Continuity and settlement structure:
A study of traditional and colonial spatial patterns in Benares, India

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COVER ILLUSTRATION: Traditional and colonial settlements.
From James Prinsep's drawing of Benares, 1822.

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Abstract

This thesis explores the relationship between the physical
structure of Benares and continuities within its physical
form.

It traces the development of the spatial structure of the city
and analyses the physical characteristics of the different
spatial patterns in Benares. Grounded in an examination of
settlement plans, the study concentrates on the spatial
structures of the traditional and colonial settlements at
different scales of the city's organization.

The study concludes that, although the spatial form of the
traditional settlement is distinct from the colonial
settlement, some of the principles underlying the spatial
structures of both the settlements are similar. It identifies
the flexible nature of the plan, the dynamics of the foci, and
a whole and part relationship, as characteristics common to
the spatial structure in both settlements. This study
maintains the hypothesis that these characteristics are
essential to the simultaneous existence of global and local
orders, in which parts of the settlement are differentiated
from one another, yet the whole is intelligible from the
parts. Furthermore, the other settlements of Benares, reflect
a simultaneous existence of the global and local orders only
when each settlement is considered in relation to the
structure of the city as a whole. Within each of the other
settlements, only one type of order exists, either local or
global.

Acknowledgments

Contents

"Each city has an implicit program that must be found
every time it is forgotten lest the city face extinction"   -
Italo Calvino in "The gods of the city."

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1. Introduction

The inquiry

This thesis offers an explanation for the physical form of the traditional core and the colonial settlement of Benares. The explanation is grounded in the examination and reconciliation of three interrelated issues.

The first issue is about the physical structure of the city as a "material entity." It concerns elements of the urban structure that yield a legible configuration to the city and define the parameters that regulate city form. It is an analytical study of the capacity of the city form to support conditions of the physical environment such as flexibility and diversity. The thesis is an effort to explore issues about the "deep structure" of the city and its physical organization.[1]

Closely related to this topic is the second issue which deals with ideas about physical continuities within the built form - a specific set of conditions supported by the physical structure of the city. Although such continuities may be of a cognitive or a historical nature, the scope of this thesis is limited only to references about the physical states of extension over space and prolongation over time within the built form. The thesis seeks to address such issues as how continuities within the physical form are maintained.

The third issue concerns the relationship between the spatial patterns in the traditional core and those in the colonial settlements, within the context of Benares, a provincial city in India.

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[1] Hillier, Bill. "The Architecture of the urban object." in "Space Syntax" Ekistics, Vol. 56 no 334/ 335. Jan. - April 1989. In referring to the city as a "material entity", Hillier considers the city as having a "deep structure". He suggests that the physical form is an autonomous reality in itself and an essential constituent of the dynamic processes that make up the city as well.

In summary, this thesis is an attempt to investigate the relationship between the physical structure of the city and continuities in the city's physical form.

Frame of reference

Typically, studies related to ideas about continuity and city form have recognized continuities within city form as either a product of the social structure of the society, or as an intrinsic constituent of both social and physical structures of the city .

Literature offering an explanation of city form as a construct impacted by socio-economic, political, cultural or topographical forces has been largely restricted in providing a comprehensive understanding of city form. This framework of studying city form generally focuses on a limited number of factors influencing the nature of city form. Each of the factors that influence city form offers a different way of studying it i.e., each approach relates to a distinct disciplinary base from which the study is conducted.

Although the efforts of the studies are directed at one aspect that affects city form, they do not deny that other factors may be important as well. However, by concentrating on a single aspect, the other factors which impact city form are usually ignored, or at any rate, not taken into account to the same extent. An example of this kind of analysis can be found in Diana Eck's study of Benares, which offers an explanation of the city from a cultural anthropological

perspective. [2] Admittedly, her study in no way suggests that other explanations of the city are unimportant. Yet, the restricted focus of Eck's study does not permit other perspectives to be incorporated so as to offer a broader outlook in the understanding of the city form.

Often, a study conducted from any of the independent bases is considered to be sufficient in explaining the city form. An example of this kind of study can be found in Webber's ideas about despatialized network of communications and transactions in which the "material city" vanishes.[3]

Moreover, the significance of the city structure as a material entity is often doubted.[4] The relevance of the city structure is viewed only in terms of the cues that the city can provide as to the form and nature of the different processes that affect city form; and not as an essential constituent of the dynamic processes that shape the city.

By contrast, as will be presented in the following section, various studies on city form recognize the city structure as possessing a degree of autonomy. In these studies, the urban form is described in terms of its own intrinsic significance, as well as in its being an essential constituent of the dynamic processes that make the city and guide its form. This inquiry draws particularly on this body of literature in an attempt to examine ideas about continuities within the spatial structure of the city.

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[2] Eck, Diana. Banaras: The City of Light. New York: Alfred A. Knopf, 1982.

[3] Webber, M. Explorations into Urban structure. Philadelphia University of Pennsylvania Press, 1964.

[4] Examples of such studies can be found in: Wheatley, P. "The concept of Urbanism " P.J Ucko Ed. Man, Settlement and Urbanism. London: Duckworth, 1972. and Carter, H. An introduction to Urban Historical Geography. London: Arnold, 1983 etc.

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Literature Review

Levi Strauss has referred to ideas about space possessing its own meaning and value. [5] Marcel Poete has also suggested that the form of the city has a meaning of its own that is reflected in the city's built form. [6] Poete regards the city's form as rooted in "persistence" - a constancy of themes over different periods of time. He argues that the "basis of city form" lies in the "persistence" of the city's plan. Moreover, the "persistences" assure a relative unity to the city's form. Further, Pierre Lavedan has observed that "persistence" is the "generator" of a city's plan.[7] He asserts that the "persistences" are reflected in the city, in its physical structures, streets and urban monuments.

The crux of these beliefs is that the development of city form is dependent on the direction and meaning accorded by older artifacts within the city's structure. The order is structural - i.e., order associated with city form is guided by the elements that have structured the city's plan.[8]

A more detailed and empirical version of this view is expressed in Conzen's explanations about an existing plan feature exerting an influence on future development. [9] Conzen suggests that a plan of a town forms a framework for development as it provides the physical link between the built form, site, and the town's past existence. He argues

[5] Levi Strauss. Triste Tropiques . Paris: Plon,1955.

[6] Poete, Marcel; as referred to by Aldo Rossi in The Architecture of the City. Cambridge : M.I.T Press, 1989.

[7] Pierre Lavedan; as referred to by Aldo Rossi in The Architecture of the City. Cambridge: M.I.T Press, 1989.

[8] Moshe Safdie in "Collective Significance," Harvard Architectural Review. No: 4 regards order as an identifiable configuration of the physical form within the city.

[9] Conzen, M.R.G. Alnwick, Northumberland; A study in town plan Analysis. 1960

that the plan of a town, in fact, constitutes a morphological construct within which subsequent development occurs conformably.

This opinion is further articulated in Anne Moudon's research project about transformations in the spatial structure of a San Francisco neighborhood. Her research affirms that the configuration of space in the city provides cues to later development within it. Moudon refers to these cues as development guidelines. She argues that a city's development guidelines are inherent in the city's spatial structure. [10]

Aldo Rossi has built upon some of the studies referred to above to provide a much more conceptually developed, yet theoretical view of the relationship between the continuities in the physical form and the structure of the city. [11] Rossi's book, The Architecture of the City, is based on a claim that a city's structure has a degree of autonomy. His theory propounds the notion of 'permanence', a derivative of the proposition that urban development has a temporal dimension. The city is thus regarded as a continuum, in which the diversity within it is a function of the city's past.

Rossi has also acknowledged the idea of spatial continuity in the city through the concept of 'type.' Based on the acceptance of the definition of 'type' from Quatremere de Quincy, Rossi has reflected that a 'type' is an object which despite changes to its form, sustains a clear manifestation of the elementary principle which structures it. He maintains that a 'type' is a predetermined concept, a constant and a rule for a model. Rossi views 'type' as

[10]Moudon, Anne Vernez. Built for change: Neighborhood Architecture in San Francisco. Cambridge: MIT Press, 1989.

[11] Rossi, Aldo. The Architecture of the city. Cambridge: M.I.T Press, 1989.

allowing for innovation, flexibility, diversity as well as for continuity within the built form. To stress this viewpoint, he distinguishes between a model and a type. Rossi suggests that a model is an object in which everything is precise, given and must be repeated, whereas a type is an object according to which built forms can be created that do not resemble one another and yet are able to retain the common traits which characterize them.

In addition, Rossi has also argued that the form of the city is based on a structure which provides 'axes of development' that direct the city's growth. He maintains that "permanences" in the form of monuments, as well as the city's basic layouts and plans, persist in the city's evolution. Rossi suggests that these "permanences" guide the city's configuration.

A similar belief resonates in Stanford Anderson's idea of a city plan as a resource.[12] This view, based on the recognition of a degree of autonomy in the built environment, rejects any claim for either physical or social determinism. Anderson acknowledges that the physical environment is an arena for potential actions and interpretations which are defined by a set of societal values and norms. Therefore, there is a complex relationship between abstract geometry and use patterns exists in the city's structure. Anderson argues that each of these affects the other. He contends that the plan of a city is a system of artifacts which provide conditions of constraint and support over time. Anderson asserts that the plan of the city is neither indifferent to, nor merely reflective of, the moment of its generation. He maintains that city plan is a constantly

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[12] Anderson, S. "Plan of Savannah and changes in its occupancy during its early years: City form as a resource." Harvard Architecture Review no 2. Cambridge, Spring 1981. Also in "Studies towards an ecological model of urban environment." On Streets (Ed). Cambridge: M.I.T Press 1978 and M.I.T Architecture Lecture Series - Fall 1991.

modifying resource that long outlives the moment of its initiation, and continues to provide guidance for later decisions related to the form of the city.

Although the different views expressed within the literature constantly emphasize the significance of the physical structure of the city, the discussion is predominantly theoretical in nature. In addition, despite the fact that the different views consider the concept of type as providing the framework for continuities within the built form, the discourse is largely focused on continuities that emphasize relationships over time, with little mention about relationships over space. Moreover, even though the different views maintain that the elements of the city structure are also responsible for the city's configuration, and suggest that these elements can be found in the city's monuments, plans as well as basic layout, they do not elaborate on the characteristics of the elements which support continuities over space.

The mode of study

A study of a city's form through the city's plans, in conjunction with experiential and historical references establishes a framework of analysis, which allows a potential for a comprehensive and broad based understanding of city form.

As constantly referred to within the literature, the city plan "persists" despite social, economic, political and cultural changes within the city. The spatial pattern is thus a repository of different time periods and morphological patterns that have endured change. The plan allows the

different stages of the city's evolution to be clearly distinguished .

In addition an analysis of the city through its plans also allows one to grasp a structure of the city, which may not be apparent otherwise - experientially or through historical accounts, economic surveys etc. Also, the plans allow the city be viewed simultaneously at different scales. Different areas can be distinguished from one another. A study through plans also permits a comparative examination of different areas.

Moreover, a study of the city through its plans may usefully parallel the simultaneous consideration of different factors like social, cultural, economic forces which affect city form. The plans enable a comprehensive analysis. Such an analysis, even though limited to a particular period of time, or based on a consideration of a limited number of factors affecting form, can at a later stage incorporate into its organization the other factors that affect city form. The methodology of studying city form through plans does not restrict the scope of analysis. Also, plans enable the city to be understood as an object of analysis itself, a significant structure in its own right, rather than just a medium which gives form to the different factors that shape the city.

This thesis, grounded in an examination of settlement plans explores how the spatial patterns in the traditional core and the colonial settlement of Benares support continuities within their physical form.
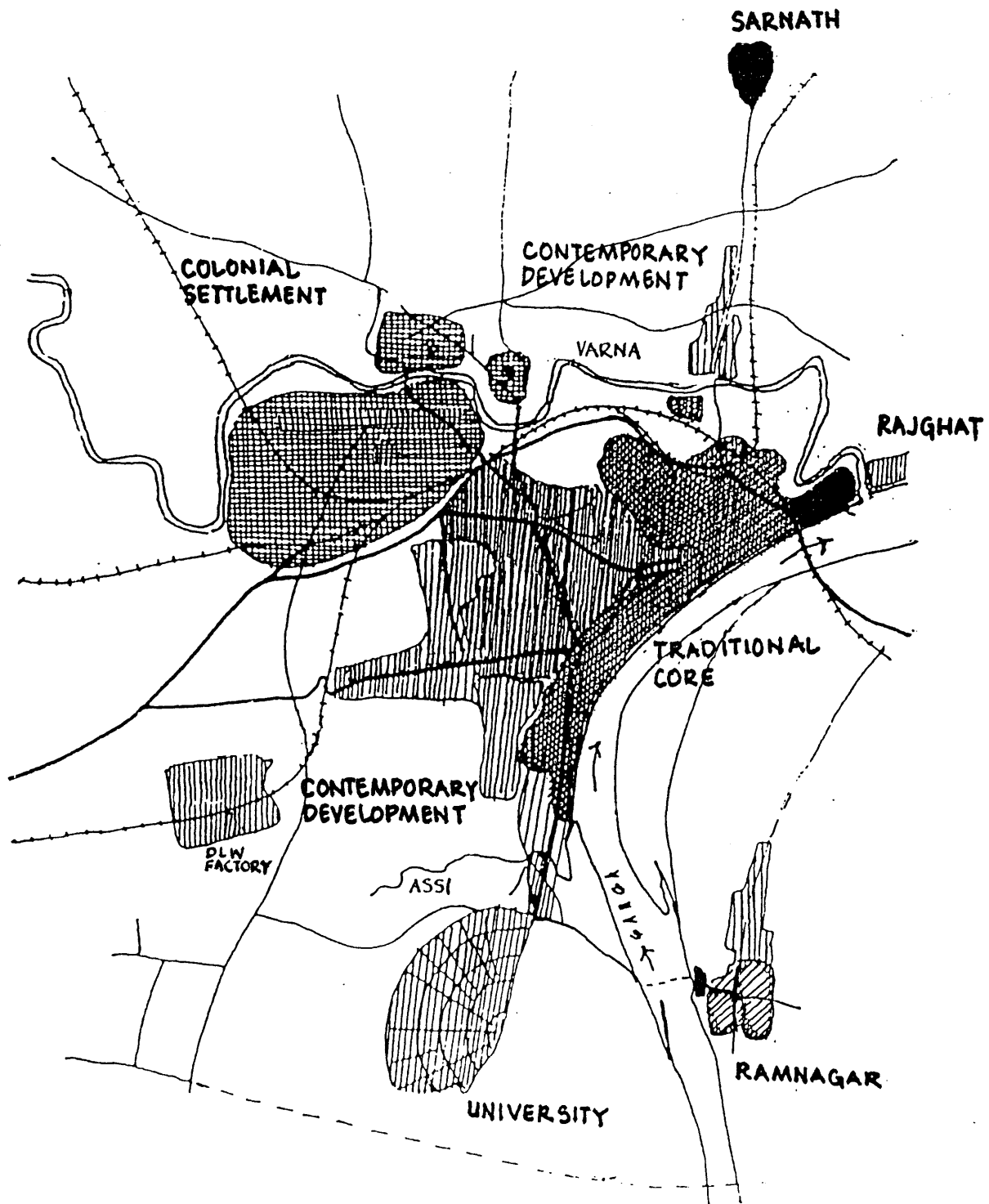
Thesis Outline

Beyond this chapter, which introduces the issues to be addressed in the thesis and also argues for a framework of study based on the analysis of the city's plans, this thesis comprises four other chapters.

The following chapter offers a brief introduction to Benares. Besides describing the various settlements in Benares, it traces the development of the spatial structure of the city in its historical context. Chapter two also includes an analysis of the physical characteristics of the different spatial patterns in Benares.

Chapter three is a discussion about the spatial patterns in the traditional core of Benares. The first part of the chapter focuses on the sources from which the plan of the city is derived. It discusses the impact of the sources on the form and structure of the settlement. The second part of the chapter contains an analysis of the spatial structure of the traditional core of Benares. It investigates the characteristics of the spatial structure at different scales of the city's organization. Chapter four follows the same structure in its examination of the colonial settlement in Benares.

Chapter five discusses the relationship between the spatial patterns in the traditional and colonial settlements of Benares, with reference to their structural and physical characteristics. The chapter examines aspects of the spatial patterns that support continuities within each of the settlements. Finally, based on an understanding of the physical and structural characteristics of the two settlements, the thesis concludes by offering comments on the spatial structure of the city as a whole.
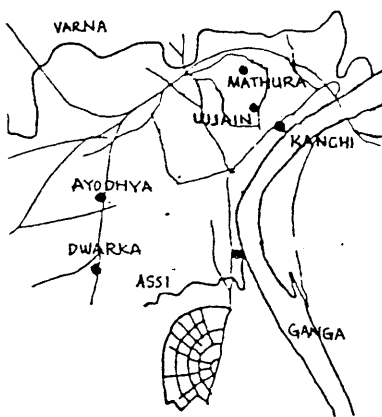
SARNATH

COLONIAL
SETTLEMENT

CONTEMPORARY
DEVELOPMENT

VARNA

RAJGHAT

TRADITIONAL
CORE

CONTEMPORARY
DEVELOPMENT

DLW
FACTORY

ASSI

YOIYAK

RAMNAGAR

UNIVERSITY

[2.1] Settlements of Benares

2. A brief introduction to Benares

Benares, a city of one and a half million inhabitants is located at latitude 25° 18' N and longitude 83°1' E. [13] Situated in the north central part of India, the city forms a part of the alluvial valley along the crescent - shaped banks of the river Ganga.

Benares is one of the oldest living cities of the world. Besides having functioned as an important ancient center for trade and commerce in the South Asian region, the city has also been the focus of Hindu culture and civilization. Renowned as the most important of the seven sacred centers of Hindu pilgrimage, Benares, is referred to as the "soul of India." The city has been recognized as a center of learning, and is also known as the "cultural capital of India."

References to the city are abundant in ancient scriptures such as the Upanishads and the Vedas, compiled around the second millennium BC. Jain historical sources from about the eighth century BC, as well as the Chinese traveler Fa -Hien's accounts, that can be traced to the third century BC, also describe the city. The spatial patterns in the traditional core of the city, today, are remarkably similar to those described in the historical accounts of the city; the oldest buildings within existing city, as we see them today, date back to the eleventh century AD.[14]

[2.2] Metropolitan cities and the seven sacred centers of India

[2.3] Sacred centers in Benares

[13] Varanasi Master plan, 1991. U.P, Town and Country Planning Organization
[14] References to historical and sacred accounts of the city can be found in Pandit Kubernath Sukul's Varanasi Vaibhav. Patna: Bihar Rajbhasha Parisad, 1977. Detailed descriptions of the spatial pattern and some parts of the city, specifically the different codified religious circuits and the Ghats can be found in the sacred texts such as the Mahabharat, Jabal Upanishad (sections 1 and 2), Brahma Purana and Agni Purana. In addition the entire section of the Skanda Purana called Kashi Khanda, Mudit Sanskara of the Matsya Purana and Kashi Mahatmya of the Padma Purana are devoted to the description of the city. A survey of various archaeological findings of the city can be found in Varanasi Report, 1987. Archaeological Survey of India.

Benares, today, comprises distinct spatial patterns defining areas that are generally coherent and legible. These areas include the traditional core, Ramnagar, the colonial settlement, the university, as well as the post- independence contemporary development. Each area comprises a number of distinct parts that are related to one another because of common principles of spatial organization. The spatial patterns within each area exhibit formal characteristics that are unique to that area. These characteristics are derived from the settlement's principles of organization, layout, massing and the elements articulate buildings.

The city is also known as Varanasi, a reference to the area on the western banks of the river Ganga, bounded by the rivers Varna to the north and Assi to the south. This area marks the site of traditional core and forms the oldest part of the city. Originally the area was a large forest, with scattered development within it. The forest served as a center of learning, a free territory accessible to different scholars. Gradually the area developed into a dense spatial structure, which invading powers have continuously sacked and rebuilt.

Numerous Hindu dynasties ruled over the traditional core until the eleventh century AD, after which, it was brought under the rule of successive Muslim powers, such as the Turkish- Afghans, other Sultanates, and the Mughals. With the establishment of the Kashiraj dynasty in 1725, the Muslim influence over the city declined. However, a weak political structure ensured that other political powers, the Maratha's being the most significant of them, contributed to the city's development. [15]

[2.4] Traditional core - figure ground drawing
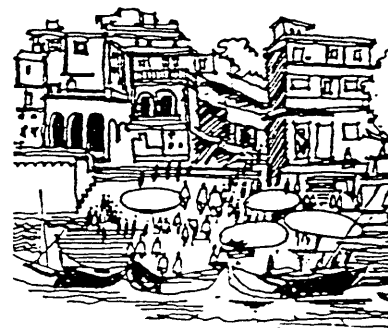
[2.5] River front in the traditional core

[2.6] Narrow street in the traditional core

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[15] References about the political structure of the city can be found in R.L Singh's Banaras: A study of Urban Geography. Nand Kishore and Bros, August 1955.

[2.7] Ramnagar Fort

The traditional core is composed of a superimposition of diversified community structures which are based on regional and religious characteristics. There are distinct areas within the spatial organization that relate to a particular caste or regional community. For example, Punjabis are located in Lahori Tola, Bengalis in Bengali Tola, and Nepalis in Doodhvinayak. The location of different communities within the spatial structure is based on factors such as the time when the communities came to the city, and the social relationship between various castes.

The spatial pattern is organized as a juxtaposition of a wide variety of built forms. Despite this variety of forms, there is an underlying coherence in the spatial character of the traditional core. The built form in the traditional core is ordered on a geometrical module, and accommodates a wide variety of integrated uses. The built form is structured by the 'mandala,' a spatial pattern derived from divine forms and an orthogonal network of streets. Despite this formal organization, the pattern appears to be irregular. The buildings are generally 3 to 5 stories high and are organized around a central courtyard, which gives them an introverted character. Religious buildings, usually defined by their iconographic details mark significant differences in the physical form within a neighborhood. Also, the form of the spatial pattern is very dense in the center and more spacious towards the periphery.

[2.8] Plan of Ramnagar

Ramnagar, founded by the Kashiraj dynasty in 1752, was created as a center of political power. It is the only settlement located on the eastern bank of the river Ganga. By locating at a position of such prominence, Ramnagar commanded a position of importance, matched only in importance by the sacred city across the river. In addition,
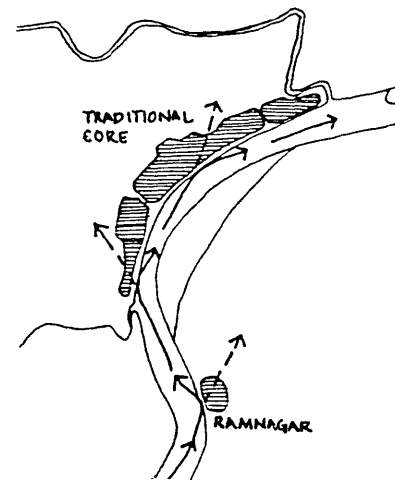
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by distinguishing itself, Ramnagar did not dilute the integrity of the already existing city.[16]

Ramnagar, comprises a continuous linear edge of civic buildings enclosing an avenue that defines its spatial pattern. The civic spine connects the fort at the western end to the city gate at the eastern end. The civic spine dominates and encloses the dense, 'hidden' residential sector of the city. The built form in Ramnagar is generally 2-3 stories high and introvert in character. Ramnagar, together with the traditional core constitutes the traditional city.

[2.9] Strategic location of Ramnagar

The colonial settlement refers to settlement patterns founded by the British. The colonial settlement was primarily located in proximity to the river Varna, at a distance of four and half miles from the traditional core. The constituent parts of the built form within the colonial settlement were hierarchically segregated, and distinctly differentiated. The colonial settlement, together with the traditional city and the university, constitute the area referred to as the colonial city. These areas were under British domination from 1775 until independence in 1947.

[2.10] A colonial bungalow

The origins of the colonial settlement are rooted in a military camp established in 1775, that was brought under the direct administration of the East India Company in 1794. The settlement comprises areas reserved for military use known as the cantonments, and a civil station that accommodated administrative functions. It also included railway lines, a police camp known as the police lines, a
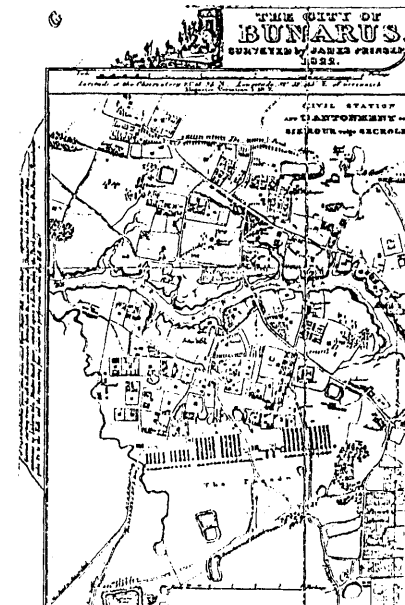

[2.11] Map of the colonial settlement

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[16] The Maharaja, V.N Singh, in a conversation with the author in June 1991, showed documents considering different options for the location of the fort. The Maharaja claimed that the choice of the present location allows the fort to form a dam that regulates the flow of the river, and to prevent it from changing course. He argued that central to Ramnagar's existence was a larger purpose: " to protect the existing structure of the sacred city in its form and functioning."
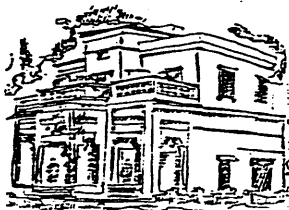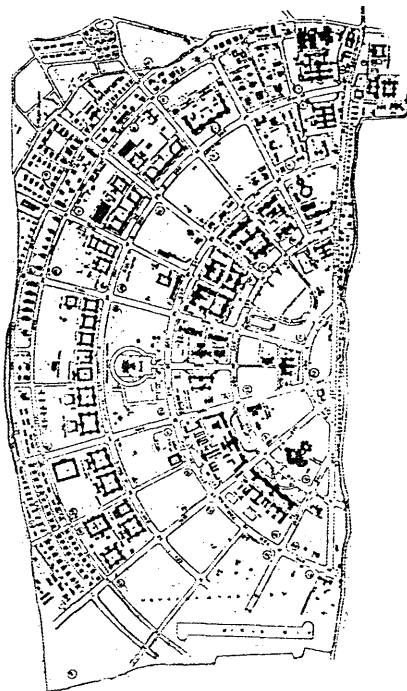
[2.12] Hybrid institutional character in the university

[2.13] University road

[2.14] Residential building in the university

[2.15] Plan of university

satellite military garrison on the western bank of Ganga, as well as isolated developments of churches, schools and hospitals located near the traditional city. Each component of the colonial settlement was located around its own independent focus, and comprised a mix of institutional and residential uses.

In contrast to the traditional settlement, the street networks in the colonial settlement are more regular. The colonial settlement is distinguished by its wide open spaces. The buildings are 1 to 2 stories high, located on large lots and characterized by buildings with high ceilings as well as a hybrid architecture. The hybrid character was consequence of adapting western architectural forms to native conditions.

The University, founded in 1916, is located near the southwestern banks of the river Ganga, diametrically opposite the settlement of Ramnagar. The settlement is defined by its regular and composite semi-circular pattern. The University is also characterized by its wide open spaces. It is composed of sectors that are identified either by the separate functions that they accommodate, or by the position of their residents in the University's social hierarchy. This hierarchy is based on the occupation of the residents within the University.

Unlike other settlements in Benares where housing constitutes the major component of the settlement structure, the buildings within the university are primarily institutional. The buildings within the University are also characterized by a hybrid architectural character. This character is based on forms derived form western principles and stylized by traditional Indian motifs.

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The contemporary city comprises the traditional and colonial, as well as the post - independence settlements. The patterns of the contemporary city are characterized by the process of densification. The contemporary settlements are defined by post - independence 'modern' developments. They are also identified by the coalescence of the built up and open areas by infilling and swelling, within all the settlements.

The organization principles of the post - independence settlements are based on legal, or 'formalized' zoning codes. The nature of infrastructure and tenure status are two critical aspects that have influenced the organization of the post independent settlements. The components of the post - independence settlements are secluded from one another. Also, the buildings can be distinguished from one another on the basis of functional differences. The buildings in the contemporary settlement vary from one to eight stories. In comparison to other developments in Benares, the 'modern' settlements reflect a greater variety in the housing conditions ranging from plotted and group housing, to 'squatting.'

[2.17] Market place in the contemporary city
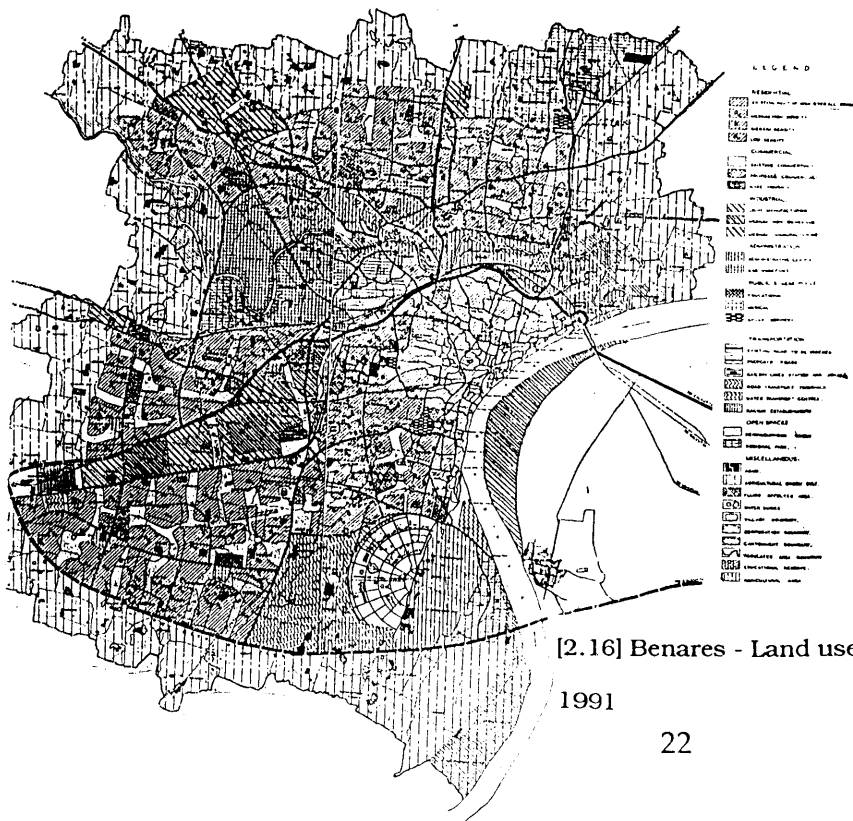
[2.16] Benares - Land use 1991
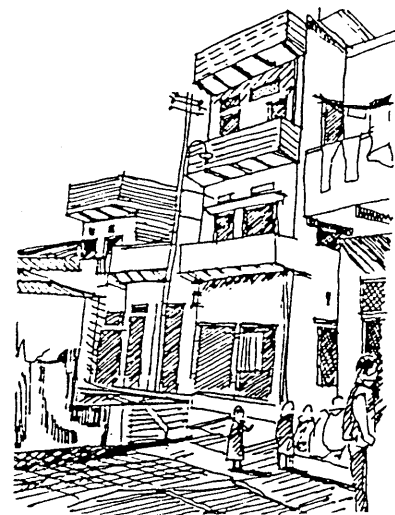
[2.18] Residential development in the contemporary city

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[2.19]

[2.20]

2nd century BC.: Traditional core of the city is established. Development is restricted to the 3 sacred zones and the Rajghat plateau.

10 - 11th century AD: Period of golden age - city reached its zenith as a center of religion, trade and commerce. Numerous Hindu dynasties rule the traditional core until 1013 AD.

After 11th century AD: The city is brought under intermittent short spells of Hindu and Muslim rule. The city is maintained as a sacred zone, and remains accessible to different social and cultural groups. The Rajghat fort continues to be the center of political power until 1194 AD. when it is raised to the ground.

13th century AD: The city is brought under the rule of the Muslim Nawabs who ruled from Lucknow and Delhi.

1585 AD: The traditional core is brought under Akbar's Mughal empire. The city continues to be ruled from outside Benares. Although the settlement is destroyed and rebuilt a number of times, it's physical size is limited to its original extant. However, over the years it becomes more dense in its structure .

1725 AD: The Kashiraj dynasty establishes Ramnagar. Development includes the Fort and the Monumental core.
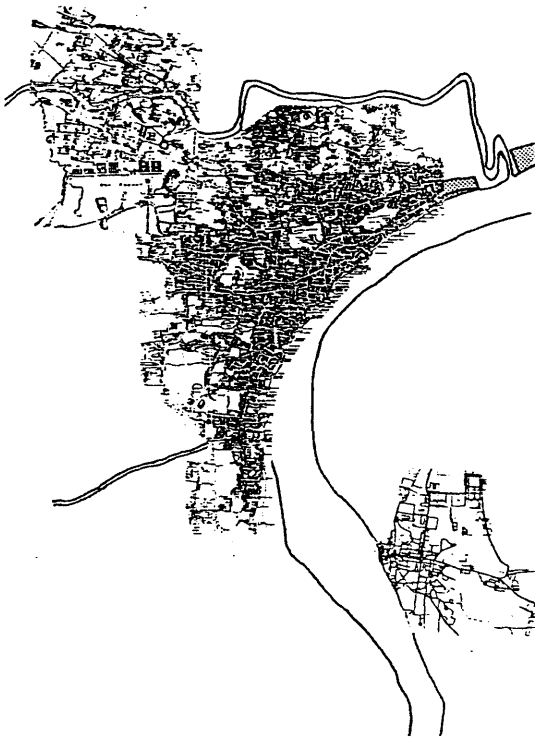
[2.21]

1732 AD: Small British garrison camp established on the Rajghat plateau.

1750 AD circa: The rising Maratha, Rajput, and Sikh powers start actively participating in the building of the city.

1775 AD: British gain political control over the city, and establish a camp south of Varna.

1794 AD: the cantonment north of Varna is established.

[2.22]

1832 AD: Rapid growth of the city begins to encroach upon the natural drainage pattern. Major water bodies - Mandakini, Matsyadori, Veni and Godavari are drained, filled and reclaimed for parks. 'Pleasure garden enclosures' are established by the native rich and the British, in areas between the native and colonial settlements.

1862 AD: The first railway link between Calcutta and Benares is established. River Ganga is linked by a rail cum road bridge at Rajghat. Water transport system begins to decline.

[2.23]

[2.24]

1916 AD: Benares Hindu University is established south of the Assi river. Areas between the traditional core and the colonial settlements grow further. New colonial missionary developments are located in between the colonial and traditional settlements.

1947 AD: India's freedom triggers a rapid process of urbanization. Large number of partition refugees from 'East Pakistan' accommodated within the city. All the parts of the pre- independence city grow further

1950 AD: The first master plan for the city is prepared. The plan proposes a separate industrial zone within the city and a new road link to Ramnagar. It also initiates a strategy for inner city decongestion.

1962 AD: A second master plan with a regional planning focus is adopted.

1974 AD: Varanasi Development Authority is formed, which develops guidelines to control the city's growth.

1991 AD: "Draft Master Plan 2001 " is prepared.

TYPE	BASIS OF MORPHOLOGICAL DIFFERENTIATION	COMPONENTS	ORGANIZATION PRINCIPLE
Traditional	Core: Religion, Caste, Regional and Sect/ Cult bias.	Mixed: Residences, Commercial, Religious and Secular functions	Juxtaposition and Superimposition
	Ramnagar: Power, Caste and relationship with the 'Fort'	Mixed: Fort, Commercial Administrative and Religious buildings Structures for support staff Ancillary buildings; Residential Ancillary buildings Villages	Domination and Enclosure
Colonial	Native - European, Class and functional bias	Cantonment: Military garrison. Residences for officers, Barracks for soldiers Civil Lines: Civil administartion, "Western services" - Club, Post and Telegraph office etc.; High and middle class residences Railway Colony: Railway depot and Employees dwellings.	Differentiation and Segregation
	Hybrid: University University Hierarchy Income and Functional type bias	Education facilities - class rooms, libraries Research facilities - Hospitals, dairy, laboratory, agricultural fields Residences for teachers students and employees	Composite and Separate
Contemporary	Function type and Income class bias	Segregated: Individual plotted, group housing and "Squatting." Commercial, Industrial and Service.	'Densification" and seclusion

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| TYPE	LAYOUT	MASSING	INDIVIDUAL BUILDINGS
Traditional	Irregular and dense in the core. Regular and spacious towards the remote periphery.	3 - 5 stories Temples and Mosques - salient elements	Generally introvert Building envelope/mass encloses a courtyard. Sharing of party walls
	Axial, dense and symmetrical Defined by a continuous edge More spacious at locations distant from the edge Fort detached	Generally 2-3 stories Fort - dominant structure	Generally introvert Building envelope/ mass encloses a courtyard. Sharing of party walls
Colonial	Regular, grid with liberal open spaces	Residential building generally single story	Defined by compound walls
	Spacious with wide tree lined roads, gardens and open regular spaces.	Institutional buildings 2-3 stories high skyline punctuated by church spire and other institutional buildings (e.g. mint etc.)	Individual buildings contained within large open space Entrance defined by "Verandah"
	Regular		
	Highly regular with large open spaces. Street networks based on a grid.	1- 3 stories	Hybrid: Contained within a large open space and building mass or envelope encloses a courtyard
Contemporary	Coalescence of built up areas by swelling and infilling.	1 - 8 stories high Water tanks serve as salient landmarks	Smaller plots with minimal open areas. "Stereotyped" Generally narrow spaces between plots. "Additions" to earlier developments "Squatting"
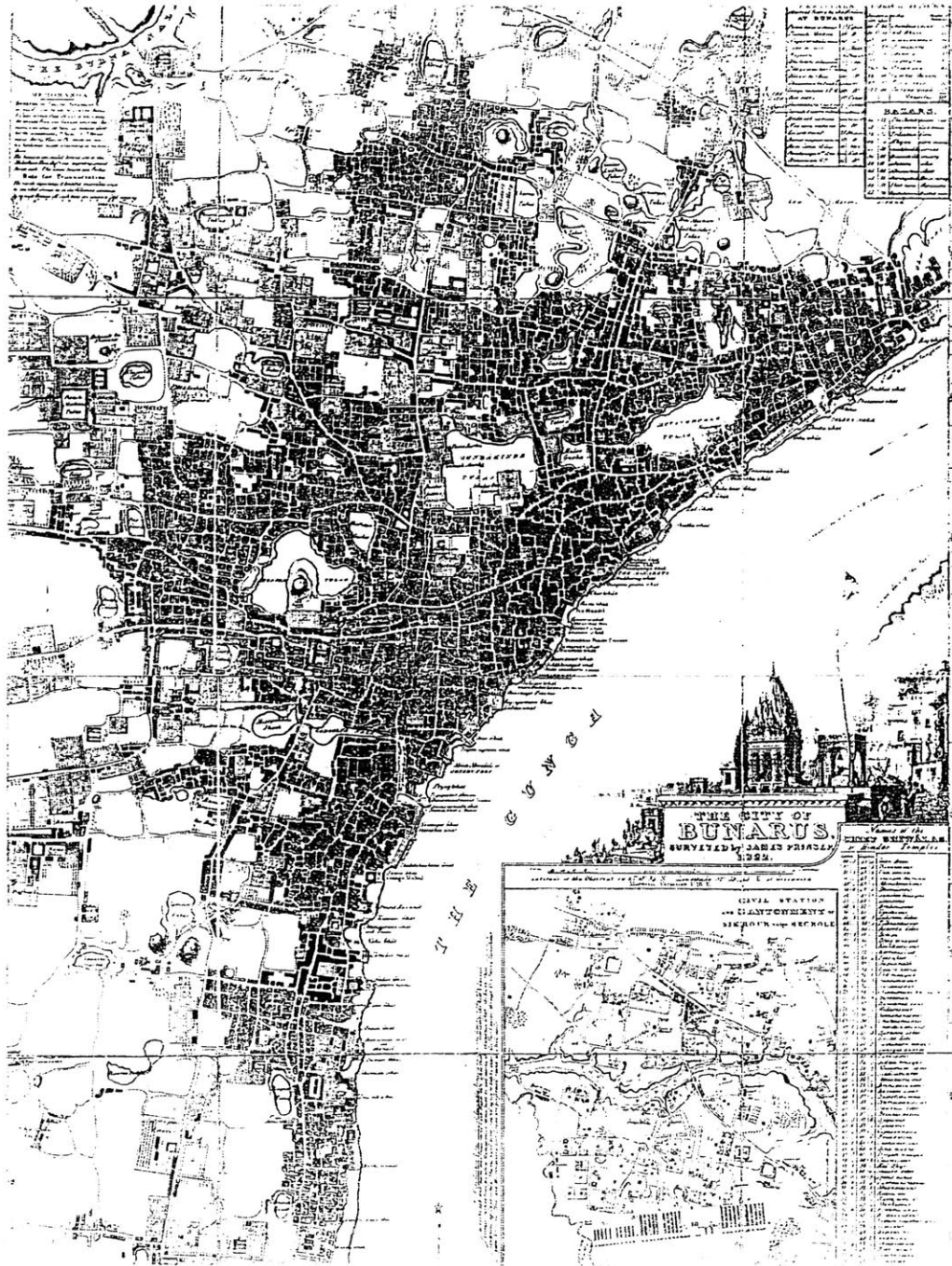
[3.1] Prinsep's drawing of the traditional core
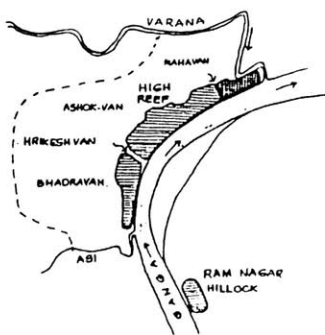
[3.2] Forests and reefs in the traditional core

1. Matsydari
2. Mandakini
3. Veni
4. Godavari
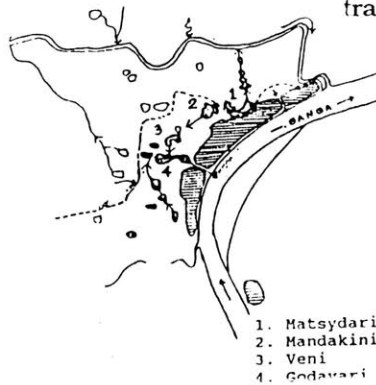
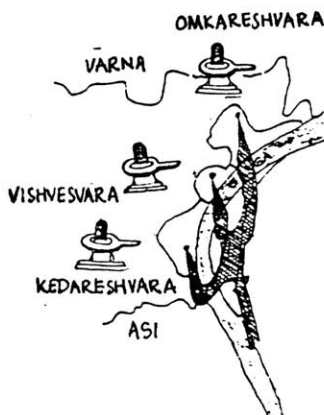[3.3] Water bodies within the traditional core
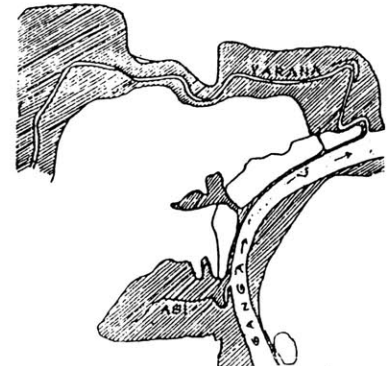
[3.4] Flood - plains of the three rivers

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3. The traditional core

[3.5] Shiva with his trident

KRTA
Trident

[3.6] The three sacred regions

[3.7] Porous spatial pattern

The spatial pattern

The traditional core of Benares, a religious center, is located on the banks of the river Ganga, which is considered sacred by the Hindus. The settlement is concentrated on the bend of the river, and extends along its length in an almost linear form.

Rana P.B Singh explains the choice of the city's location on the basis of its sacred geography. He suggests that the profile of the river in Benares resembles the crescent shaped moon over Shiva's head. The city's topographic condition, consists of three mounds resembling Shiva's three fork trident. Singh points out that these mounds are recognizable as the three sacred regions of the city: Omkareshvara in the north, Vishvesvara in the central part and Kedareshvara in the southern part of the core. To support his argument, Singh notes that each of the three regions has a Shiva temple as one of its principle shrines. He argues that the recognition of these sacred forms in an area bounded by water bodies, also considered holy, support the sacred image of the city and may well be the main reason why the city exists in this particular location.[17]

The form of the traditional core, as it exists today, is characterized by a homogeneous, dense and porous spatial pattern. The structure of the spatial pattern is composed of radiating, near concentric semi-circular street networks superimposed by a near orthogonal network of streets. The street networks define enclosures with an independent identity, yet similar spatial structure.

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[17] Singh, Rana P.B. "The image of Varanasi: Sacrality and perceptual world in Hindu codification.' National Geographical Journal of India, Vol. 34, 1988.

The spatial pattern of the traditional core is ordered as a superimposition and juxtaposition of diverse characteristics of social and religious aspects of the community structure, and of physical form. The traditional core of the city comprises parts that can be distinguished from one another on the basis of their morphological character.

Along the banks of the river, the core comprises a band of enclosures, each representing a different province in India. These enclosures comprise an organization of different, yet functionally related buildings, and are connected to the river through a series of step structures known as 'ghats.' There are 108 'ghats' in the traditional core of the city, most of them connected to one another. Each 'ghat' has a specific social or religious significance associated with it.

Well integrated with the band of enclosures along the banks of the river, are the different residential quarters of the city. The city is divided into a number of sectors known as 'mohallas,' which are defined by the narrow, meandering street networks of the core. Each 'mohalla' accommodates a group of people belonging to a particular caste and a linguistic - geographical area of the Indian sub continent; and represents a distinct architectural style. The 'mohallas' also serve as a 'unifying harbor' for pilgrims from its region of origin. Together, all the 'mohallas' of the core reflect the social and cultural diversity found in the Indian sub-continent. Each 'mohalla' is further subdivided into different blocks, each accommodating a distinct social sub group.
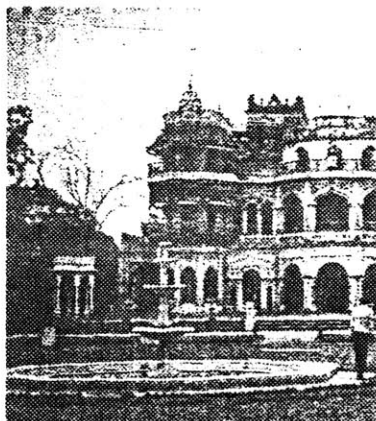
Towards the periphery of the core, are located large plots of land which accommodate the 'pleasure residences' and garden complexes of the rich .

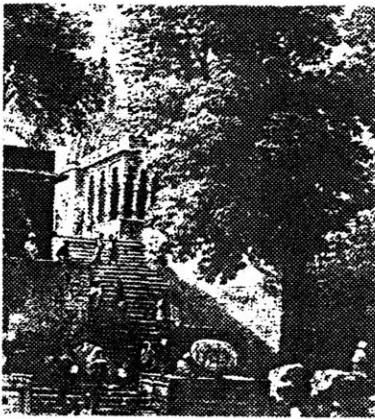[3.8] Palace complexes and "ghats"along the Ganga
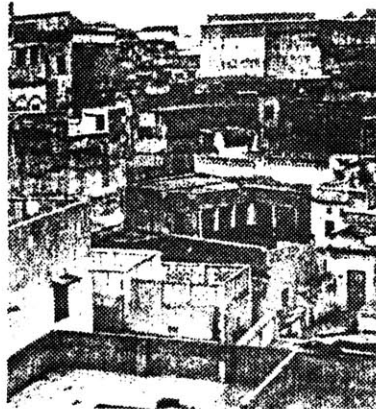
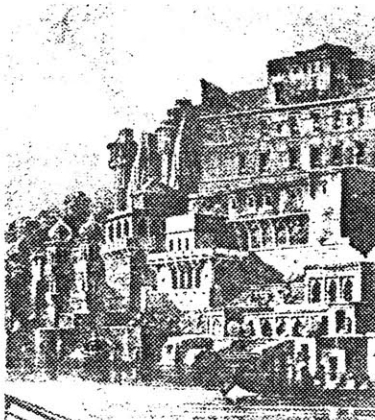[3.9] Residential quarters

[3.10] Garden complexes in the periphery

The source of the spatial pattern

The spatial pattern of the existing settlement in the traditional core has developed incrementally, over a number of centuries. Its invention cannot be linked to a single source. Essentially, the spatial pattern of the traditional city is a superimposition of different images promoted by diverse groups of people during different periods of the city's growth.

The development of the pattern, from a few buildings in a forest, to its present dense form, is derived from a number of analogs. Each of these analogs relate to different sacred images for the settlement, and is based on a divine form or myth. The divine forms or myths are associated with a corresponding image of an 'ideal structure.' The predetermined set of principles derived from the image of the 'ideal structures' have affected the form of the traditional core in Benares. The growth of the spatial pattern in the traditional core of the city, however, cannot be attributed to an aggregation of complete ended, independent sets of decisions. The analogs have not dictated a fixed form for the city, but only its structure, based on which subsequent development occurs.

More specifically these analogs have resulted in structuring specific and often multiple, identities for places, have defined boundaries for future development, have provided directions for growth and have had an impact on the organization of the built form. Mechanisms such as rituals, that have preserved these images have also conserved the built form and ensured a continuity within the spatial structure of the city. The following section offers a more detailed discussion of the impact of the analogs on the form of the spatial pattern in the traditional core.

[3.11] Isolated developments within the forest

[3.12] Development from a few buildings in the forest...

[3.13] ... to a dense development

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**The impact of the source on the spatial pattern**

Analogs as a mechanism for generating identities within the spatial pattern

Within the traditional core of Benares, sacred images of 'ideal structures' have been generated through the allusion to various 'mandalas.' A 'mandala,' in its simplest form, is an embodiment of the divine, and a representation of the cosmos on the surface of the earth.[18] The 'mandalas' provided an order for structuring places and establishing their identities. The superimposition of various 'mandalas' has assured the concurrent representation of many sacred forms, and therefore of differing identities within the city, to which diverse groups of people can relate.

The sacred identity of the core has been reinforced by the recognition of natural 'mandalas' which are reflected in the topography of the site, and by recreating 'mandala' diagrams within the settlement. The 'mandala' diagrams within the city have either been structured by landmarks dispersed throughout the terrain, or by rituals, such as those enacted through circumambulatory circuits known as 'yatras'.

Amongst the significant 'mandalas' within the city core generated by landmarks, one of the most prominent is the chariot form defined by seven Shiva temples. The temples of Gokarneshvar, Sultankeshvar, Manikarneshvar are located at the centers of the wheels of the mythical 'mandala' chariot, and the position of the Visveswara temple is metaphorically located at the drivers seat. The temples at Madhyameshvara and Omkareshvara are representative of the horses driving the chariot along the
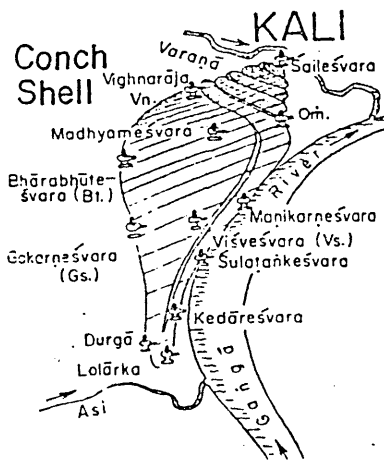

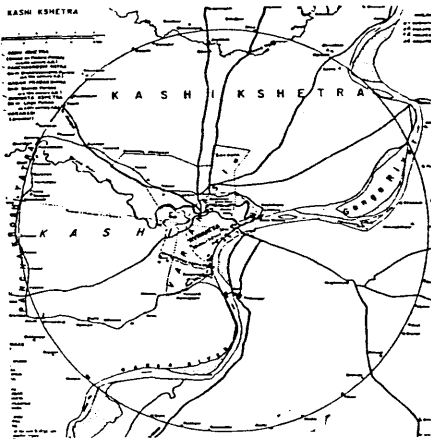[18]Volwahsen, Andreas. Living Architecture. London: Macdonald, 1969.
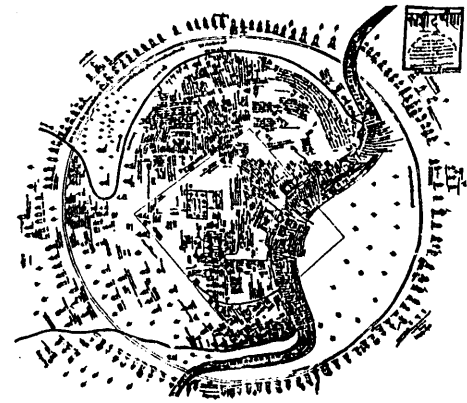
[3.14] Kashi 'mandala'
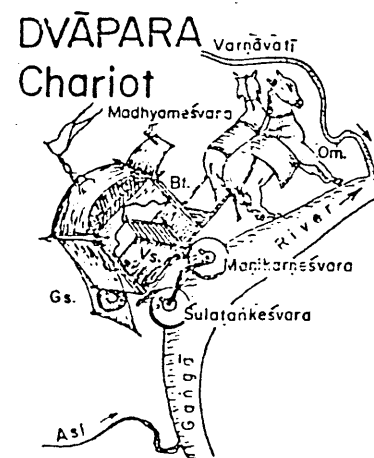
[3.15] Chariot 'mandala'

Conch
Shell

[3.16] Conch shell 'mandala'

[3.17] Sacred zones of Kashi -
the Benares region

[3.18] Pancakoshi and its
temples

path defined by river Ganga. All of these temples were also incorporated in the conch shell 'mandala', created by the Vaishnavite sect, which also includes the Vinhanraja, Vinayaka Sartesvara, Kedareshvara and Lolark temples. Other 'mandalas' have recreated divine forms such as Shiva's body.[19]

A large number of 'mandalas' have also been recreated through circumambulatory circuits enacted as religious rituals. Each of these religious rituals has a myth associated with it, and establishes a sacred zone. The sacred zones have a defined boundary that gives an identity to locations within the settlement and distinguishes one place from another. The 'mandala' recreated through the Pancakoshi yatra is an image of the cosmos on the earth, and defines the sacred territory of Kashi. In fact, the tradition of pilgrimage in Kashi can be linked to this circumambulation.[20]

The sacred space and the image established by each of the circumambulations within the spatial structure of the traditional core however, is not realized as homogeneous in nature. Locations derive different identities and values of significance along a route. Each location is associated with a distinct significance value with respect to the entire structure, that corresponds with the 'mandala' image that generated the identity. Moreover there are a number of religious circuits that are enacted within the settlement, which yield different identities to the same locations. There are locations within each circuit that correspond with two or more 'mandalas', and derive multiple identities. This situation ensures that parts of the settlement are perceived in a qualitatively different manner from one another.

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[19] Singh, Rana P.B. op. cit.
[20] Kashi Khanda of the Skanda Purana. Calcutta: Radhakrishna Math Publications,1949.

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Significance and the identity of places within the spatial structure have also been established by relating various locations to specific mythological places through the enactment of epic dramas, such as the Ramlila. In the traditional core, the Ramlila is performed annually for a period of twenty-one days. Unlike other parts of India, the Ramlila performances in Benares are not restricted to a particular location. The movement of each days Ramlila performance enables each of the different locations to derive a new identity for the area. This identity has been sustained in the collective memory of the city. Places within the core, such as "Lanka" that host a day's performance, are referred to by the names of mythological places that serve as backdrop reference locations for the drama. In fact, some of the Ramlila locations within the core have incorporated certain characteristics of the places that they relate to in the pageant.

Even Ramnagar's own distinct and separate Ramlila performances bear an influence on the character of places within the traditional core. Locations in Ramnagar and the traditional core not only derive an identity from mythological places, but from each other. The derivation of identities has facilitated the creation of different images for different places in the city, which has influenced the character of future development. Reference to analogs is, therefore, a mechanism that also enables a different significance value to be placed on built form already in existence, and to give credence to an established social and political order.
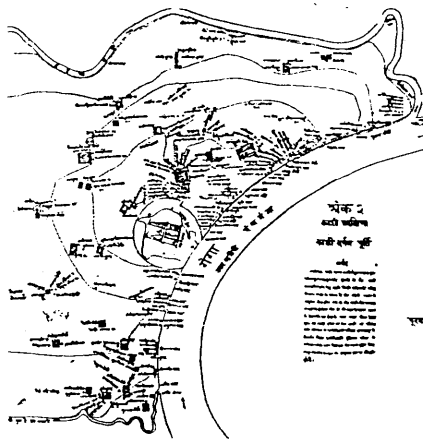
Rituals performed within the traditional core that are location specific have also established an identity and character for the spatial pattern based on myths. The diverse character of the 'ghats' can be explained by myths
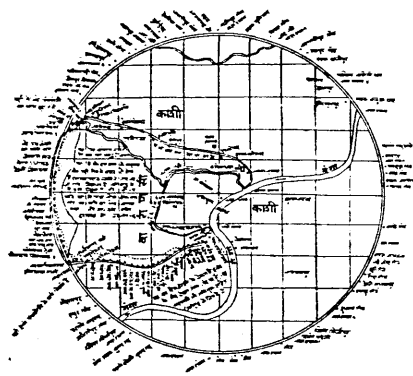
[3.19] Boundary of Kashi

[3.20] Sacred zones within Kashi

[3.21] Sacred inner rings of the traditional core

relating to the sacred character of the river Ganga, to death, to festivities and the composite sacred character of the city that represents all the sacred zones of India.

Analogs as a mechanism for defining the boundaries for development within the settlement pattern

The Mandala patterns that generated significant landmarks actually served to define nodes and boundaries between which various street networks were developed. Likewise, the different circumambulatory circuits, because of their religious significance, became attractive to development.

The circumambulatory circuits were generally long routes, along which rituals were continuously performed for a number of days. Consequently, the religious circuits required halts at regular intervals that corresponded to the distance which could be covered by a days journey on foot. Often the halts in these routes also corresponded with the geometrical divisions in the 'mandala' diagram, which the circuits traced. Over the years, the location for halts have gradually developed into concentrated zones of development.

The Chaurasi Krosi yatra, that traces the disc form Mandala and forms a 168 mile circuit, developed four significant nodes along the four cardinal points. Each node is defined by the temple of Bhairava, a form of Shiva. Whereas the canonical halts suggested during the enactment of the 45 mile long Panckoshi Yatra correspond with nodes located at a day's foot journey from one another. These nodes are located at Kandava, Bhimcandi, Ramesvar, Sivpur and Kalpadhara. The pilgrimage circuit also comprises of 108

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temples along its route that are located at geometrical divisions on the 'mandala' diagram. The figure 108 itself is related to the mandala that the route traces, and is a product of 12 signifying time and 9 signifying space.[21]

Beyond the religious needs, development along the circumambulatory routes was also attractive for economic reasons which supported links with the pilgrimage. The performance of the circumambulation is guided by a rule that makes it mandatory for pilgrims to buy food or fuel for fire. The rule suggests that if a pilgrim accepts any gifts, all the spiritual gains from the circumambulation are to be transferred to his benefactor. As a consequence of this rule a number of villages mushroomed up all along the circuits between the concentrated zones of development. The circumambulatory circuits assured villages of an important source of income, when crowds of pilgrims passed through.

## Analogs as a mechanism for regulating the form of the spatial organization

Principles derived from references to various analogs have regulated the spatial order within the traditional core. Each religious circuit has had an impact on the organization of physical form of the traditional core.

The physical form is arranged in a manner such that functions which are considered sacred, for example the temples and tanks for ritual ablutions are located along the right side of the route. Those considered profane, for example the rest houses for pilgrims known as the

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[21] Piepar, Jan. "A Pilgrims map of Benares, Notes on codification in Hindu cartography." Geo journal 3(2), 1979.
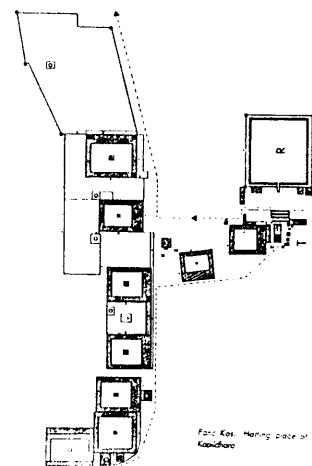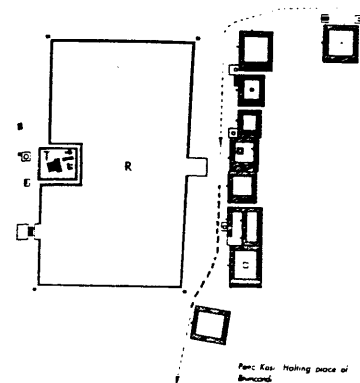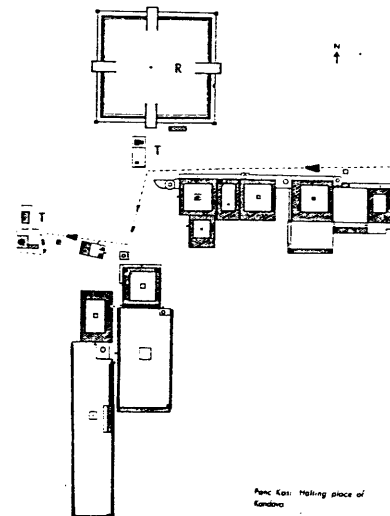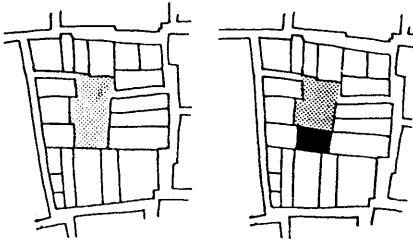

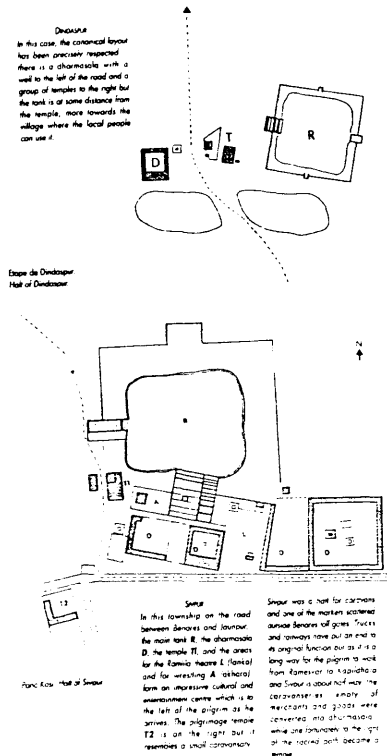[3.22] Canonical halts along the Panckoshi 'yatra' route.
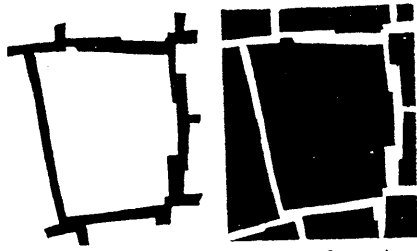
[3.23] Left - Sacred routes

[3.24] Right - Sacred zones defined by sacred routes

[3.25] Left - Profane functions organized to maximize frontage along sacred routes

[3.26] Right - Temples located in the center of blocks to generate a sacred zone within the block

'dharamshalas,' are located on the left side of the route. These physical structures generally form an edge that defines the circuit route. Moreover, each node is usually located around a natural water body. In the absence of natural sources of water, artificial tanks have been substituted.

The configuration of the forms and high density within the spatial pattern of the traditional core, is also based on the relationship between the physical form and rituals. Circumambulatory rituals enacted within the settlement generate radial, semi- circular, and the orthogonal networks of streets. These networks constitute parts of larger 'mandala' diagrams which define sacred zones. The sacred route as well as the land within the sacred zones, is considered to be of great significance. Consequently, most of the area within the core, except that which is required for performing rituals, is built up. This situation results in a dense pattern of streets and blocks where the configuration within a block is arranged so as to maximize frontage. The block within the settlement is organized in a manner such that functions which are considered profane, such as the residential and commercial lots, are located facing the sacred street edge. To maintain the sacred character of the settlement, internal spaces within a block are then organized to accommodate small temples.

[3.27] Canonical halts along the Panckoshi 'yatra' route.

[3.28] Panckoshi 'yatra' route

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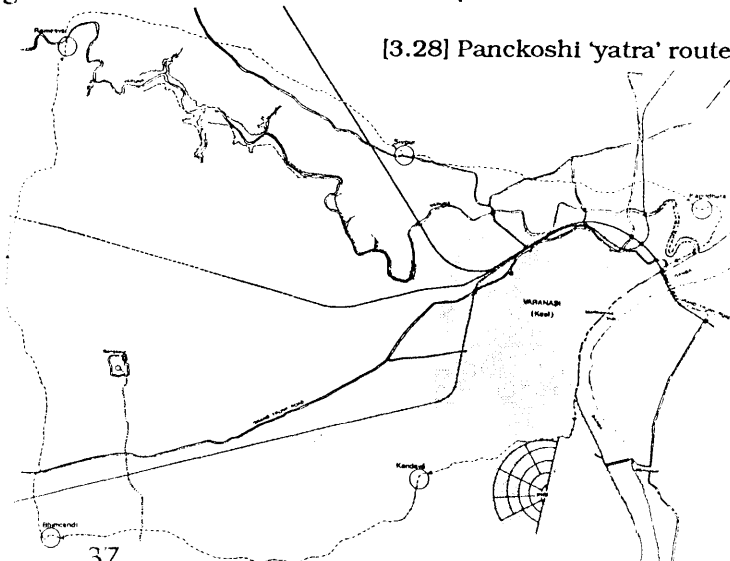
Characteristics of the spatial patterns within the traditional core

Deformation in the shape of the pattern

Within the core of the traditional settlement a deformation in the shape of the regular ideal geometry of intersecting spatial patterns is caused by the impact of the topography of the terrain. The shape of the regular patterns, rooted in a utopian vision of ideal form, and recreated on the ground by various 'mandalas,' are also affected by the location of pre-existing structures such as trees, water bodies etc. Imprecise techniques, such as circumambulations that are used to recreate the ideal form on the terrain, have also caused deformities in the shape of the pattern.
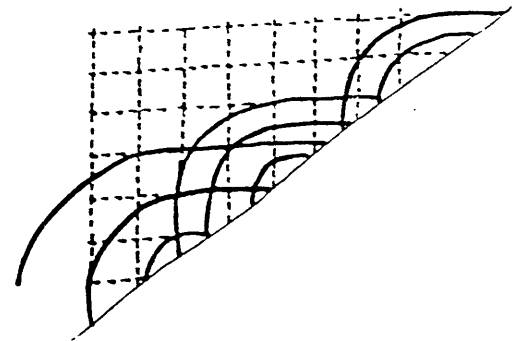

[3.29] Hypothetical ideal pattern

[3.30] Pattern 'extracted' from Prinsep's plan

Dual relationship between solids and voids within the spatial structure

A potential for multiple interpretation within the spatial structure is advanced by the treatment of open spaces, in the form of gardens, and their relationship to the built mass. The garden complexes are organized both as a suburban extension of the built mass of the city and as voids within the city.
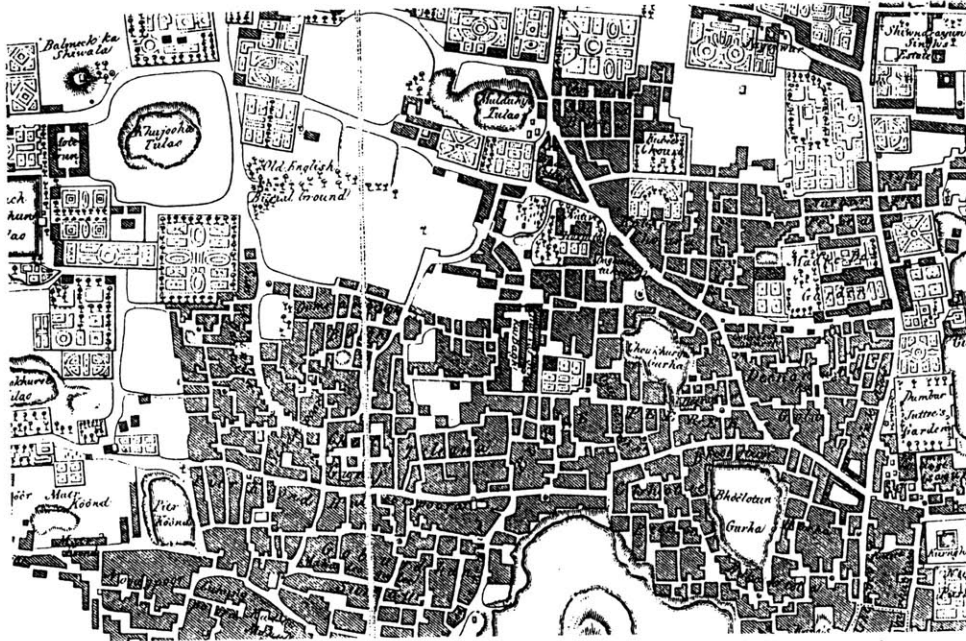
The garden complexes within the built mass of the city function as a focus within the blocks. These garden complexes are distributed throughout the entire spatial structure of the traditional core. They also form the largest sized public open spaces within the core.
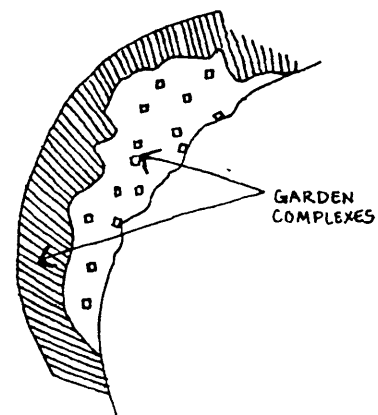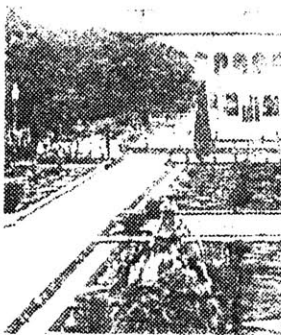

[3.31] Garden complexes as suburban extension of built mass and voids within the city

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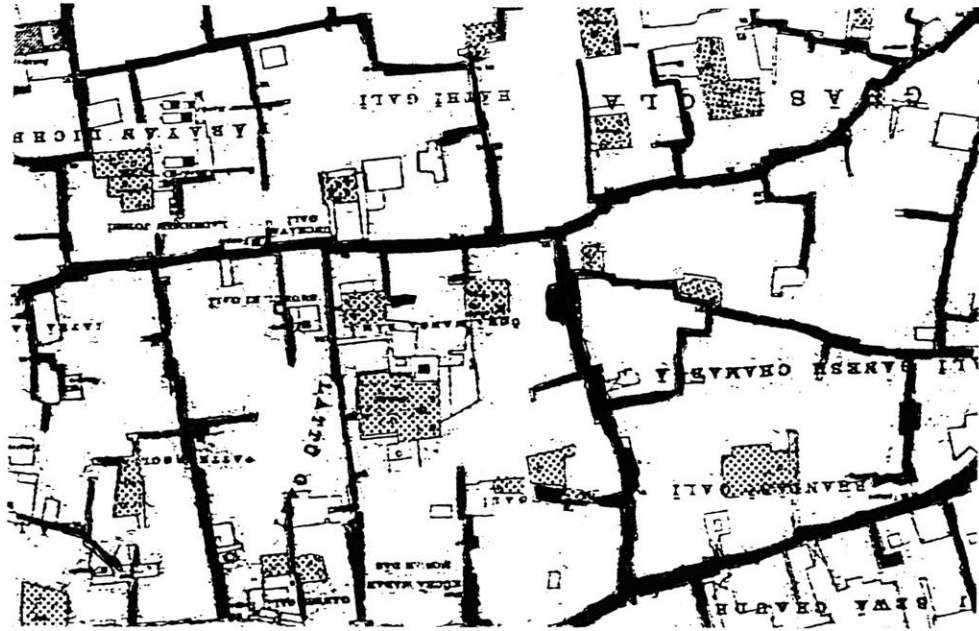
[3.32] Gardens within the city sectors, 1929 map
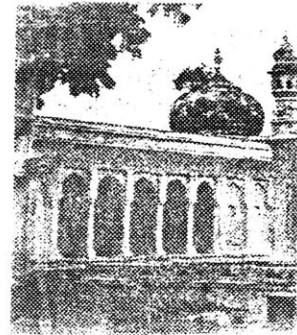

[3.33] Gardens defining the boundary of the traditional core, 1822 map

[3.34] Garden complexes at the periphery of the city core

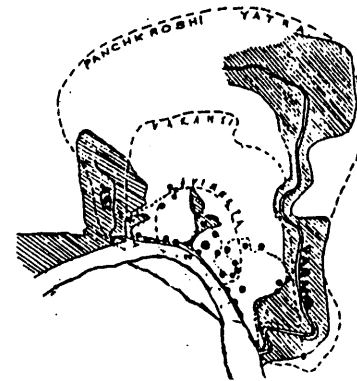[3.35] Gardens within the residential quarters

[3.36] Gardens within the palace complexes

The garden complexes located in the periphery function as an antithesis to the city. These gardens define the boundary of the traditional core. They are organized as a part of large residential plots and are much larger in size, in comparison to the gardens located within the core.
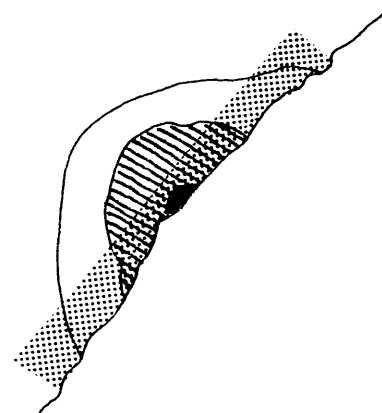
Multiple areas of differentiated hierarchical significance within the spatial pattern

Within the spatial structure of the traditional core, multiple areas of differentiated hierarchical significance are achieved by the superimposition of the semicircular and orthogonal street networks. Although the two spatial networks create areas which have a greater hierarchical significance relative to other areas within the core, no single area of importance is created. The two networks introduce contrasting effects with reference to hierarchy in the structure of the city.

[3.37] Areas of hierarchical significance within the traditional core

The near concentric, semicircular networks generate a radiating pattern of streets that structures a hierarchy in the importance of areas within the spatial structure. This pattern accommodates the class distinctions found within the social structure of the city. The smaller, inner rings of the street network, because of their proximity to the sacred river, are considered more important than the larger peripheral rings. Consequently, areas of the city located in the proximity to the river assume a greater social significance. The inner rings accommodate groups of people belonging to the higher castes, while groups of people belonging to the lower castes are usually located along the larger rings, at a greater distance from the river.
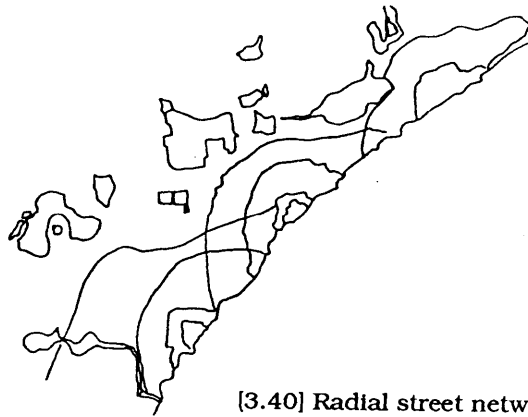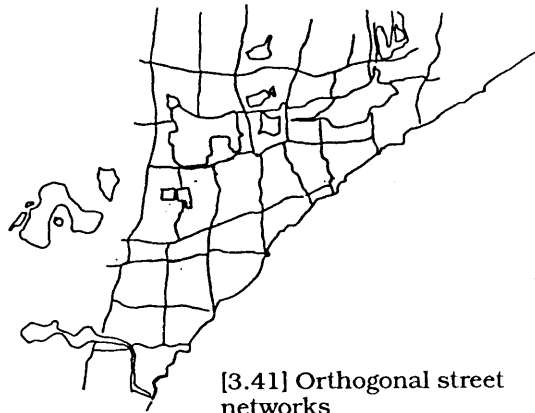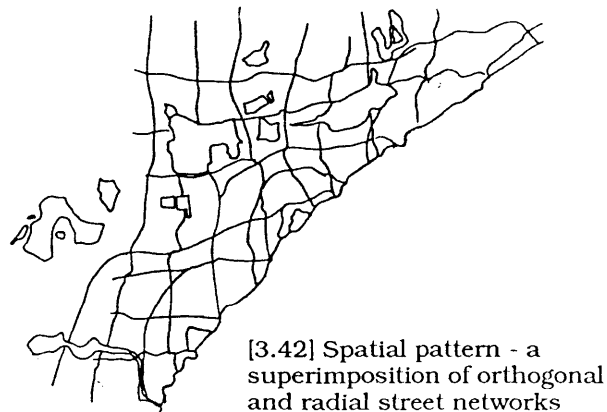
[3.38] Sacred zones along the river
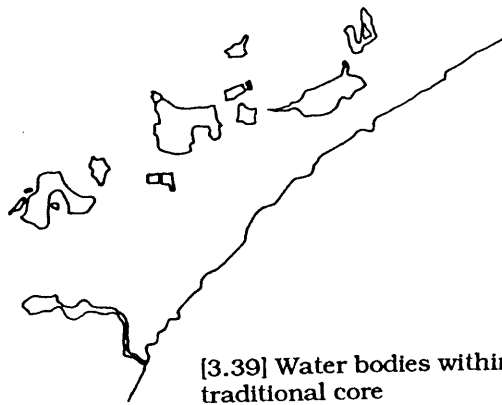
[3.39] Water bodies within the traditional core

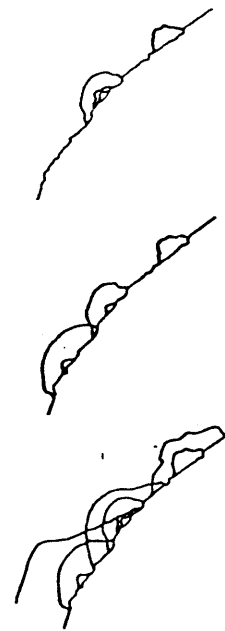[3.40] Radial street networks

[3.41] Orthogonal street networks


[3.42] Spatial pattern - a superimposition of orthogonal and radial street networks

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Once a network of concentric rings was developed, the need to accommodate newer groups of people belonging to higher castes within the core, caused the generation of newer rings within the core. Accordingly, a number of near concentric radial networks of streets were created along the banks of the river. Due to the existence of a number of intersecting, radiating, concentric, semi- circular street networks, no singular network of significance is established. Moreover, each ring comprises different areas of significance. As a result, areas of differentiated hierarchical significance are dispersed throughout the spatial pattern of the traditional core.

The superimposition of the orthogonal network of streets over the radial street networks further disperses the areas of differentiated significance along the banks of the river. In its generic structure, the orthogonal network of streets forms a grid, which, because of the coherence in the shape of its parts, encloses areas that are devoid of any hierarchy. In the traditional core, the proximity to specific edge conditions such as the sacred river, provide a greater significance to areas located near it, whereas, features such as water tanks lend significance to the areas located at a distance from the river. As a result, the orthogonal network generates another 'layer', comprising areas with differentiated significance within the structure of the traditional core. This character of the orthogonal network, in which a number of areas of significance were created and no single area dominated the entire spatial structure was central to supporting the diverse community structure of the city based on regional divisions.

[3.43] Hypothetical generation of radial rings within the traditional core
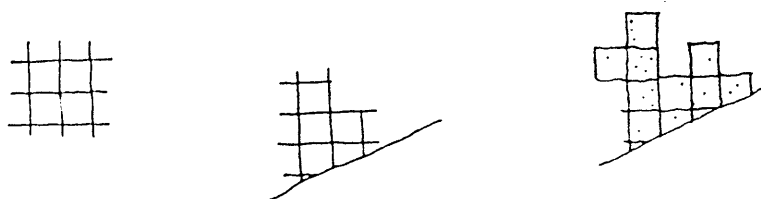
[3.44] Multiple areas of significance within the orthogonal street networks

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Multiple orientation within the spatial structure

Multiple foci within the spatial structure are imposed by multiple areas of differentiated hierarchical significance. The intersecting, near concentric networks of the radial pattern create multiple foci towards the river. The superimposition of the orthogonal pattern upon the radial pattern connects the different rings and reinforces the focus towards the river. The intersection of the radial networks and the orthogonal street networks generates a reticulation of streets that actually disperses the focus toward the river.

The focus towards the river, however is restricted in the core to the area between the edge of the bow - shaped profile of the river Ganga, and a series of water tanks located inland. This corresponds to the area where the radial rings are located. Unlike the radial pattern, the orthogonal pattern is not restricted in its coverage by the features of the terrain. The orthogonal pattern that connects the different rings, because of its geometrical configuration, extends beyond the radial network of streets. Parts of the traditional core that are articulated only by the orthogonal pattern are characterized by the absence of a unified focus. Within these areas there are a number of local foci which are created by significant features of the terrain such as water bodies.

[3.45] Multiple foci within the radial structure

[3.46] Multiple foci within the spatial structure

Whole and part relationship within the spatial structure

A whole and part relationship is apparent within the spatial structure of the traditional core. Not only can the core be identified by its distinct character as being situated within a larger entity, the city of the present day; but also as a composition of distinct parts, it may be identified as an individual city - an entity in itself. Each of these parts may also be recognized as miniature cities in themselves.

Within the spatial patterns of the traditional core, the intersection of the semi- circular and orthogonal street networks yields a composition of sectors. These sectors are related to one another on the basis of common characteristics that distinguish the core from other parts of the city. They exhibit similar traits which are derived from common principles of organization, layout, massing, elements which articulate buildings, and a distinct functional composition and character. The sectors are enclosed by a network of streets, demarcated by a network of streets and gates, and share a common geometrical module. There is generally a functional continuity between adjoining sectors. Each sector is composed of a number of blocks. The functional and geometrical relationship between various sectors, as well as their collective relationship to the composition of the traditional core, suggests that the sectors form a part of a larger whole. Consequently, the structure of spatial patterns within the traditional core, as a collection of similar typologies, and a pattern with distinct spatial characteristics, can be identified as a whole city - a complete entity in itself.

The traditional core may also be recognized as a composition of different sectors, each of which may also be identified as a complete entity in itself. These sectors
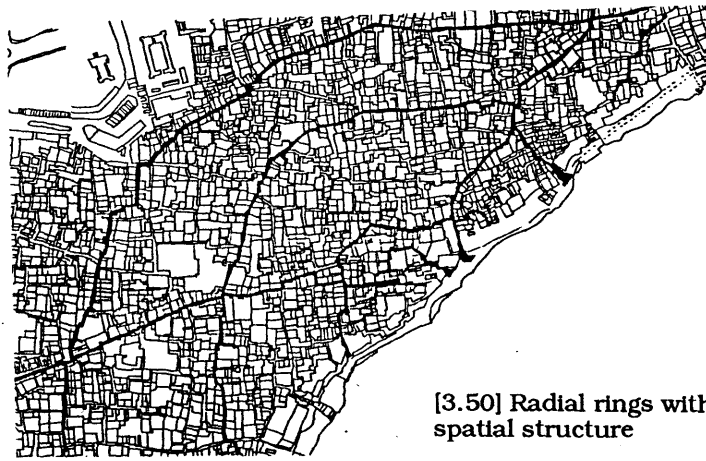

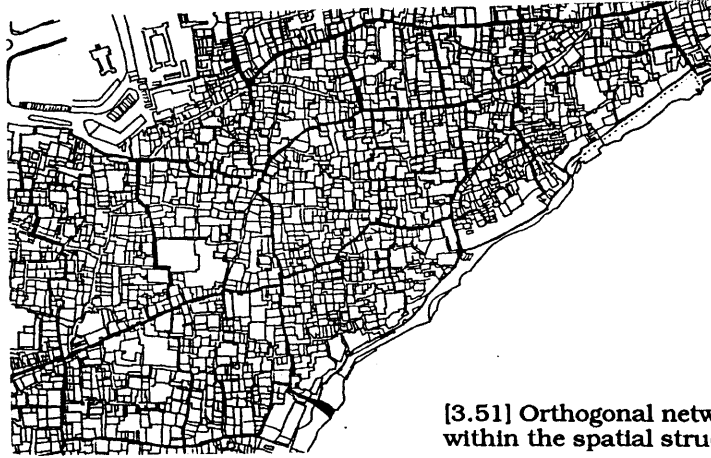[3.47] Figure ground of area defined by a concentric radial rings

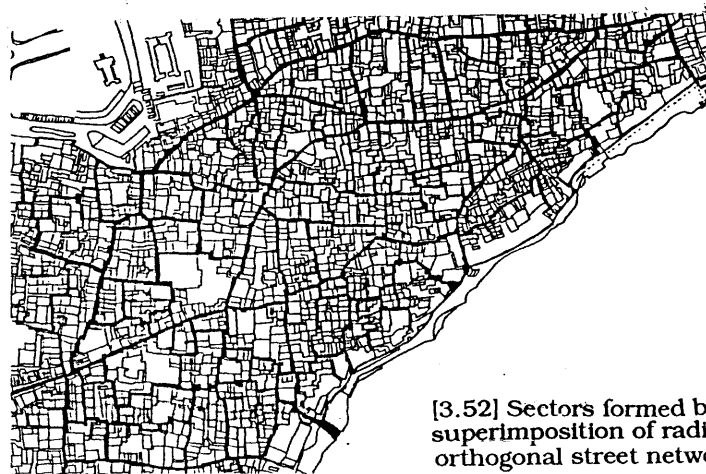[3.48] Geometrical configuration of a single sector
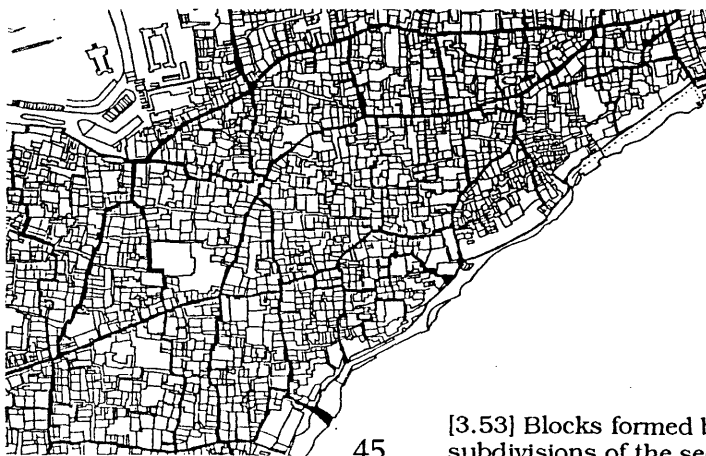

[3.49] Sector subdivided into blocks

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[3.50] Radial rings within the spatial structure

[3.51] Orthogonal network within the spatial structure

[3.52] Sectors formed by the superimposition of radial and orthogonal street networks

[3.53] Blocks formed by subdivisions of the sectors

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sectors comprise a diverse range of functions reflecting the structure of the traditional core. Each sector accommodates a distinct social group, from which the sector derives its unique character. Street networks defining the enclosure of a sector serve to maintain the sectors identity. Each sector is distinguished from another by the gates that demarcate its formal boundaries. Despite the fact that the sectors within the traditional core are coherent in their relative size, they have marked differences in their shapes. No two sectors comprise a similar configuration of blocks. These characteristics suggest that sectors are smaller cities in themselves.
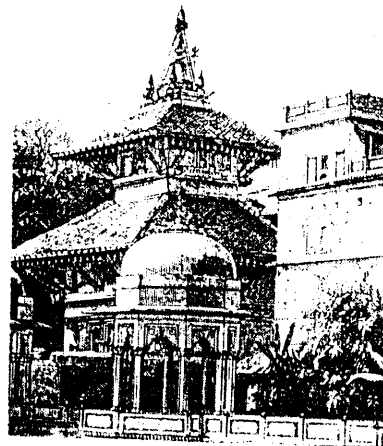

[3.54] Adjoining sectors distinguished by differences in their physical forms

Whole and part relationship within the block

The geometrical interplay between street networks within the traditional core results in subdivisions of the sector into blocks. As identified at the scale of the different sectors of the city, a whole and part relationship is also evident with respect to the structure of the block. The block may be considered as either a part of the larger structure of the sector and the core, or as a complete unit in itself.

The blocks within a sector are coherent with respect to one another. Although the block sizes vary, the relative variation in their proportional module is not extreme. Coherence within the block is based on a module which is generated from the intersection of the orthogonal and semi-circular street networks. The coherent character of the blocks is also a consequence of the block's formal typological character and generally uniform functional composition. The geometrical structure of the block is defined by an enclosure of street networks and one or more internal foci. There is generally a continuity in the functional character from one block to another. The relative
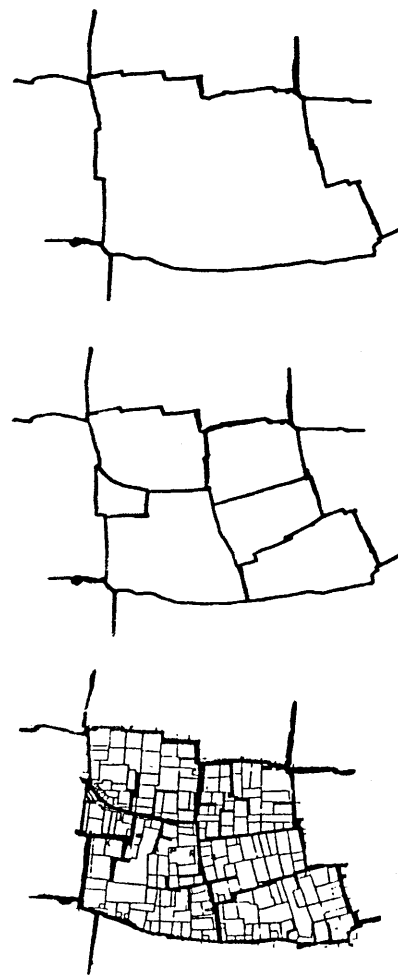
[3.55] Whole and part relationship within a block

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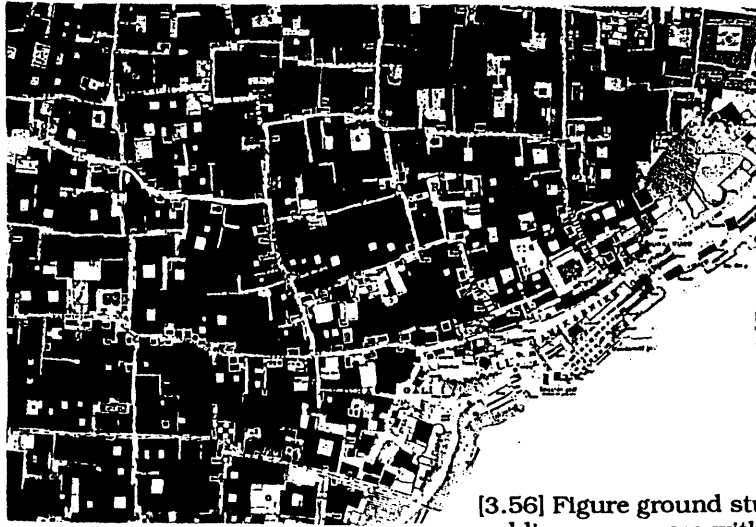
[3.56] Figure ground study - public open spaces within the blocks
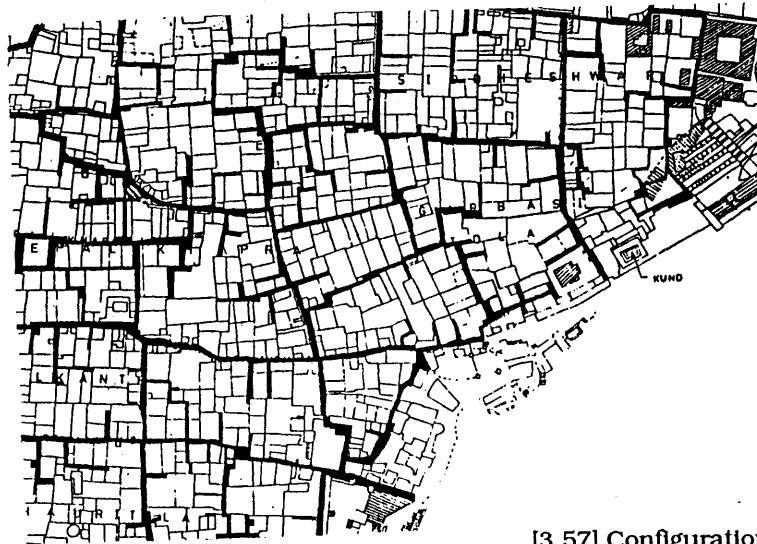
[3.57] Configuration and internal subdivisions (lots) within the block

[3.58] Public gardens within various blocks

[3.59] Blocks with different functional identities
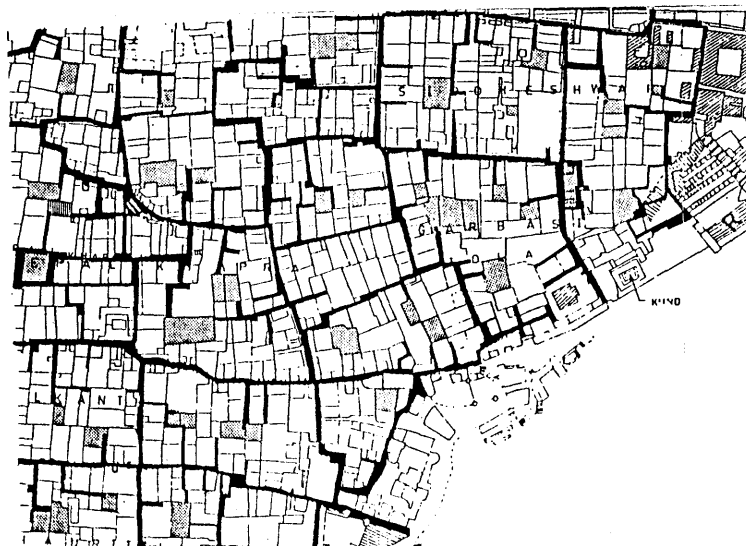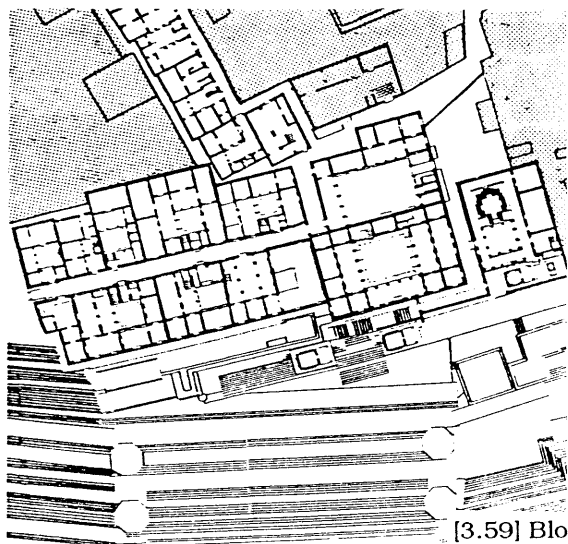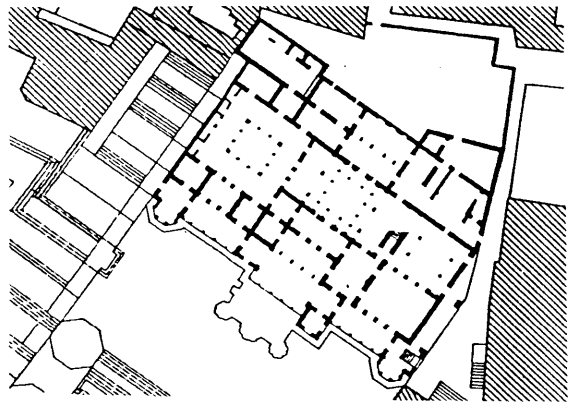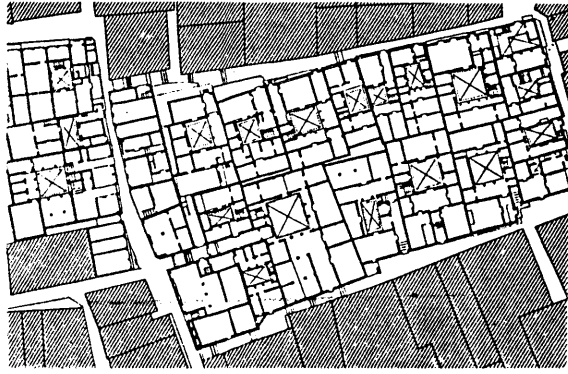
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uniformity within the blocks, as well as their collective functional and geometrical relationship to the structure of the traditional core, suggests that the blocks are additive components of the sector and settlement structures.

The blocks, though have a distinct identity. The intersection of street networks induces a variety in the spatial structure of the traditional core by generating a range of blocks differing in shape and size, which are marked by gates. The intersection of the two street networks also allows for maneuvering different site conditions. This variation accommodates different orientations for different blocks. The blocks along the river run parallel to its edge, whereas those at a distance from the edge are defined by the orthogonal and radial street networks. The block, as a typological unit, accommodates a multiple character of urban traits ranging from ghats to a variety of building types. In addition, the block accommodates a specific character of functions. For example a specialized commercial character such as shops trading in brassware or silk sarees etc.. Blocks generally accommodate a specific trade, institutional uses like schools, temple complexes or rest houses, any one of which could give the block a distinct identity. The identity of the block is also characterized by the particular sub - social group that the block accommodates. The distinct and independent character of the blocks suggest that they function as cities at a smaller scale.
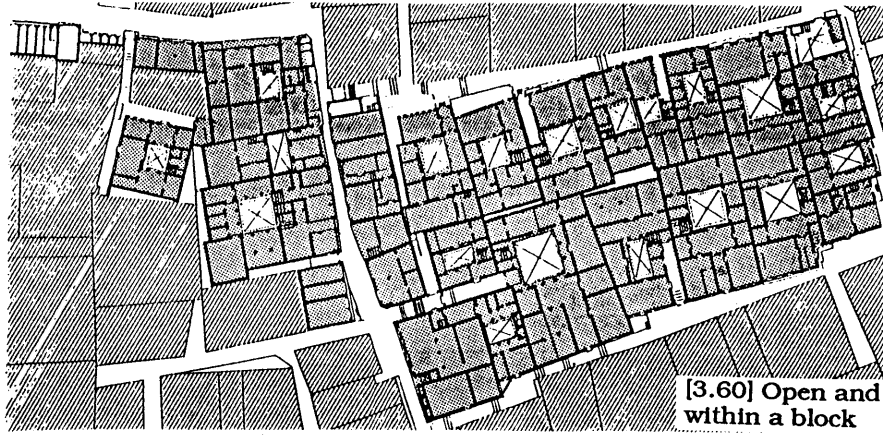
[3.60] Open and built areas within a block
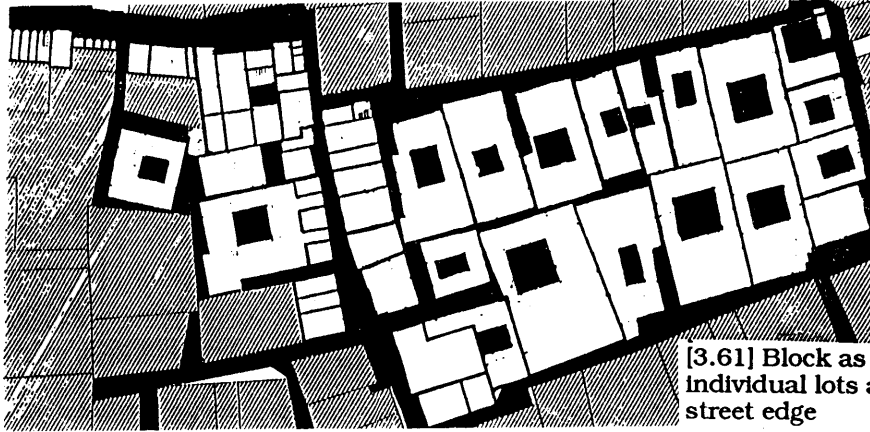
[3.61] Block as an aggregation of individual lots abutting the street edge
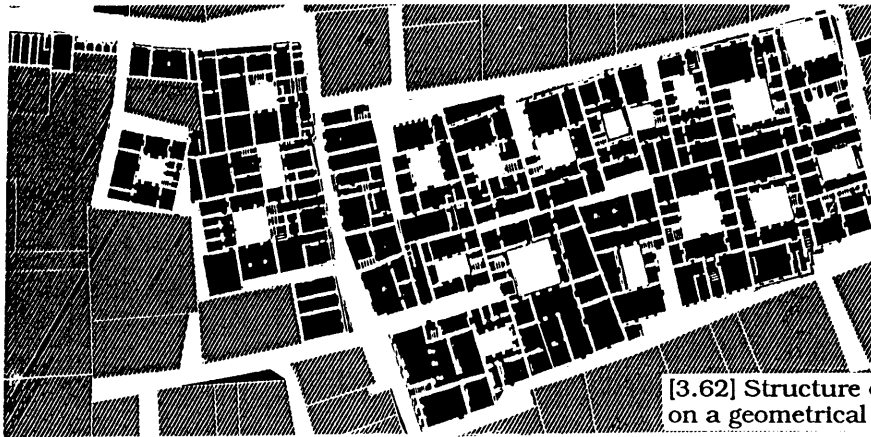
[3.62] Structure of a block based on a geometrical module

[3.63] Internal focus within the block

[3.64] Inward orientation of the block

Multiple orientation within the block

The geometry of the blocks within the traditional core reflects the opposition between the blocks simultaneous inward and outward focus. The opposition between the closed character of the external face and the existence of openness within its internal spac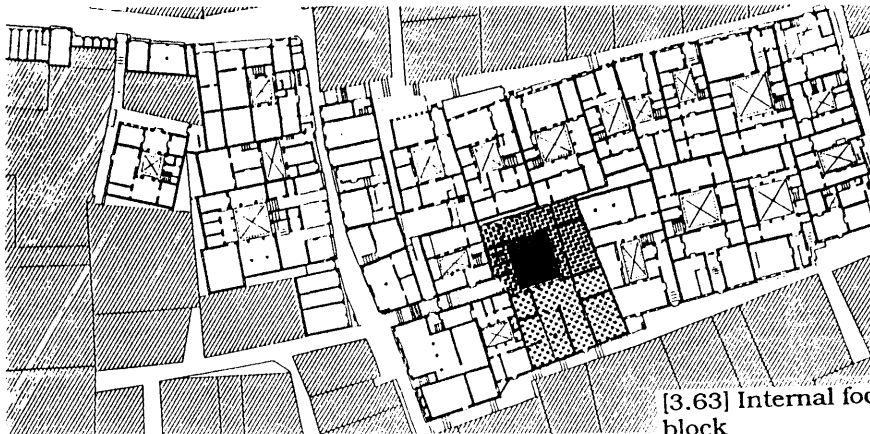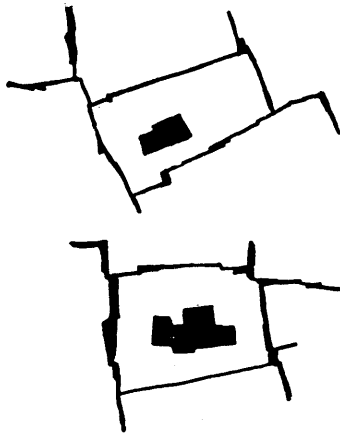e is a common architectural characteristic of the traditional core. Like all other building types and complexes within the traditional core, the spatial structure of the block is also based on common principles of centrality and enclosure.
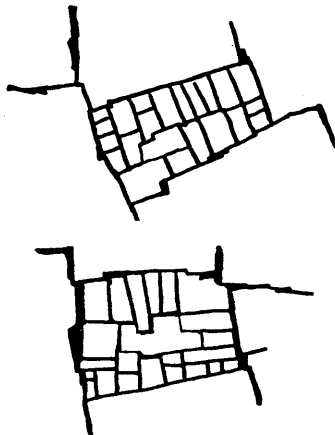
[3.65] Outward orientation of the block

Outwardly, the block is a 'close ended entity'. That is, the organization of the block is defined by buildings or walls abutting its peripheral enclosure. The facades of a block form an edge along the full extent of its perimeter. The external public facade of the block, except at the river edge is enclosed and defined by adjoining blocks. Blocks also share a common module which relates it to the adjoining blocks and gives coherence to the sectors in its vicinity. The blocks generally maintain a functional continuity with its adjoining sectors. In essence, the outer face of the block establishes unity within the settlement structure.
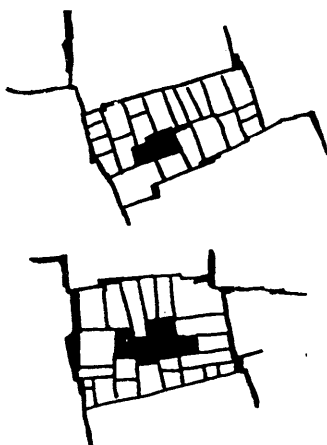
[3.66] Structure of the block

In contrast, the block's internal focus accommodates a significant characteristic that gives the block its identity. The internal area typically accommodates civic institutions or gardens. The internal focus area distinguishes the block from other areas of the settlement. In contrast to the closed public facade, the inner local focus of the block is defined by the open character of courtyards or gardens. As a result of this configuration, hierarchy and focus, as well as variety in the block are, established by site conditions, size of lots, nature of the corner lots, presence of institutions, prominence of a central open space and the relationship of the block to streets defining it.

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Multiple orientation within the lot

The blocks within the traditional core are organized as a composition of individual units or lots, which share similar typological characteristics. These lots are coherent with respect to one another. As identified the block structure, the geometry of the lots also exhibits a concurrent opposition between each lot's internal and external focus.

The structure of most of the blocks is organized in such a manner that the maximum number of lots attain a street frontage. Each lot accommodates a specific building which occupies its full extent. Consequently, the buildings are fine grained small scale developments. The buildings also share a common typology. The lots are quadrangular in shape and oriented towards the street, even to the extent of generating intermediate left over space within the block. This open space is usually incorporated into public gardens within the block. Each building is also composed of a central courtyard into which all the rooms of the house open. The central courtyard is also implanted on a platform, which is raised above the street level and allows for storage space.

In addition to the individual character of the facade, the abutting of the house onto a street edge reinforces the external public focus of the buildings. Whereas the raised character of the courtyard distancing the building from the public realm, the relationship of the rooms to the central courtyard, as well as the openness within the building created by its central open space, support its introvert identity.
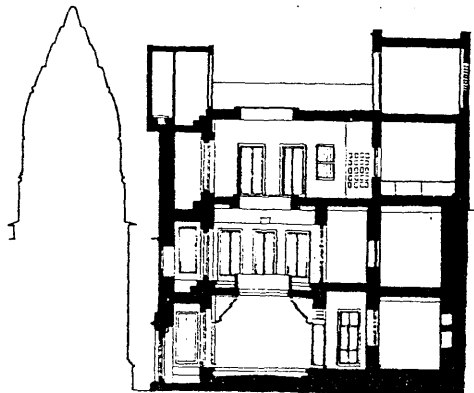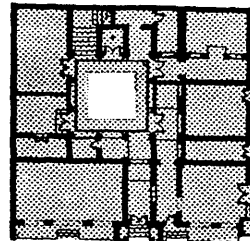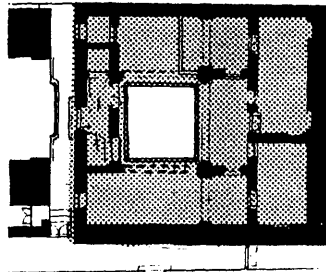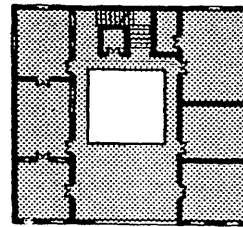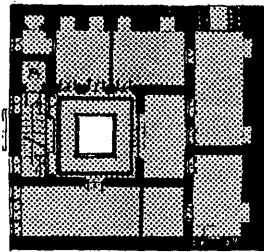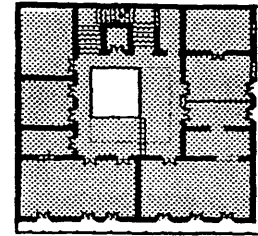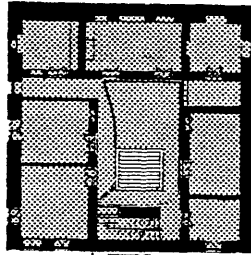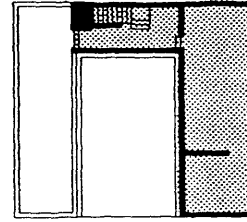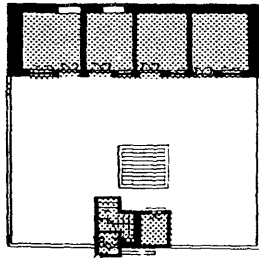
[3.67] Individual buildings occupying the full extent of the lots and organized around a central courtyard

[4.1] Prinsep's drawing of the colonial settlement

4. The colonial settlement
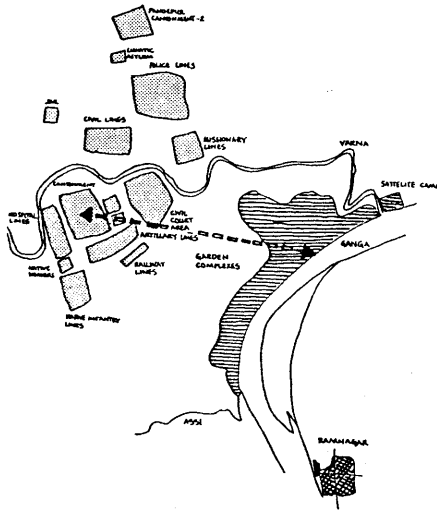
[4.2] Location of the colonial settlement

The spatial pattern

The Colonial settlement in Benares was founded by the representatives of the British East India Company. The settlement was located in close proximity to the north and south banks of the river Varna, at a distance of four and a half miles from the traditional core of the city.

The British regarded the traditional settlement as "unsanitary and dangerous." Therefore, the maintenance of a distance between the traditional and colonial settlements was critical to the British requirements for both security and 'hygienic' environmental conditions. The ability to achieve these objectives was further improved by choosing to locate the settlement next to the river Varna. The river provided both, a security barrier and an ample supply of water for the maintenance of gardens. The British considered the gardens as a precondition to "healthy surroundings." In addition, the distant location also served the British need to distinguish themselves for social, cultural and political reasons. Anthony King argues that the distance between the two settlements provided an "ease of control in the supervision of native affairs" and helped the British maintain their own self-identity. He also suggests that a clear distinction between the two settlements required lesser infrastructural investments on the part of the British.[22]

The colonial settlement was comprised a number of distinct components encompassing areas that were developed at different periods of time and located adjacent to one another. Each of the components served a specific function within the settlement and was defined by clearly marked

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[22] King, A.D. Colonial Urban Development: Culture, social power and environment. London, Henley and Boston: Routledge and Kegan Paul. 1976.

boundaries. Generally the use of the colonial settlement was limited to the British.

The origin of the colonial settlement was rooted in military camps which grew into two major developments on either side of the river Varna. To the south of the river was the older camp that developed into the cantonment. The cantonment was bounded by the native infantry lines (of the British army) and the railway lines at its southern end. To the north of the river, was located the civil lines which served as the administrative component of the colonial settlement. It comprised institutions such as courts, governmental offices and residences for senior officials. To the periphery of this area were located the independent components of the colonial settlement such as the jail, the cemetery, the lunatic asylum and the police lines. These components were added at different periods of time, much after the civil lines had been founded. The components that were later added to the development south of Varna included the area around the post office, the commissariat office, as well as an area set aside exclusively for interaction with the natives, that included a civil court and the Maharaja's palace.

The spatial structure of each of the components consisted of a central focal area around which buildings of importance, such as the civic institutions and residences of prominent persons were located, in independent lots. Buildings accommodating functions of secondary importance, usually those which were residential in nature were also located in independent lots, adjacent to the buildings of importance. They were organized along a street network away from the central focal area. This direct relationship between the individual lots and the street edge, as well as the prominence of the central focal area, was always maintained in the colonial settlement. At the beginning of

BENARES
AND ENVIRONS
One English Mile
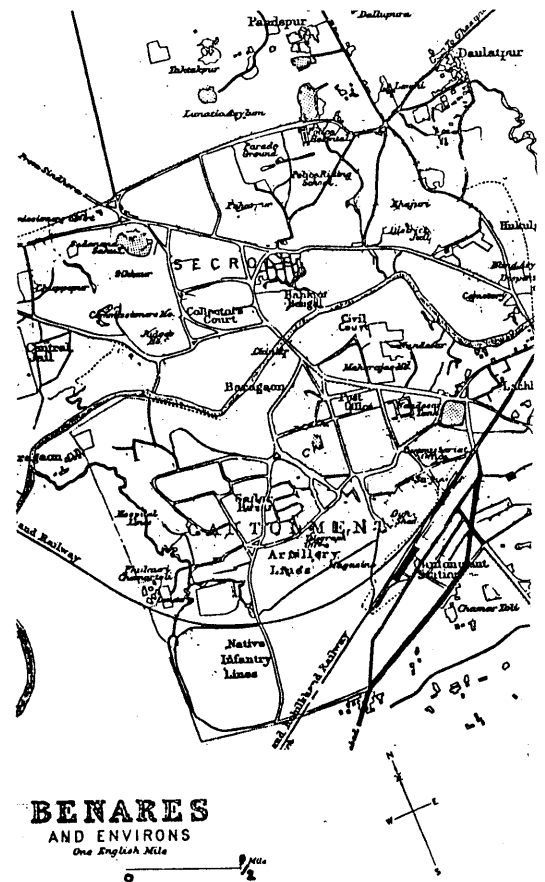
[4.3] Colonial settlement , 1938
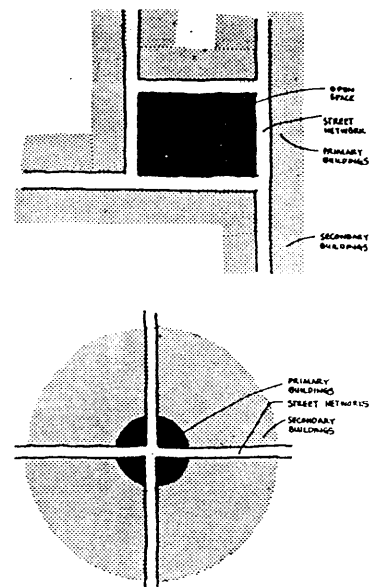
[4.4] Principle of spatial organization

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[4.5] Cantonment plan

[4.6] Wide road
in the cantonment

[4.7] Typical residential lot

the twentieth century, when pressure on residential use increased, a number of residential lots were subdivided in the cantonment area. Another street network was then introduced between the main streets that defined the central focal area. Although this network provided a direct street access to all the lots, it did not impinge upon the significant character of the central focal area.

The form of the colonial settlement was derived from the colonists need to import British norms in India. It was also a reaction to the dense homogeneous structure of the traditional city. The colonial settlement introduced a new spatial pattern in Benares. In contrast to the traditional core, the form of the colonial settlement was distinguished by its large open spaces, sparse development, low rise buildings and ample vegetation. In addition, within the different parts of the colonial settlement, there were no significant changes in the physical character or scale of the street networks. Unlike the traditional settlement, public activities in the colonial settlement, such as garden parties, sports and 'club activities' occurred indoors. Even commercial activity as opposed to occurring on the streets was generally restricted to the individual lots. Moreover, the different buildings form were hierarchically differentiated and segregated from one another.

The source of the spatial pattern

The colonial settlement in Benares was one of the earliest to be established by the British in a provincial city in India. The settlement's precise form, in terms of its components and their layout, differed from the other colonial settlements that the British had established in India. One possible reason for this difference was that Benares was a

weak political territory and a religious center. Unlike other cities in the north central region of India, the city did not see armed action even during the 1857 'mutiny'. Consequently even after 1857, there were very few changes that could be observed in regard to the structure of the settlement.

The settlement nevertheless, shared a number of common characteristics with the other colonial developments in India. Like the other colonial settlements, its form was based on a conscious set of largely unwritten codes which were formulated by the British administrative establishment.[23] These codes were derived from various military, technical, political and cultural principles that were developed over a long period of time. The principles were an outcome of the British social, economic and political structure, the mode of production, and the military context in which they were developed.[24]

A significant characteristic of the codes was that they did not relate to any fixed form, but to a set of images and principles of an 'ideal living environment' for the British in India. These principles and images guided the development of the spatial pattern. The codes developed over a period of time and were affected by the changing norms of the British societal structure in India. The following section offers a more detailed discussion of the impact of the codes on the spatial structure of the colonial settlement of Benares.

[4.8] Colonial settlement in Allahabad

[4.9] Colonial settlement in Agra

[4.10] Roman Castrum plan

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[23] Although there is no single comprehensive document suggesting norms for the development of colonial settlements in India, a number of manuals and letters of correspondence exist. Many of these can be found in the volumes of the Imperial Gazetteer of India (26 Volumes). There are also manuals such as the Cantonment Regulations and Cantonment Code These records are available at the India Office library in London and the National archives in New Delhi.

[24] King, AD. op. cit.

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[4.11] Hutlon Rudby, Yorks - village plan
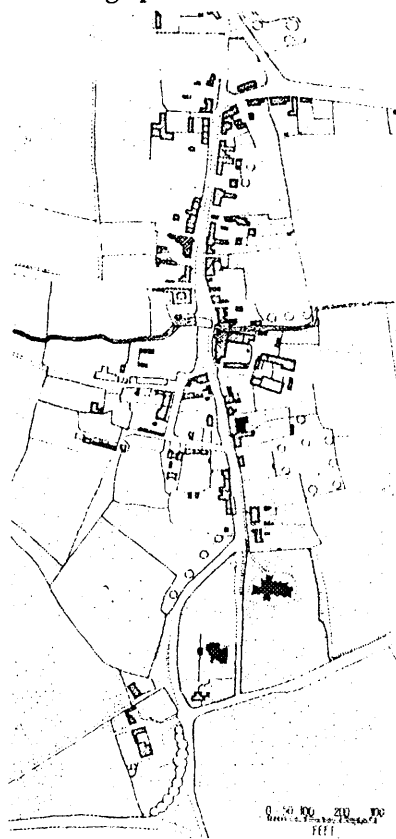
[4.12] Kersey, Suffolk - village plan

The impact of the source on the spatial pattern

Codes as a mechanism for generating identities within the spatial structure of the colonial settlement

Central to the nature of the codes that guided the development of the colonial settlement was that they enabled the creation of a spatial environment which distinguished the colonial settlement from the rest of the city. This distinction gave the colonial settlement a unique identity.

The distinct character of the settlement was rooted in images and principles derived from analogs of the military camp and the village green in England.[25] The security aspects of the colonial settlement were grounded in ideas based on the image of the settlement as a military camp, whereas the image of the village green related to ideas about the picturesque aesthetic which appealed to the British. This fascination for the picturesque was partly because of its being in vogue in Europe, at the time of the founding of the colonial settlement. Both of the sources were rooted in a paranoia that recommended high standards of health and comfort. The codes therefore ensured that ideas about comfort, health, aesthetic appeal and security were not compromised.[26]

Since the codes were based on a set of social, cultural, political and technical principles, they became a source that promoted 'ideal living conditions' for the British settlers in India. Some of these conditions were hard to

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[25] Refer Col. Swinton's letters in Imperial gazetteer of India. Vol.7. Oxford, 1908.

[26] King. A.D. op. cit.

achieve even in England. The codes dictated the location and the distinct form of the colonial settlements.

The codes also promoted the differentiation of the parts of the colonial settlement as distinct components. Since the codes did not propagate a fixed form but constantly changing principles, they were flexible enough to accommodate the Britishers constantly changing perception of what the function of the colonial settlement was. This changing perception about the function of the settlement was reflected in the number of distinct individual components within the colonial settlement. The settlement was composed of a number of small sized components. Additions to the colonial city were constantly made without affecting the integrity of the parts of the colonial settlement already in existence. The components were independently located and did not alter the physical form or functional aspects of the other components of the city which had been established earlier.

Each of the components were defined by their functional characteristics and independent structure. These traits gave the components a distinct identity. Thus, the codes provided a mechanism by which different areas within the city could be distinguished, segregated and yet maintain links with one another.

In addition the codes also enabled the creation of an identity which the Britishers from other parts of the country could relate to. This system of laying out cities could be used anywhere in India. It allowed the British who moved from one part of the country to another to easily adapt to their new settings. This was an essential aspect of the colonial settlement design strategy as the British did not restrict themselves to one single place, and were constantly transferred from one colonial settlement to another. The

codes thus provided a quick way to organize different groups of people with a single purpose within the entire country. The development of the spatial pattern based on the codes therefore developed a structural order that not only related parts of the colonial settlement, but also incorporated them into the larger domain of colonial India.

Codes as a mechanism for regulating the form of the spatial organization

The opposition between the principles rooted in the two analogs - the military camp and the village green were reflected in the form of the colonial settlement in Benares.

Security concerns, derived from references to the military camp dictated that the different constituents of the colonial settlement be located away from the native settlements, but close to one another. Also, they provided the rationale for the settlement's being organized in such a manner that it was protected by natural features, or an existing colonial settlement on at least one of its external boundaries. Further, security reasons prescribed that the lots within the settlement not be scattered, but be arranged as a compact organization. In addition, the open civic spaces had to be minimal and enclosed on all sides, and the institutional buildings were to be secured. Thus, all the roads in the settlement were defined by lots and the central focal space was enclosed on all sides by the civic buildings. Activity within public spaces was restricted causing all social and cultural events to be generally located within individual lots. The military camp analogy also dictated that the various constituents of the settlement be clearly distinguished and segregated from one another.

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Not only did the form derived from the military camp analogy facilitate an orderly settlement, but it also provided a mechanism for colonization. The technology employed in the development of most of the colonial settlements within the country was similar, and technical resources and design principles within the colonial empire were shared, allowing new areas to be constructed with ease. Since, the codes supported that the building activity was directed within limited economic resources, no settlement was developed completely at one single time. Each settlement grew when the need arose. This pattern of growth ensured an equitable distribution of resources within the colonial empire.

The superimposition of another independent ideal, that of the image of the village green, diluted the rigid form of the pattern that was generated by allusions to the military camp analogy. The settlement itself was viewed as a retreat into nature, with large open spaces and ample vegetation. In addition, each constituent of the settlement - the components as well as the individual lots were perceived to be independent and detached from one another. Buildings were located at a distance from one another in large plots with gardens. Often ancillary facilities related to the function of the building were also accommodated along with the plot.

The impact of various cultural, social, technical, political and economic principles from which the colonial development model was derived had more specific impacts over the physical form of the city. The impact was realized in the building's orientation, closed forms, styles, organization of internal spaces, and relationships to other structures within the lot. [27]

Early nineteenth-century pattern   Later nineteenth-century pattern

[27] King, A.D. op. cit.

[4.13] Colonial form derived from concern for "clean air"

Characteristics of the spatial pattern within the colonial settlement

Deformation in the shape of the pattern

The spatial pattern of each of the distinct component areas within the colonial settlement is based on a geometrical construct. The pattern, similar in its organization to a military camp, consists of a secure center and a periphery secured on one or more sides by a natural feature such as a water body or another component of the settlement. Each of the components of the colonial settlement comprise a central focal area around which buildings were located in large lots. The form of the central open area was configured as either a rectangular shaped space, an open space enclosed by street networks, or by the intersection of street networks themselves.

A deformation in the regular shape of the pattern was caused because of preexisting features, such as trees etc., as well as by specific conditions of the terrain. This deformation in the shape of the pattern was supported by the colonists urge to create a picturesque landscape that would resemble a village green in England.

[4.14] Deformed street network
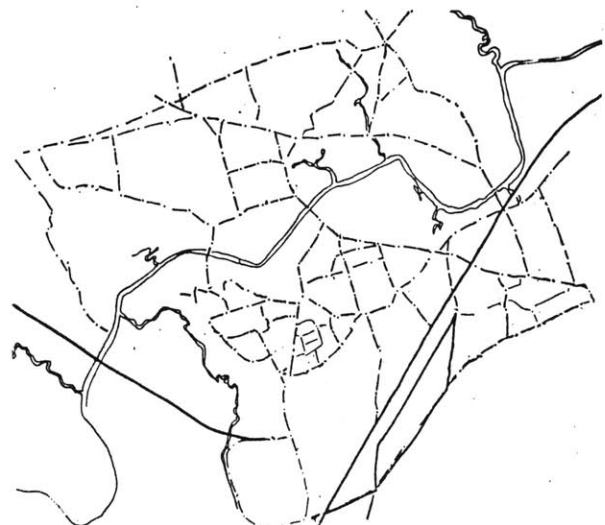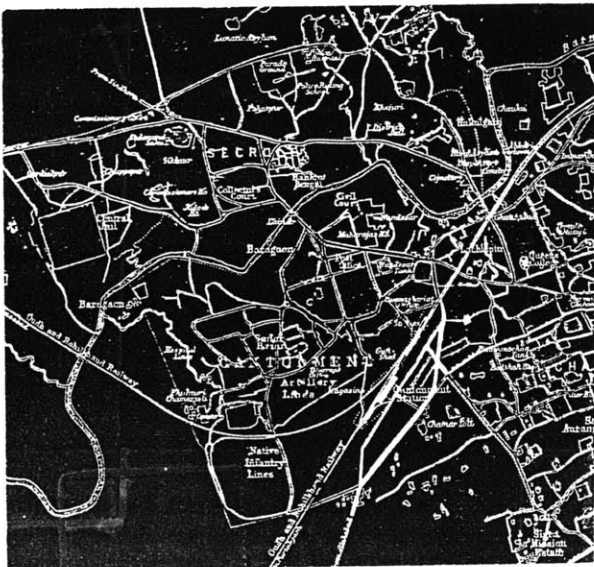
[4.15] Street networks in the colonial settlement

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Dual relationship between solids and voids within the spatial structure

The relationship between the built form and open spaces within the colonial settlements distinguishes its form from other settlements in Benares. The ratio of open spaces to the built form in the colonial settlement is very high.

Within the colonial settlement, quite like the traditional core of the city, open spaces in the form of garden enclosures were located both as suburban extensions of the settlement as well as within each component of the settlement itself. In fact, the open spaces defined the character of the central focal area within each component of the settlement. Each of the street networks defining the open space were organized as a wide meandering street network or avenue lined with trees. Unlike the traditional settlement, each building was located independently from one another in large lots of land. The buildings occupied a central position in the lot, and were defined by the garden that surrounded them.

[4.16] Gardens enclosing individual components of the colonial settlement, 1913
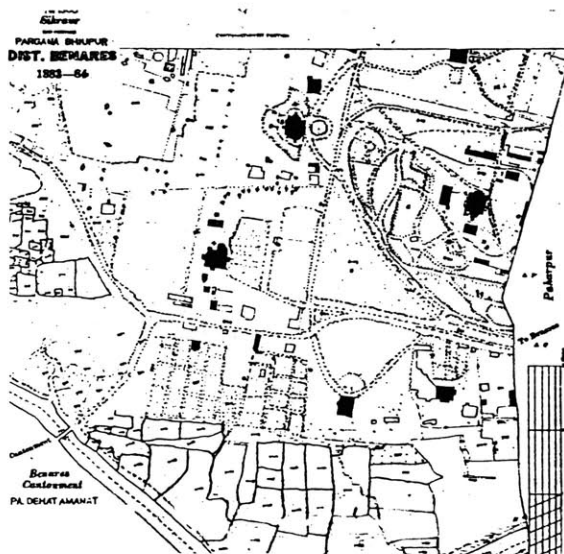
[4.17] Individual lots in the civil lines

[4.18] Garden enclosures as the intermediate space between colonial and traditional settlements, 1822

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<u>Areas of unique significance within the settlement</u>

The colonial settlement comprised distinct composite areas that were differentiated from one another. Each of these areas had a unique significance relative to the colonial city as a whole. This character was derived from the functional and social identities of the area.

Each of the colonial components was developed to accommodate a specific function for the benefit of the British establishment. For example the cantonment served military purposes and accommodated the British troops. Whereas the civil lines was for administrative purposes and the railway lines for the railway. The location of each of these functions was unique to the settlement.

In General, the component areas accommodated groups of people, the majority of which were British and whose occupation related to the functional character of the area. For example, officers who served the military resided in the cantonment, while judges and other civil servants were located within the civil lines. The small minority of colonial settlers who did not serve the colonial establishment were located in areas around the civil lines according to their income status.

The agglomeration of people with a distinct occupational makeup in an independent area which had a generally uniform functional character gave each of the components a distinct social identity. The social and functional distinctions within the settlement related each component to another part of the settlement. The distinguishing functional and social characteristics in the colonial settlement generated a graded spatial organization which was related to the colonial social structure, with each area assuming a unique significance in relationship to the rest of the city.

BENARES
AND ENVIRONS
One English Mile
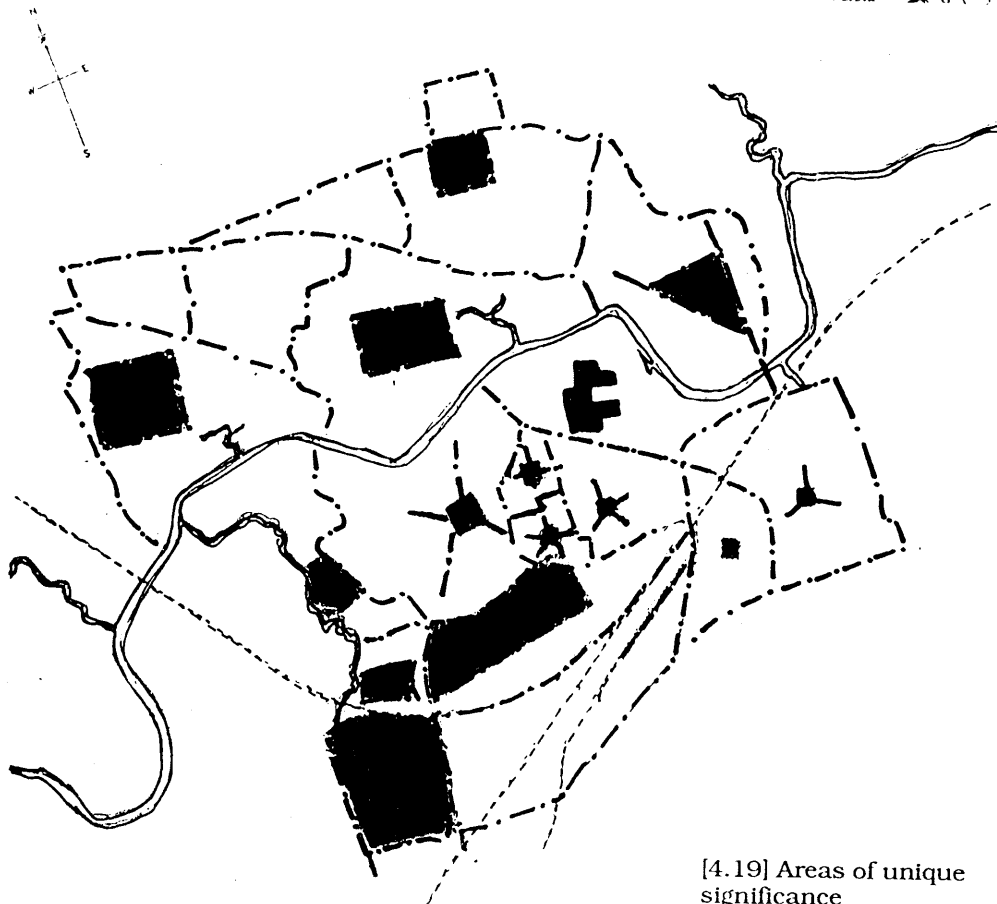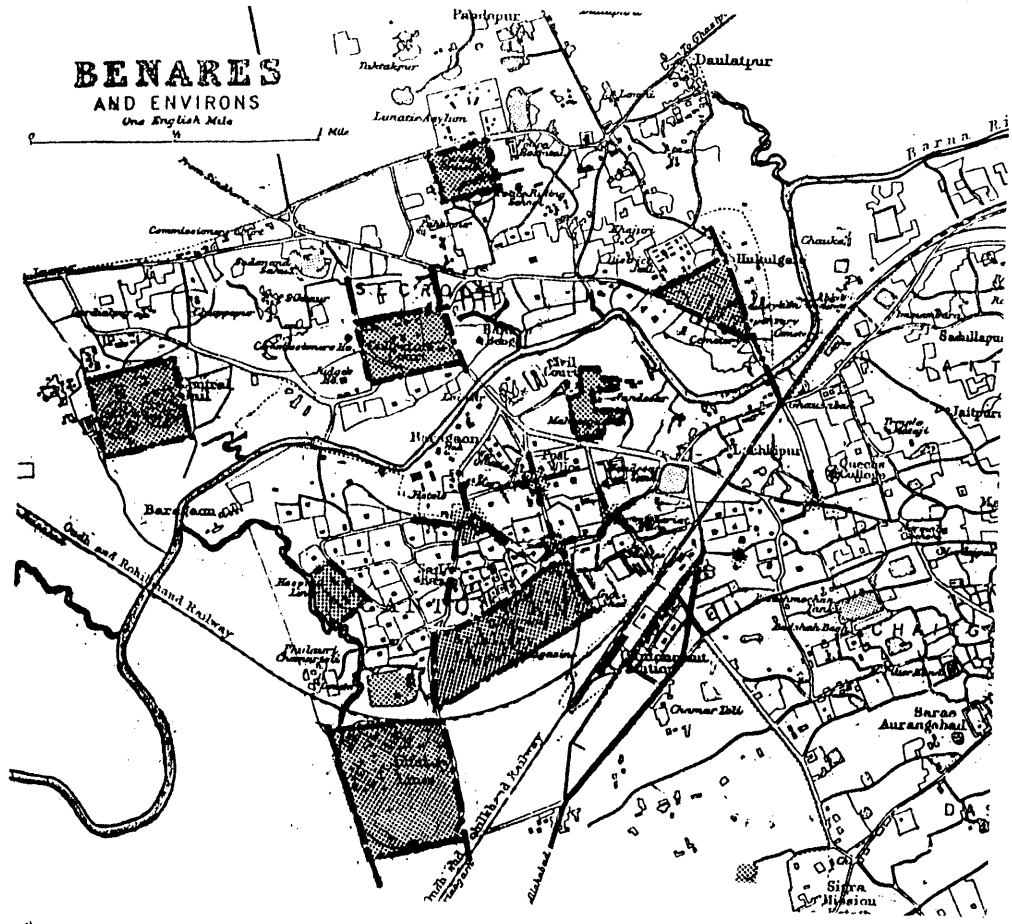
[4.19] Areas of unique
significance

Although some areas assumed greater hierarchical significance relative to the others such as the cantonments and the civil lines, no single area of importance was established. This characteristic was also true for the peripheral areas such as the missionary lines, the hospital lines, railway lines etc. The places of a greater hierarchical significance were generally located in the center of the settlement and comprised plots with larger areas, whereas those which were considered less important were located at the periphery and were subdivided into comparatively smaller plots.

Each of the components was further subdivided into sectors. The sectors in themselves could also be considered as areas of independent significance. Within the various sectors of a specific component, the size and shape of subdivisions differed. In addition, each of the sectors were composed of specific institutional functions. For example a court against a mint, and accommodated different classes of people which reinforced its distinct identity.
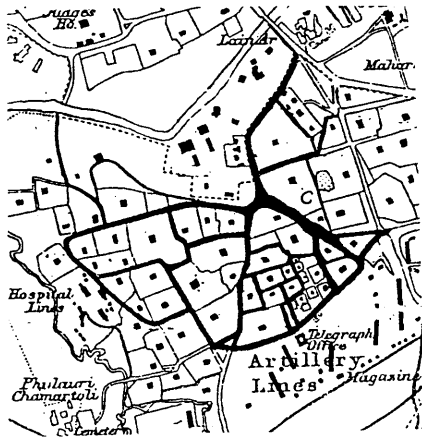
[4.20] Individual lots in the cantonment

Despite the division of a component into various sectors, there was a overall unity in the character of the urban form of a component itself. The sectors within a component shared a common typology, a mix of residential as well as institutional functions, a coherent geometrical module and relative size. In addition, the sectors shared an overall social identity which was common to the component as a whole. The unity in a components structure was further reinforced because the importance of the central open area was always maintained, despite changes within its individual sectors .

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BENARES
AND ENVIRONS
One English Mile
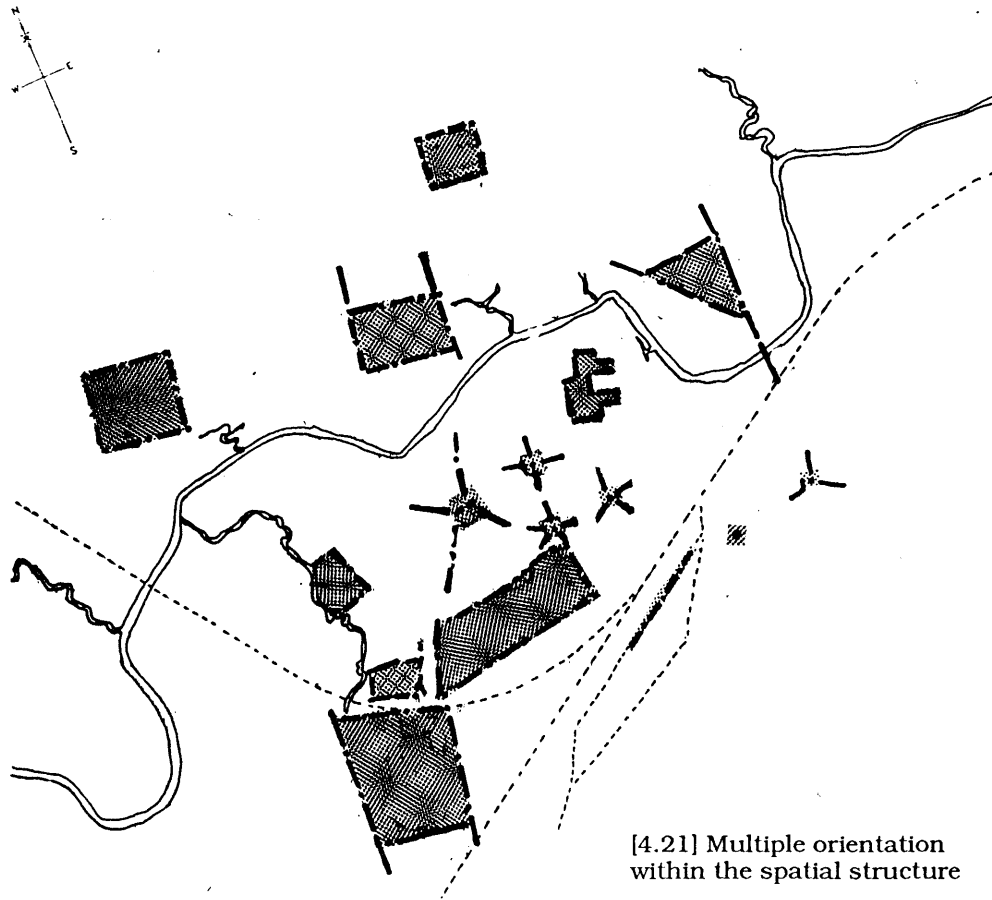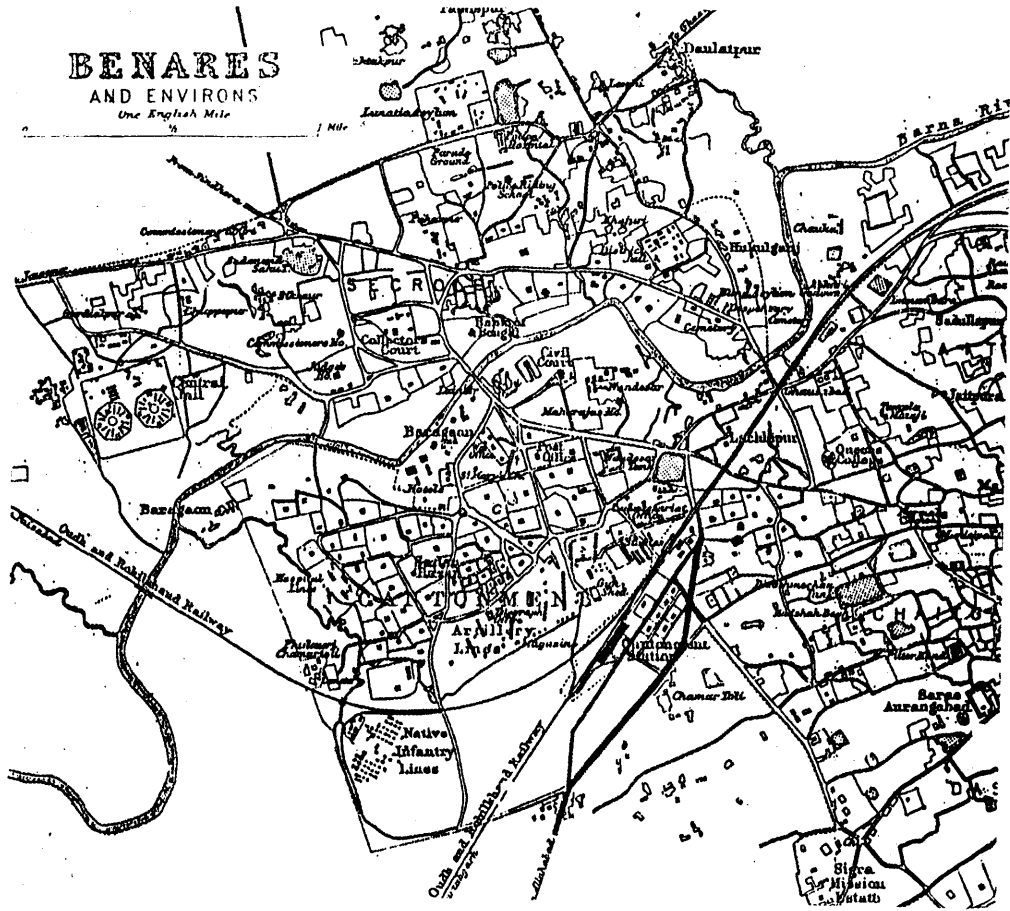
[4.21] Multiple orientation
within the spatial structure

Multiple orientation within the spatial structure

Within the colonial settlement, each of the individual components were developed around a single focal space. This development created a centralized focus within the components. The settlement as a whole, however, was an aggregation of different components. As a result, the spatial patterns within the colonial settlement comprised many such foci which were dispersed throughout the area. Due to the absence of any single area of hierarchical significance, there was no singular global focus within the city. Yet the development of the spatial pattern was restricted to the proximity of existing components of the colonial settlement.

The configuration of the focus within each of the components, the need to maintain social and functional distinction between the constituent areas of the settlement, and the absence of a singular focal point, were critical to the character of the spatial pattern within the colonial settlement. The cantonment area was composed of four streets radiating from a central focal area. Buildings of primary importance within the cantonment, such as the civil institutions, the church, hotel and residences of senior military personnel, were located around the central focus. Buildings of secondary importance such as residences, were located in places that were at a distance from the central focal area. Even though these divisions existed, there were no physical restrictions defining boundaries.

However, despite the absence of a physical boundary, the growth within the cantonment area was restrained. Additions to existing component were prevented because of the restricted size of the central focal space. The physical limitations of the space around the central focal space limited the number of new buildings of primary importance

4.22] Size of cantonment regulated by the central focal area

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that could be accommodated around it. Consequently, a new component was added to the colonial settlement as soon as a need to locate more buildings of primary importance developed. The restrictive capacity of the central focus space, in addition to the need to distinguish between the social and functional identities of each building, as well as the concurrent urge to locate in proximity to the existing parts of the settlement dictated that a new settlement be located towards the north. This principle of organization ensured that the functional and social integrity of the cantonment was maintained when new developments were accommodated within the structure of the colonial city.

The growth of the colonial city continued based on the principle according to which a new center was established every time new groups of buildings of specific functional and social identities needed to be accommodated. The settlement north of Varna was composed of a rectangular ring of roads, around which the administrative component, as well as the residences for senior public officials, were located. Similarly, the police lines focused on to a parade ground. The railway lines, hospital lines, missionary lines, as well as the area around which the natives were expected to frequent, were also located around independent foci.
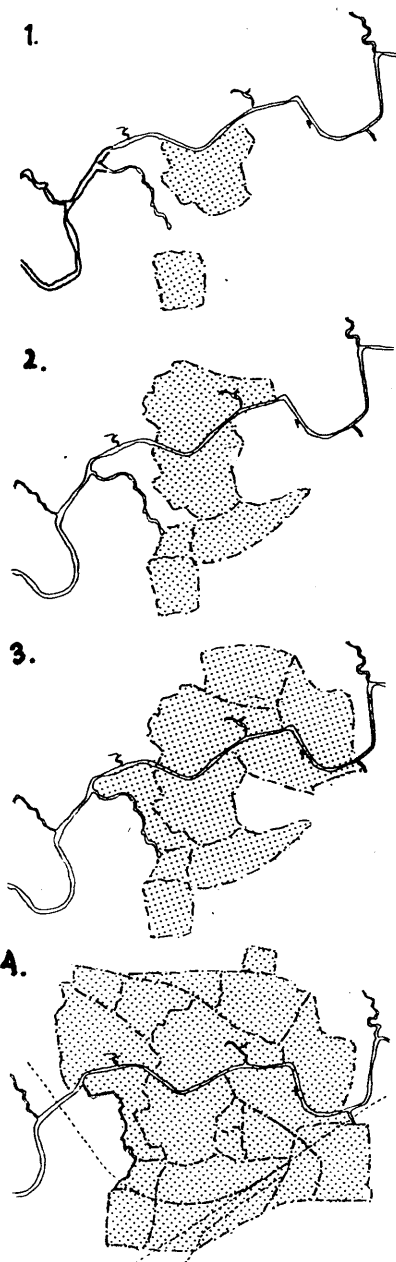
[4.23] Hypothetical development of the colonial settlement
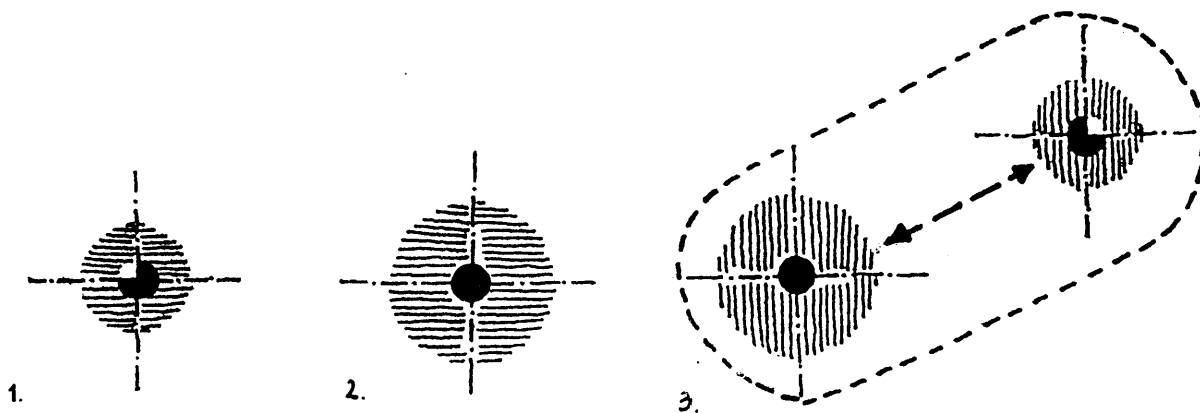
[4.24] Hypothetical development of the colonial components

Whole and part relationship within the spatial structure

The spatial pattern of the colonial settlement manifests a whole and part relationship, in which each of the components of the settlement is a microcosm of the structure of the whole colonial settlement. Yet, the different components retain their own distinct identities.

Although, the colonial settlement was conceived as an independent artifact with a distinct character and independent structure, its very purpose was dependent on the existence of the traditional core and of Ramnagar. This functional dependence, along with the settlements present status as a constituent of a larger city network, suggests that the colonial settlement is a part of a larger entity. However, its character as an aggregation of distinct and independent colonial components implies that the colonial settlement is a city by itself. Concurrently, the distinct character and day to day functional independence of each of the components of the colonial settlement allow them to be identified as smaller cities by themselves.

Each of the components of the colonial settlement share similar traits that distinguish them from the rest of the city. These characteristics include a spatial organization based on a hierarchical relationship in which the buildings are differentiated and functions segregated from one another, a layout with liberal open spaces and a coherent architectural character. Yet, each of the components of the colonial settlement can also be identified by the functional character that distinguish them from one another. For example the cantonment, the civil lines, the railway lines etc. The differences in the functional character between the various components of the settlement, however, ensured a functional relationship between them. This relationship was
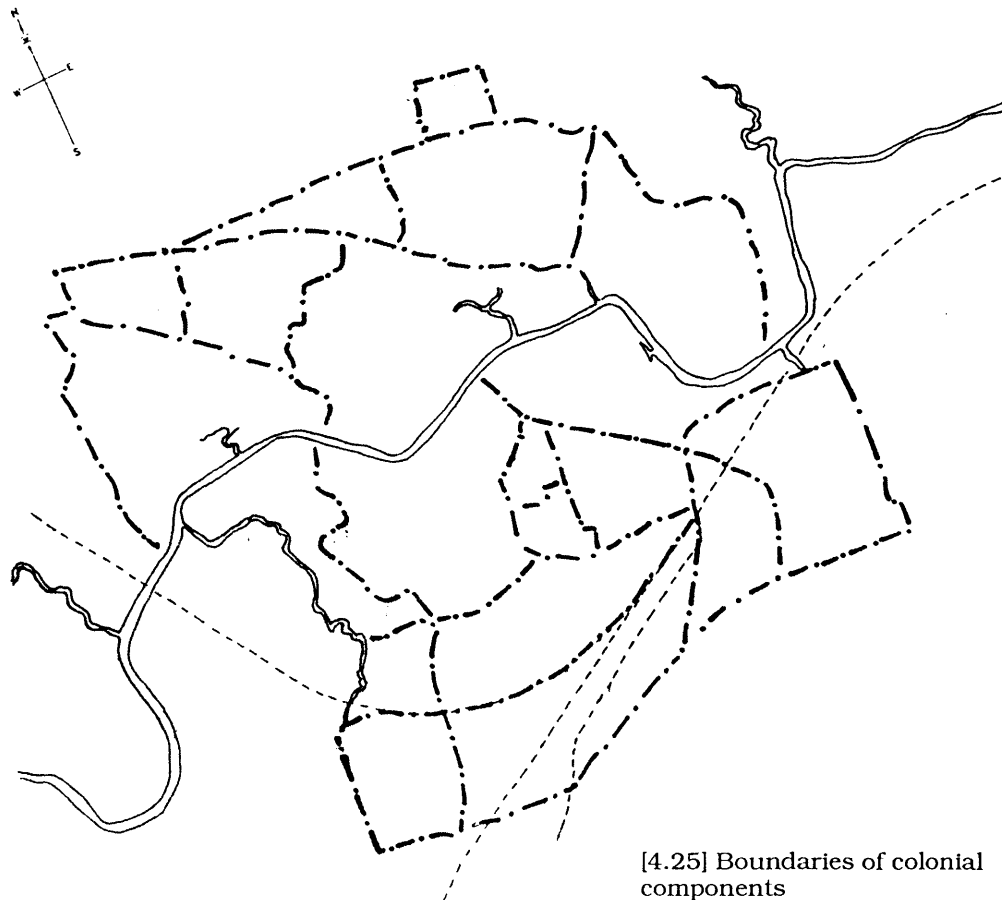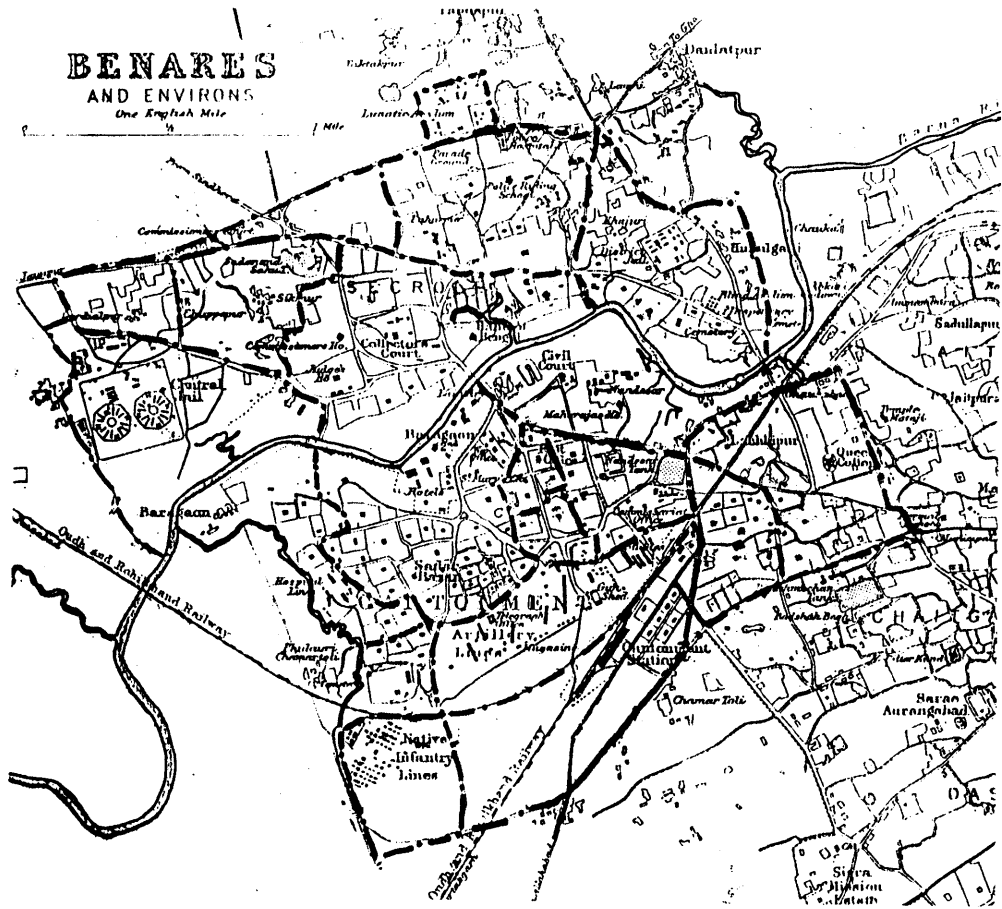
[4.25] Boundaries of colonial
components

[4.26] Focal area defined by configuration of street networks in the cantonment
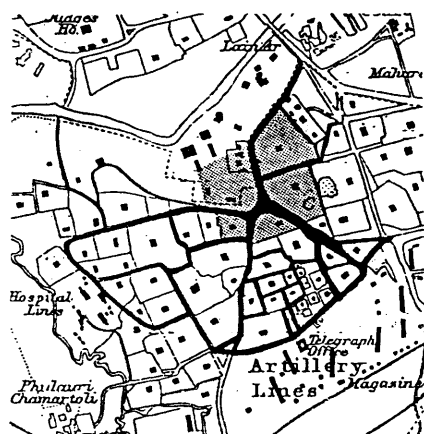
[4.27] Focal area defined by buildings of primary importance in the cantonment
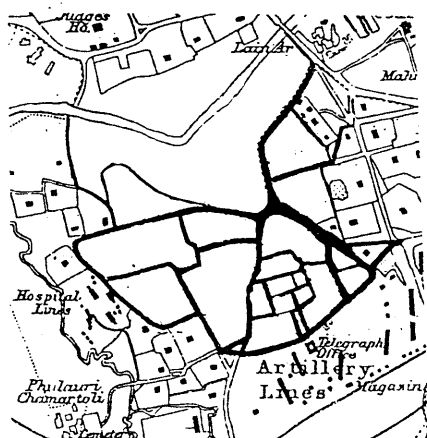
[4.28] Individual sectors in the cantonment

secured by the location of the different components in areas that were in proximity to one another.

In addition, continuities between the various components were established, because of the structure of the components within the colonial settlement having been derived from common typological principles. The size of each of the components was regulated by a central focal area around which institutional buildings within independent lots were located. The lots accommodating functions that were less important, usually residences, were located in the periphery of a particular component area. This ensured that the areas in between two distinct adjacent components were primarily residential in nature, thereby establishing a functional continuity between them. Continuity between the components was further reinforced by the common geometrical module between them which was related to the hierarchical structure of the British colonial society.

The functional links between the various components and their individual relationship to the entire colonial settlement, the coherent size between the components, the use of a geometrical module and similar typological characteristics, suggests that the components are a part of a larger whole. As a result, the colonial settlement as an independent spatial entity and a collection of coherent structures, may be regarded as a city by itself.

At the same time, the distinct functional character of each colonial component, its independent structure defined by a focus and independent boundaries, differences in shape, size and the internal subdivisions that distinguish them, functional mix comprising institutions and residences, as well as the distinct social class (related to the components function) within the British hierarchical structure, that each

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of components accommodate suggests that the components are smaller independent settlements by themselves.
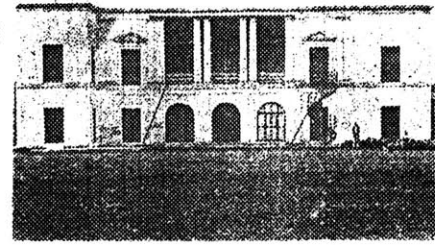
Multiple orientation within the lot

The smallest subdivisions within each of the colonial components are the individual lots. The typology of the lots exhibit a concurrent opposition between their independent introvert and extrovert urban character.
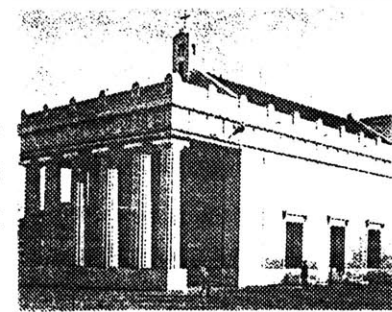
The lots are large, and usually quadrangular - shaped plots of land, each defined by a compound wall of low height. The structure of the lots within the colonial component was generally organized in a way such that all the lots achieved a direct street frontage. Usually the length to width ratio of the lots were equal. In no case did either of these dimensions exceed twice the other. A building within the lot was normally located in its center, at about half the depth of the plot. The buildings were built in brick or stone and were characterized by two distinct typologies - that of the residential houses and that of the institutional buildings.

In the case of the residential lots, the buildings were usually single storied. Those in the institutional lots though, were up to two floors in height. The buildings within the colonial settlement could be distinguished from one another by their architectural styles as well. The style varied from regenerations of a traditional hut with its pyramidical roof to Georgian, Greek revivalist, or Neogothic adaptations. The colonial settlement was a repository of various styles.[28]

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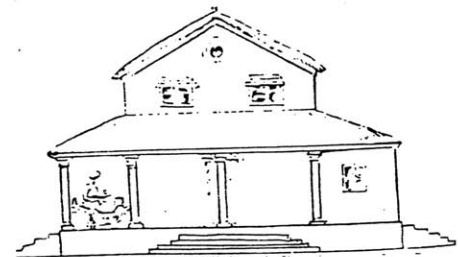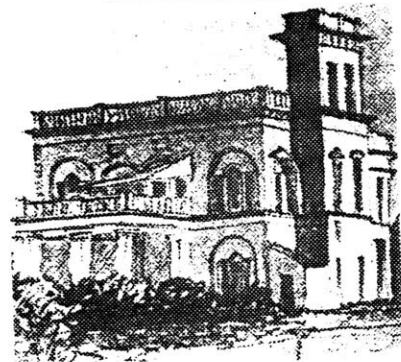
[28] Coute, P.D and Leger, J.M, Ed. Benares: An Architectural Voyage. Paris: Edition Creaphis, 1989.

[4.29] A repository of styles

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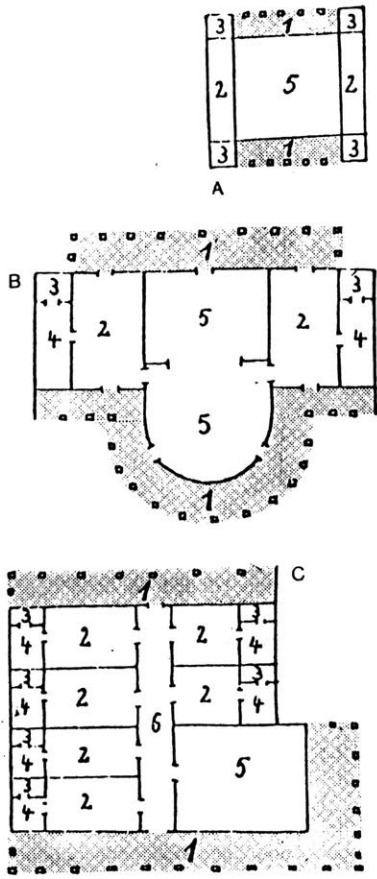
A Basic form   B & C Developed form
1 Verandah 2 Bedroom 3 Bath 4 Dressing room 5 Living room 6 Hall
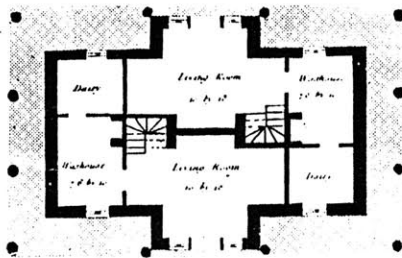
Often additional ancillary buildings, like those which accommodated servant houses and garages, were located at the rear of the lot. The main building itself was surrounded by a formal garden and a semi circular driveway in the front and had its own kitchen garden at the rear.

The characteristics of the lot, such as regular shape, coherent size and module, a common typology of buildings, orientation of the buildings towards the street edge as well as the definition of the street edge by the compound wall, suggests an urban character to the individual lots, as though each lot was a part of the city.

Whereas the lots independent size, distinct shape, as well as the character of the individual buildings within it marked by their distinct styles, closed character, distance from the street, its own kitchen garden and ancillary buildings, support the idea of an independent character for each lot. It was as if the lot were an independent structure detached from the settlement.
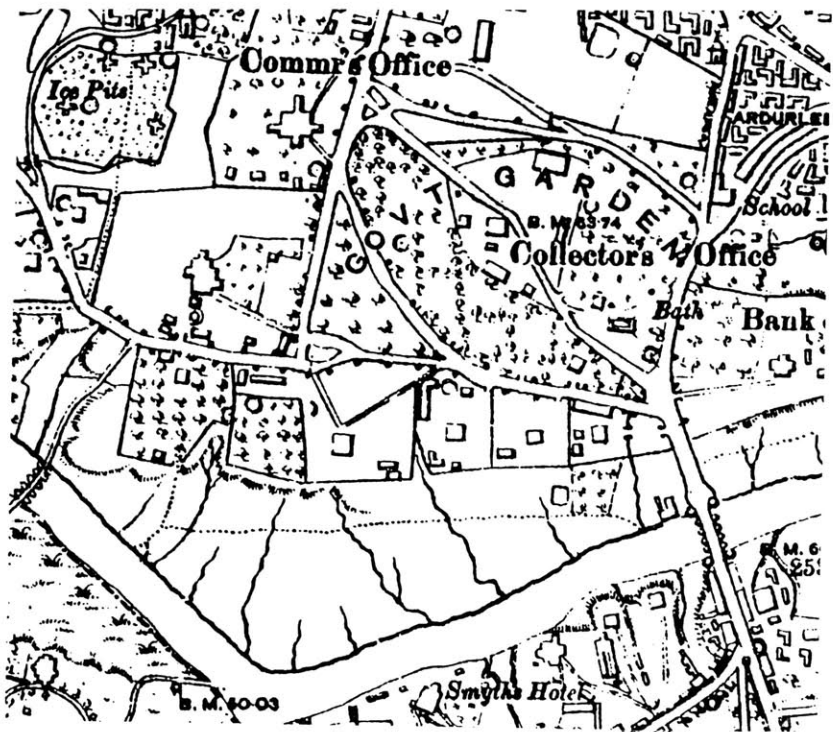
[4.31] Independent lots within a 'tight urban structure'

[4.30] Similar plan types
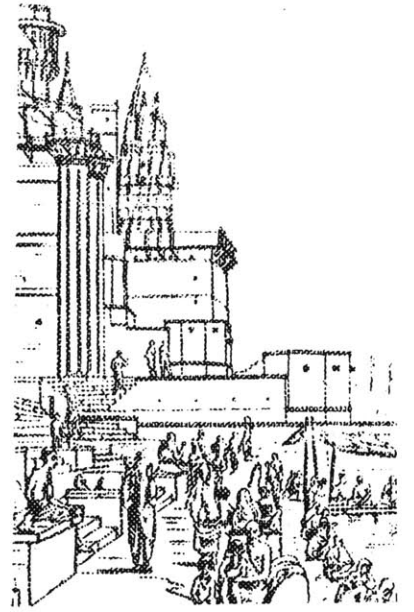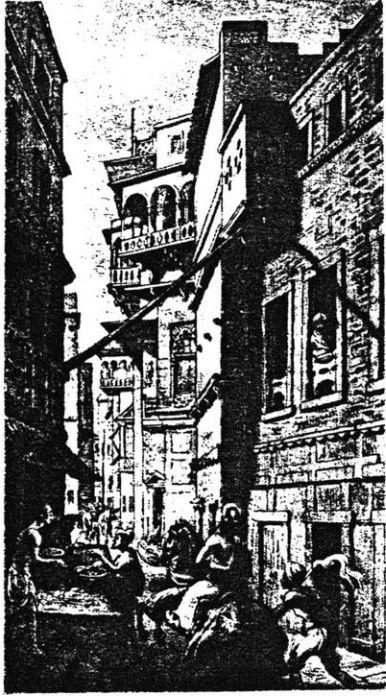
[5A. 1] Images of the traditional core
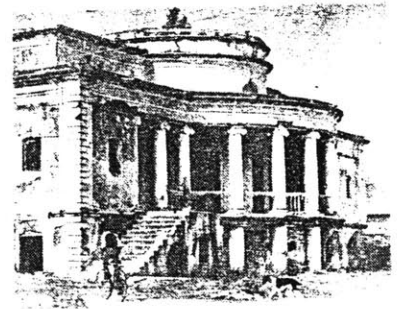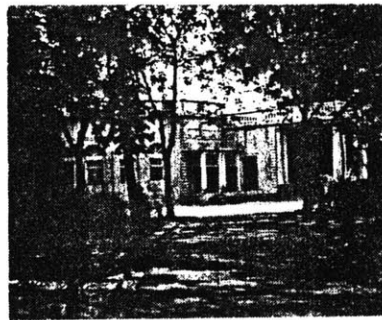
[5A. 1] Images of the colonial settlement

5. Summary and conclusions

"A tale of two cities"

At the very outset of this inquiry, I raised the issue concerning the relationship between spatial patterns in the traditional core and those in the colonial settlement of Benares. The discussion of this topic is based on the other issues that I also raised -- those regarding the relationship between the spatial structure and continuities in the city's physical form.

As observed earlier,[29] the two patterns constitute very different spatial environments. The spatial form of the traditional settlement is distinct from the form of the colonial settlement. However, some of the principles underlying the spatial structures of both the settlements are similar. The following section offers a more detailed discussion about the characteristics of these spatial patterns.

Dissimilar forms

The dissimilarities between the patterns of the two settlements occur primarily because of the differences in the social, cultural, political and topographical factors that influence the nature of their physical form. In fact, the dissimilarities in the two spatial patterns can be traced to the differences in the functional purposes that the two settlements have served. The primary function of the traditional core is based on activities devoted to religious purposes whereas the colonial settlement was created as an establishment of the British administrative, cultural, and military power.

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[29] Refer Table in chapter 2

The distinctions between the traditional core and the colonial settlement are apparent in the nature of the spatial patterns themselves. The two settlements not only differ in the nature and mix of the physical parts of which they are composed, but also in the manner in which their spatial pattern is organized. The parts of the colonial settlement are differentiated and segregated from one another, while those in the traditional core are mixed. Also, the functional diversity within any given area of the traditional core is much greater than that within the colonial settlement.

In addition, there are marked differences in the physical forms of the two settlements. The layout of the traditional core comprises dense, irregular street networks, that are more spacious and open towards the periphery. The street forms have varied profiles that range from straight to curvilinear shapes. The buildings within the traditional core vary from three to five stories. Also, the individual buildings enclose the full length of each lot, abut one another on the side, and define the street edge. Each building is characterized by an open space which is introvert in nature, and located in its center.

In contrast, the layout within the colonial settlement appears to be more regular in shape, has liberal open spaces, and is characterized by ample vegetation. The street profiles are straight, and there are very few changes in the character of street networks from one part of the city to another. The street edge of the colonial settlement is defined by a compound wall of a low height. Buildings are usually one to two stories in height, and located in the interiors of the lots away from one another. In comparison to the buildings within the traditional core of Benares, the buildings in the colonial settlement have larger rooms, higher ceilings, larger areas, and are surrounded by large open spaces on all sides.

Similar spatial structure

Despite the differences in their forms, the traditional and the colonial settlements share several common principles underlying their spatial structure. These commonalties originate from the manner in which the two spatial patterns support a similar type of structural order, by which socially and culturally diverse groups of people are organized within each of the settlements. The spatial patterns in both the traditional and the colonial settlements provide a distinctive way of ordering space so as not to produce actual social relations i.e. human behavior, but support the principles of ordering social relations. A significant characteristic of the spatial patterns in both the settlements is that the pattern is not simply a resultant, but in addition, an intrinsic constituent of the forces that affect the spatial organization.

Central to the character of this organization is the understanding that the identity of each of the groups is clearly established in relation to the settlement as a whole. Although the different groups can easily be distinguished from one another, they share certain common characteristics that are related to the larger, global attributes of the settlements. Within both the settlements, new groups of people are constantly accommodated within new and clearly demarcated areas which share a unique significance in relation to the entire settlement. This strategy of spatial organization thus permits the settlement to grow, in a manner such that the significance of the existing structures does not undermine the character of the newer additions to the city. In addition, despite changes within the composition of the settlement as a whole, the integrity of each part of the settlement is established and maintained.

As recounted below, there are three distinct characteristics common to the spatial patterns in the traditional and colonial settlements that impact the nature of the spatial organization within it. They are:

a) The flexible nature of the plan

b) The dynamics of the foci

c) A whole and part relationship between the components of the spatial structure

A discussion of these characteristics follows.

Flexible nature of the plan

The spatial patterns within the traditional core, as well as the colonial settlements, owe their flexible structure to the simultaneous overlay of multiple analogs in their design. The analogs relate to different 'ideal forms' considered appropriate for the purpose of the settlement, and generate often conflicting images within each settlement. This characteristic of the spatial pattern, that is, to be able to accommodate different analogs concurrently, has been critical for the accommodation of diverse social and cultural groups sharing a larger common social purpose. It permits distinct identities to be incorporated within a unifying structure, that emerged from the complimentary character of the activities within each of the settlements itself.

The spatial pattern in the traditional core, a religious settlement, is derived from images of ideal structures which are related to divine forms and myths. These sacred forms were recognized as a union of differentiated yet connected parts, some of greater significance than the others, but each of unique significance to its particular structure. Whereas, the spatial pattern in the colonial settlement, an outpost of the British military, cultural and

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political establishment was based on the ideals of a military camp and the image of the picturesque - a village green from England. It was organized as military camp and a village comprising related distinct parts that were distinguished and segregated from one another.

The different analogs provided a distinct spatial order to the spatial structure of each of the settlements. The unifying intent the analogs served in each of the settlements permitted the settlements to be incorporated into a larger domain of spatial structures - that of the sacred Hindu city and that of the British colonial city, which groups of people with a common social purpose both within and outside each of the settlements could identify.

Distinctions within the pattern were made possible through the differences in the analogs used to guide the structure of the settlements. The pattern of the traditional core of the city comprises a number of 'mandala' forms which often superimpose or intersect one another. A majority of these forms were recreated by different religious sects for example, the Shavites - the followers of Shiva, and the Vaishnavites - the followers of Vishnu. Variations within the pattern were also created by adapting forms derived from different regions in the Indian subcontinent. These variations distinguished different sectors within the settlement from one another.

Similarly, the colonial settlement patterns also accommodated the diverse interests which were created by the different social groups based on occupations. These were reflected in the variations in the different styles of the buildings within the settlement. The spatial pattern also reconciled different interests within each component of the settlement. Each of the colonial components adopted the closed and secure spatial organization dictated by the

military camp analogy as well as an open and detached form derived from the image of the village green.

In addition, the nature of the analogs affected the growth and spatial organization within the two settlements. The spatial order did not define a fixed physical extent of the spatial pattern, but a structure which could constantly evolve, and based on the predetermined principles derived from the analogs, guide the form and spatial organization of the settlement. The fixed principles guiding the spatial structure ensured that the development of the plan occurred in a manner such that the newer additions maintained a coherent character in relation to the existing structure of each of the two settlements. Due to the settlement's flexible structure and the absence of a fixed form, different social and cultural groups, as well as developments which were new and of a diverse character, could be incorporated within the spatial structure of the two settlements, without compromising their own identity, affecting the character of the existing spatial structures, or changing the overall order within the settlement.

The dynamics of the foci

The character of the spatial organization and the development of the plan in the traditional and colonial settlements is regulated by the dynamics of the predetermined centers within their spatial structure. Both the settlements comprise distinct areas, whose significance is unique to the composition of the entire settlement. These multiple areas of significance are dispersed throughout the spatial structure of the city. Each of these areas is marked by a focal area around which the development of the settlement occurs, and from which it derives its identity.

The areas of significance within the traditional core are defined by nodes located at regular distances along the orthogonal and radial street networks, as well as the river front. The areas of significance in the colonial settlement are formed around a central focal area, defined by the intersection of street networks. The buildings of primary importance in the colonial settlement, such as those accommodating institutions or residences of prominent persons are located around the central focal area.

The pattern of growth in the traditional core and the colonial settlement are dependent on the size and configuration of the dispersed foci. The restricted area and configuration of the central focal area, as well as the need to maintain a social distinction between various components of the settlement, forced the development of new areas within both the traditional and colonial cities.

This principle of development, based on the generation of a new focus for each distinct social group, and restriction in the size of the urban units formed around each central focal area, maintained the social and physical integrity of preexisting areas. It also allowed the identity of new groups to be expressed.

Within the traditional core, sectors comprising distinct social groups, based on caste and regional characteristics were located around each of the nodes. As observed earlier,[30] once the focal area was defined, development mushroomed around it. However, as a result of the limited size of the focus and the need to maintain a social and cultural distinction between different social groups, newer additions to the settlement were accommodated only along newly defined focal areas within the spatial structure.

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[30] Refer the section on the traditional core of Benares.

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Similarly within the colonial settlement,[31] groups of people with a distinct social identity based on their occupation, were located around a central focal area. The civil servants, missionaries, military personnel etc., were all located in different areas. New focal areas were created as soon as the need to incorporate more buildings of primary importance arose, or new social groups within the settlement developed.

The location of the new development was dependent upon the relationship between the dispersed foci and the global focus within the settlement. The location of each existing social and cultural group also affected the location of the newer additions to the city.

Additions to the traditional core were made in relation to the linear global focus - the sacred river. However, because of the need to maintain the complex hierarchical structure of the settlement, the developments around existing dispersed focal areas limited the positions that the newer developments could occupy on the existing settlement grid. Consequently, the grid was constantly developed along the banks of the river. The new development either took a prominent position to draw attention to its importance, otherwise a subservient position, so as to avoid undermining the position of the existing developments within the spatial structure. Similarly, in the colonial settlement, despite the organization of the newer additions being relative to the nuclear concentration of the existing settlements, their precise position was determined primarily by the need for the maintenance of an acceptable 'social distance' between the different components of the settlement.

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[31] Refer the section on the colonial settlement of Benares.

Whole and part relationship

The different constituents of the spatial structure, such as the sectors and blocks in the traditional core and the various components of the colonial city, reflect not only their own independent character, but also the structure of the whole settlement. Each of these "levels of the spatial structure offering a different reading of the settlement pattern"[32] can be described as complete entities in themselves - mini cities, or the parts of a larger whole. This reading is more prominent in the traditional settlement.

The character of the whole is based on common characteristics that each of the constituents within the spatial structure share with one another. It is derived from the functional links between the urban constituents, their unique relationship to the entire settlement, related size, common geometrical module and similar formal typological characteristics.

The character of the parts as recognized in the spatial pattern is derived from the constituent's own distinct formal attributes, an independent structure defined by the focus and independent boundaries, by its physical size, by differences in shape, by internal subdivisions that accommodate its physical activities, by the general mix of institutional and residential functions it comprises, and by its day to day functional independence.

The whole and part relationship permits each level of urban constituents within the spatial structure to establish its own unique and often indispensable functional and unique

[32] M.R.G Conzen in The urban landscape: Historical development and management. London : Academic press 1981, refers to "levels" as the different 'morphological frames' from which the plan of a city can be understood.

formal identity, as well as the ability to be distinguished from other parts of the settlement. Yet, the relationship also supports the accommodation of certain common characteristics which unify the city as a whole.

The whole and part relationship in the traditional and colonial settlements is supported by the adoption of following principles, to order all 'levels' of the spatial structure :

- The use of enclosures that define parts of the spatial structure as distinct from one another and provide them with a unique identity. The enclosures are functionally related and share a common physical structure with other enclosures in the settlement.

- Planning based on a concept of 'centrality' that generates a focus. At the 'level of each urban constituent' there is a singular focus, but when an aggregation of these constituents are considered, the spatial structure can be described as a composition of multiple foci. Each focus has its own significance and is generally indispensable to the structure of the settlement.

- Composition within the urban constituents as a organization of different yet related spaces.

- 'Critical distance,' by which the urban constituents are located away from one another yet, restricted in location.

- Use of a deformed urban spatial matrix that accommodates variety, and yet, provides a unifying structure.

[5B. 1] Part plan of the traditional core
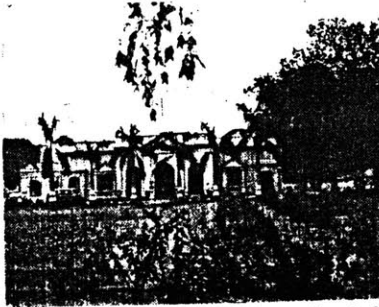
[5B. 2] Image of the colonial settlement

"Through the looking glass"

This study's preoccupation with spatial patterns of the traditional and colonial settlements of Benares is not intended to deny the importance of the other settlements in the city's structure. Nor is it merely a consequence of the limits imposed by the short time - frame within which the study of the city was conducted. The choice of these two settlements was made for two reasons. First, the traditional and colonial settlements are the products of the most divergent cultural perspectives that exist within Benares; therefore their spatial patterns make an interesting comparative study. Second, I earlier developed a hypothesis, that I felt was enhanced during the course of the study, that plans of other settlements in the city i.e., the settlements of Ramnagar, the university and the contemporary city, derive characteristics that are common to either the traditional or the colonial settlements.

Based on the conclusions derived from concentrating on the physical and structural characteristics of the traditional and colonial settlements, this section seeks to address issues concerning the spatial patterns found in Benares as a whole. Before commenting on the spatial patterns of the city, a brief discussion about the plans of Ramnagar, the university and the contemporary developments is pertinent.

Like the traditional core, the roots of Ramnagar's plan are also based on a 'mandala.' Within the settlement there is a specific way in which the different social groups are located in the city. Each of the four main Hindu caste groups, occupies a separate zone - a module of the square, along the nodes aligned with the cardinal directions. Further within each of the four zones, different social sub - groups are clearly distinguishable. Different areas in Ramnagar also derive their physical form from the image of different

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locations in the traditional core. The residential areas are dense as in the core.

In addition the plan is also inspired by that of Jaipur, which was built twenty four years before Ramnagar. The choice of the prototype is not surprising, for Jaipur was a political and economic stronghold. In emulating Jaipur's form, the planners of Ramnagar were trying to recreate the image of a powerful kingdom. Admittedly, there are differences in the two plans, the most striking being the non - axial relation of the palace in Jaipur to the city's street networks. Yet, the streets are ordered by the position of other fortresses in the hills. The similarities in the plan are clearly visible in its pattern which is derived from squares, from the exact width of the main street and from the distance between two nodes which are defined by street intersections.

The plan of the university is a diagrammatic representation of the semi circular form of the spatial pattern found in the traditional city.[33] It also relates to persistent ideas about the 'green city.' It forms a part of the two related English traditions - the colonial city form and garden city ideals advocated by Ebenezer Howard. In fact, the plan is a literal representation of Howard's diagram.

The contemporary developments are a repository of different spatial patterns rooted in all the earlier developments of Benares. They are also a part of the trends common to what Anthony King refers to as 'global cities', a phenomenon of economic and social restructuring throughout the world.[34]

[5B. 3] Plan of Jaipur

[5B. 4] Plans of Ramnagar

[33] Kostof, Spiro. The City Shaped: Urban Patterns and Meanings through History. London: Thames and Hudson, 1991.
[34] King, A.D. Urbanism, Colonialism and the World Economy: Cultural and Spatial Foundations of the World Urban System. London and New York: Routledge, 1990.
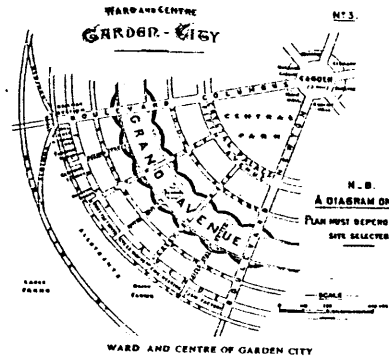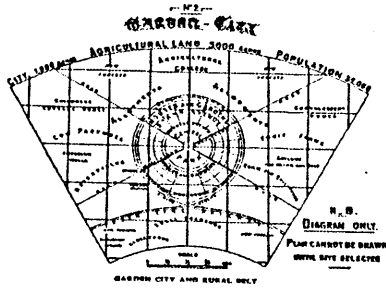
[5B. 5] Concept plans of the "garden city'
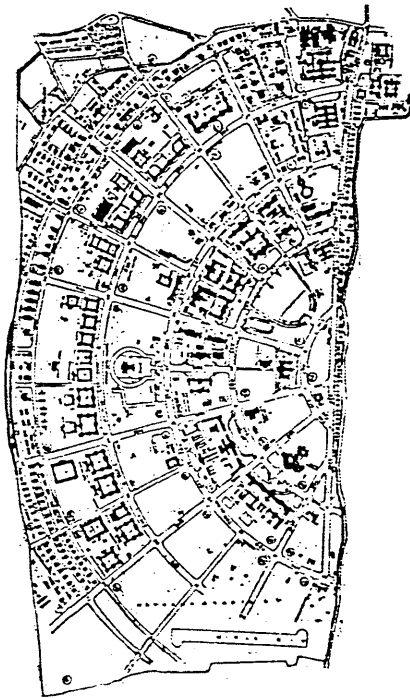
[5B. 6] Plan of the University

However, despite the formal characteristics that the different settlements share with the traditional and colonial settlements, similarities in their structural character are limited to the relationship of each independent settlement to the city as a whole.

Because of the diverse physical and functional character of spatial patterns, each of the different settlements form parts of the city that can be clearly distinguished from one another. Each area is organized around an independent focus and maintains its own separate character. The traditional core functions as the religious capital for the Hindus, the civil lines area as an important administrative center for the northern province of the state of Uttar Pradesh, the cantonment as a base for the armed forces, Ramnagar as a cultural zone and the university as an important center for education. So strong is the contribution of the each area of the city, that if it were not for the independent character of its spatial structure, one area could smother another area and dilute its character, as has happened in the case of the contemporary developments. Yet, the different parts of the city are functionally interdependent, and together contribute to the city's existence.

The relationship of each of the settlements of Benares, to the city as a whole reflects two orders -- the global order and the local order. The global order is intelligible from the composite structure. At this scale, the city that encompasses all the different settlements in Benares. The local order is however intelligible from the structure of the parts, at this scale, the various settlements. As discussed above, it is in this simultaneous existence of local and global orders, in which parts of the city are differentiated from one another, yet the whole is intelligible from the parts, that the structural quality of Benares is reflected.

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However, this relationship does not hold true when the different settlements are viewed independently.

The spatial order within Ramnagar and the university is globally oriented that is the spatial order is intelligible from the composite structure of each of the settlements. The characteristics of this order are: firstly, the fixed extent of the settlement plan as defined by the boundary in the university and dictated by the monumental core in Ramnagar; secondly, the presence of a single focus, the administrative center in the university and the monumental core in Ramnagar; and thirdly, the absence of a whole and part relationship within the different levels of the settlement.

On the other hand, the spatial order within the contemporary development is locally oriented and reflects the loss of a global order. The spatial order is intelligible only when each of the different parts of the contemporary settlement are considered separately. The characteristics of this order are: the absence of a composite plan, the presence of multiple dispersed foci, and the absence of whole and part relationships.

Unlike the traditional and colonial settlements, the spatial structures of Ramnagar, the university, and the contemporary developments, do not reflect the simultaneous existence of global and local orders at different scales of organization. Within the structure of each of the settlements only one type of orders exists, either local or global.

In essence, this is precisely the problem that we, the designers of the contemporary city, face today. There is an obsession with the making of plans that are either globally

oriented or locally oriented i.e., our interventions are directed towards generating an order through the composite structure of the city, or creating it through the city's parts. Consequently, contemporary design efforts are preoccupied with either 'monumentalism' or the creation of 'individual identities,' each involving the loss of the other. In either case, one order within the city's structure dominates, and is used to generate the other. The spatial structure of Benares has revealed that both these orders can coexist simultaneously, and create a coherent spatial structure, in which individual identities are expressed.

The study of spatial patterns of Benares has also helped clarify the relationship between the physical characteristics of a settlement and its spatial structure. The different settlements in Benares have revealed that two different spatial forms, those of the traditional core and the colonial settlement share similar principles underlying their spatial structure. Paradoxically, despite sharing formal characteristics, the other settlements within the city – Ramnagar, the university and the contemporary developments, have very different spatial structures. An understanding of this relationship is central to the current debate prevalent in India and other parts of the world about reverting to the traditional architectural forms. In adapting formal qualities of spatial patterns, the designer must be conscious of the spatial structure. Settlement patterns have a deeper meaning that can be discerned through their structure and not through their form alone.
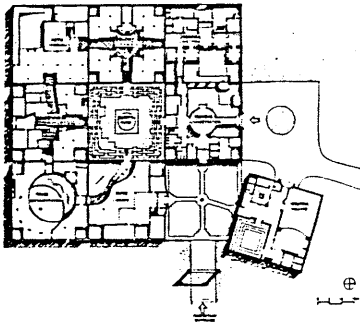
[5B. 7] Charles Correa's plan for Jawhar Kala Kendra, Jaipur

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