spaces to suit their needs. Com-
munication between the neighbors increases in
the process.

The cul-de-sacs surrounded by the houses provides
a common place for young children to play. Par-
ents prefer this kind of spatial organization
as they can sit and do their household jobs,
socializing with neighbors, while children
play in the open space under their supervision.

The same space is used for community activities,
feasts and games at other times. The space,
surrounded by houses, provides a comparatively
cooler open space with a combination of sun
and shade. In the hot arid climate of the city
shaded places remain one of the major factors
when deciding the location of the activities
even within a space.

The scarcity of the urbanizable land and the
economic condition of the population creates a
demand for high density development. There are
various ways of achieving this with modern
technology. Highrise buildings, apartments
and duplexes are one way of dealing with the
issue. However, these alternatives reduce the
possibility of the extension of living spaces
and increase the cost for maintenance of open
land as well as vertical circulation. Another
way of achieving high density is with low rise
two and three story buildings spreading over
the ground. Besides having possibilities for

extension of living spaces, it has been observed that this type of development is more advantageous in the hot climate of the city. The residents will have fewer sandstorms in the summer by the reduction of ill maintained open spaces. Also the city has limited hours of water supply. With this scarcity of water the city authorities should not only discourage extensive gardening and planting by reducing open land around private dwellings, but should encourage the traditional method of storing rainwater for use over the year.

Courtyard houses and narrow streets are characteristic of the arid and semi-arid zones. The introduction of the floor space index with bye-laws for margins to facilitate wind circulation and achieve adequate standards of lighting in the dwellings hardly can be justified in the hot climatic conditions of the city.

TERMS FOR VARIOUS HOUSING SCHEMES

monthly income upto Rs. 350   75% households

@ max. 10% of Rs. 200 p.m.   Rs. 20/-   Repayment in 20 years (interest @ 5% PA for 18 years)

Rs. 351 - 600. p.m.   15%

@ max. 13% of Rs. 476 p.m.   Rs. 62/-   in 15 years (interest @ 7% PA for 14 years)

Rs. 601 - 1500. p.m.   8%

@ max. 16% of Rs. 1050 p.m.   Rs 168/-   in 12 years (interest @ 9.5% PA for 11 years)

Rs. 1500 and above   2%

@ max. 20% of Rs. 2000 p.m.   Rs 400/-   in 10 years (interest @ 9.5% PA for 9 years)

Source: Housing and Urban Development Corporation Ltd.

SUMMING UP

"India is where centuries co-exist," the late
Prime Minister Jawaherlal Nehru once said.
The country is full of diversity and contrasting
developments. On the one hand, the Indian sky
is covered by jet liners, Indian scientists
have placed satellites in space. On the other
hand, the ground is covered by bullock carts,
horse drawn carriages and bicycles. This
diversity might provide enough inspiration to
poets and intellectual food for writers,
but it has been quite confusing and discourag-
ing to the planners so far.

Street layout is one of the important aspects
of planning. Streets in Indian cities can.
hardly be channels of circulation. Most activ-
ities, including living, occur or extend into
the streets. Streets of the old cities are
always full of the hustle of hawkers, festivi-
ties and procession. In the residential
neighborhoods streets are an extension of the
verandah, or living spaces for that matter.

Such observations should be the basis for
planners and designers, planning legislation
and building codes for the development of the
network of streets and layout of residential
neighborhoods.

The traditional method of planning, which can
not be considered quite appropriate for its
time, cannot be adopted with the specific

recommendations and a literal translation.
On the other hand, recent planning practice
cannot be viewed as appropriate for its time.
There must be modifications on the basis of
extensive observations and learnings from the
old settlements.

Planning is not only a technical matter. The
traditional method of planning has survived
and has created lively cities due to its
flexibility and capacity to accommodate the
social, economic and physical needs of the
society for which it was designed. It
could not have survived for a period of 3,000
years if it had been presented as a technical
matter. This does not mean that technical
matters such as transportation networks and
infrastructure are not important, or least
important on the list of the designer, but
suggests that one should design town planning
legislation and building codes appropriate
for the time and for the society they serve.

The brief study of the streets in preceding
chapters has clearly reflected the following:
planning manuals of the past were lacking in
many technical matters which are important
for the contemporary situation, but they have
much to offer in other matters. The spatial
hierarchy, creation of spaces, and micro
climate created by the use of traditional
methods have generated lively residential
neighborhoods.

The streets can not be viewed only in terms of physical conditions and spatial environment, but should be viewed in the overall context of the city. In the city where 70% of the population lives either in one room dwellings or in shanties, the elaborated land use pattern, wide streets for automobiles, planning for garden suburbia, huge parks and such amenities make little sense. On the other hand, the dense neighborhoods of the old city with 600 persons per acre density and 8' to 20' wide streets can hardly be called appropriate.

The streets are becoming an expression of a transport engineer's skills rather than an expression of the spatial sequence, social hierachy, and events of transition from one space to another. Such important factors of design which are forgotten, discarded or overlooked should be reintroduced in the planning.

From the material presented, one easily infers that the socio-economic status of the society indicates marginal change. People still like to stay in their community. They may be not as close as in the past, but togetherness is desired. They have shown preference for narrow, dead end streets, and cul-de-sacs. Most of the population, reamining below subsistence income level, requires special consideration. Climate, and other such physical constraints, have changed very little. Then why the absolute rejection of traditional methods of planning? One should have presented a profound rationale for the rejection of the old and the adoption of the new. Adoption without understanding the logic of existing developments has been proven futile.

Though indepth studies and research are required to modify the bye-laws, it is obvious that the authorities have to take a concrete action initiating the modification. Unless they decide to modify the policies, very little can be done. But once the move for modification is made, rest, remains in the hands of designer and intellectual --to achieve the goal-- remains in the hands of designers and intellectuals. They need to remember that should learn and understand the physical requirements of the society in its socio-economic set up.

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