CHAPTER IV

TOWN PLANNING

A city has been considered as a concrete expression of the motive forces and ideas which regulate the life of the citizens. It is one of the best specimens of the human art-activity. It did not grow at random but certainly some rules and regulations were strictly followed in laying out the cities and the entire area was carefully contoured before the town was laid out. The earliest traces of city building is provided by the ruins of cities of Mohenjodaro, Harappa, Lothal and Kalibangan. These cities were scientifically and systematically planned and were much developed. Their town planning exhibit the evidence of high standard of living characterised by a distinct kind of socio-economic organisation, advanced use of metallic tools and having a flourishing industrial economy. Whereas the Aryans were not city builders. Though there are references to pura and nagara in the sources, which were more frequently used in the sources of the later period. The frequent use of these epithets suggest that the city building was an important socio-economic activity. Since sixth century B.C. many well-developed cities were common to all parts of India. Many of them grew in response to increased art activities while others emerged because of their association with Buddha and Mahāvīra. A careful study of these towns show that they did not grow at random but certain basic norms were common to all of them. They were situated mainly on the coastal areas or on the hills (which served as natural fortifications), some of them grew on important trade
routes. This is confirmed by the literary sources of the period and further supplemented by the archaeological excavations.

Kauṭilya's Arthasastra deals specifically with town-planning in great details. He mentions that city was well fortified and was not only the centre of trade and commerce but it also had temples, a sacrificial place, teachers and priests, therefore, a centre of culture also. Kauṭilya assigns different directions to the different classes of the people in the town. The king's palace to be constructed in the north or the east, and it shall be constructed occupying one ninth of the whole site inside the fort; in the south the superintendents of the city, merchants, musicians, prostitute and the people of vaisya caste shall live. To the west the artisans and śudras should have their habitation. The Mānasāra also discusses eight different kinds of cities and mentions that all of them are fortified. The text describes that the city should be properly equipped with guard-house, everywhere with barracks, full of merchants, encircled with markets, crowded with the people and filled with temples of various denominations.

The early medieval period witnessed urban activities and country had many towns. Several references to towns in the epigraphic and literary sources are found, which on careful examination, indicate that the observance of certain basic norms definitely helped in the development of urban settlements. Their location on the river banks, on the famous trade-routes, on the hills suggest that they were situated on such places because of geographic, socio-economic and political reasons.
A number of architectural treatises such as *Mayamata*, *Samagrāṅganaśūtradhāra*, *Yuktikalpataru*, *Āprājitaparcoha* and some Purāṇas mainly *Agni* and *Matsya* present certain rules and regulations which were strictly observed during the planning of towns. These works deal with the selection of a site, planning of cities, building of palaces, houses, temples, halls, construction of fortifications, walls, digging of moats, and construction of roads and streets. The archaeological data, however, are not of much help in revealing the application of stipulated principles while laying out towns. But whatever a little data we have are of immense help in knowing the urban character of these settlements. The epigraphic evidence gives us useful information on town planning. The construction of markets, streets, houses, temples, palaces and roads described in them definitely give us the idea of diverse functions and nature of urban settlements.

First of all the question arises: what is town planning and why is it necessary? Either all towns are planned scientifically or they grow naturally?

The town planning encompasses the physical development of the urban communities with the object of their welfare and safe living. It aims at the preservation of natural beauty which is essential for living conditions and leads to the promotion of beauty in building as a by-product of sound social and economic growth. The town planning is very important but sometimes the towns evolve unconsciously and naturally owing to
different aiding factors. In some cases they emerge because of natural advantages. In other cases towns grow around temples on account of the frequent visits of the pilgrims to the temple centres where congregations of the people initiate trade and commerce and other social activities by which cities emerge naturally without any prior definite planning. Taking all these considerations in view one can say that the cities which grow naturally are also subject to some kind of planning for further development. The port town of Quilon grew into an important exchange centre because of its strategic location, but construction of residential buildings, factories, roads etc., added to its prosperity. The construction of these buildings in different quarters of city in a planned manner helped it to develop into an important port town where merchants came from foreign countries primarily for trade purposes. B.B. Dutt writes that any locality can grow into a town which has a market, or a temple, facilities of easy access and conveyance especially by water, and even a fortress is a necessity.\textsuperscript{13}

The foremost pre-requisite in city-planning is the survey and selection of a site suitable for the city building. The architectural treatises stipulate that certain basic principles have to be kept in mind before the site selection. The location of the city or village at the confluence of rivers, near a forest, hill, garden and a religious place was preferred. Therefore, practically all the important mercantile towns in ancient India rose either on the banks of the rivers or on the seashore. The
location of these sites were not only significant from the defence viewpoint but were of great help to the mercantile community at large. Apart from the reasons cited above the abundance of trees and fertility of soil were considered suitable for laying down new towns because both are indispensable for the agricultural production, the very base of urbanization. The nature, the colour, and the taste of soil was carefully examined before the final layout of the town. The sources suggest different colours of soil for the different varnas. The Mayamata suggests that white coloured soil with sweet taste was most suitable for the brahmana residents, whereas the red coloured soil having bitter flavour is most suitable for the kings. In a similar fashion, yellow colour of soil with sour taste and black colour of soil with pungent flavour is suitable for the vaisyā and śūdra residents respectively. Similar kind of four colours of soil are allotted to four castes in the Samarāṅgaṇasūtrādhi, a text of eleventh century. The text allots tastes like sweet, astringent, pungent and bitter to four castes respectively. The Mayamata further states that if the site smells like curd, honey, oil, blood, fish or fowl, it should not be considered suitable for laying out the town and if it is free from dust, cavities, charcoal, etc., the site is suitable for all the four castes. Though these prescriptions are given in the texts but their actual validity is not known whether these were obligatory or only recommendatory.
The next pre-requisite is the bhūmi-pariksā or examination of soil before laying out the town. The Mayamata lays stress on the examination of soil before the city planning. The soil should be perfect and should make every seed grow. The Samarāṅgaṇasūtradhāra describes three different kinds of land suitable for the laying out of towns. These include jangal, anūpa and sādhārana land. The text further classifies the land into sixteen different categories on account of their human, cultural as well as natural factors; for instance, bālīśasvāmini, this variety of land is easy to be administered and is inhabited by good people, vanikprasāchita which is full of markets and an active centre of trade.

The site chosen must have a good landscape. It must consist of big trees, hills, mountains which serve as natural frontier. The Mayamata mentions that trees and flowers of different varieties must grow in the town. The Samarāṅgaṇasūtradhāra also mentions that towns must have tall trees, plants, flowers in abundance which increase the beauty of the town. The work also lays emphasis on the existence of ponds, tanks, lakes etc., for the proper supply of water. The Aparaśitapraçchā describes the location of city or village near the forest, hill, garden or at the confluence of river. The Mayamata describes that the site for an ideal town must have a natural source of water. The epigraphic sources suggest that practically many important towns of ancient and early medieval India emerged and flourished near the important rivers and on the coastal areas.
For instance, Somnāthpattan, Varanasi, Tāmralipti, Quilon, Kudāmūku-Palaiyārai, Kāṇchīpura and many others grew into large urban settlements because of their strategic locations. An epigraph of twelfth century refers to town Ratnapur having innumerable and beautiful flowers, fruits, charming high mango groves and crowded with beautiful temples and palatial dwellings. The Deval prāśasti of Lalla and Chhinda of A.D. 992-3 describes the beauty of Kanauj, which is very beautiful and charming on account of its woods those are dark green and the beautiful garden which resembles the garden of Nandana. An epigraph of tenth century refers to excellent parks, great tanks, flowers, mango trees which made Ereyana Kādiyār the choicest spot of the world. The town of Purikara in the Deccan has been described as adorned with multitude of brilliant ponds, bright sandal, parks, temples and hills, which made it one of the best cities of the world. Similarly, Teridāla in the southern Maratha region which was a large settlement surrounded by beautiful rice fields, forests, lakes, tanks, groups of hill forts built in the forest, water ditches and temples of different gods adorned this place. The inscrptional evidence also indicate that stipulations given in architectural treatises were adhered to some extent while laying out the towns.

After the selection of the site the actual planning of town commenced. The Yuktikalpataru, a work of eleventh century, informs us that this task should begun at the auspicious time and
the time of the birth of king, who is to lay the city, is most favourable. The work of planning is supervised by the chief architect (sthapati). He should perform the purification ceremony of the site and pray for the peace and prosperity in the city. The Mayamata prescribes that before beginning the actual planning of town the offerings should be made to god and the purification ritual should be performed by the architect.

The chief architect had to be aware of the rules and regulations given in the architectural treatises, and wise and well-versed in different branches of the science of architecture. He should be thoroughly acquainted with the art of designing buildings, in drawing sketches and well-versed in masonry and capable and cognizant of his trade.

After these formalities the shape of the town was finalized. A variety of shapes have been described in the literary texts of the period. Two shapes, dirgha (rectangular) and caturasra (having the shape of square) are recommended by Yuktikalpataru. The rectangular shaped cities bring prosperity and longevity whereas square shaped bring fruits to the kings who build them. The Agni Purana mentions that a city resembling vajrasuci in shape or which can be reached by two or three ways, should be held as inauspicious, whereas the city laid out in the shape of bow or vajranaga is reckoned as the most auspicious. The Samaranganasutradhara, however, does not recommend bow shaped city (capakara) because the people of that place have low
character. The text describes another shape chinnakarna, where the people had constant fear of theft and epidemics, it is not of square shape. The vikarna shape is hated because it results into loss of longevity, vajrakriti, octagonal town, is hated and considered inauspicious. The Agni Purana also condemns this shape. The Aprajitaproccha refers to it as an inauspicious town as it brings enormous loss of citizens. The Samaranagasutradhara refers to sucimukha shaped town where the people live in utter misery. The circular shaped towns also result in misery according to this text. The Matsya Purana, however, recommends circular shaped city along with rectangular and square. The fan shaped town is also inauspicious, as the people of these towns are not reliable. The best shape of town or most advisable is a square. The square plan of sixty-four squares was considered most suitable for the towns, kheta, temples and other categories of settlements.

The Mayamata lays down five shapes of walls which enclose towns. These should be square, rectangular, round, elliptical and perfectly circular. Actually the construction of these walls determined the shapes of the city. The excavations conducted at a few sites reveal that the fortification wall were mainly of square or rectangular shape. In other instances, buildings constructed on square and rectangular plans have been unearthed. The excavations conducted at Mahal mound revealed a big double storeyed building possibly a court house and residential
buildings constructed on a square plan. The rooms were single-bedded and arranged around a big hall.\textsuperscript{58} The explorations conducted at Sirohi revealed that Chandravati, the capital town, was divided for residential purposes into six blocks on the rectangular pattern. Many temples have also been unearthed which are planned on the principle of rectangular pattern of bhadra, pratibhadra and karna.\textsuperscript{59} Excavations conducted at Antichak, in Bhagalpur district have also revealed some rectangular and circular structures. These structures surrounded the monastery. The rectangular structure measures nine metres by six metres whereas the circular structure is nine metres.\textsuperscript{60} Archaeologists have revealed a stūpa of square plan of eighth-ninth century with a square platform of bricks at Bharatpur district, Burdwan.\textsuperscript{61} The excavations conducted at Kāverīpatṭinam, district Tanjore have also revealed a huge structure having square plan which is possibly of seventh-eighth century A.D.\textsuperscript{62}

The nagara temples in some parts of country, constructed during this period, reveal that architects have generally used a square plan.\textsuperscript{63} Survey of temples in central, northern and western India indicate that from the seventh to eleventh centuries the application of sixty-four square mandala plan was put in actual practice while preparing the ground plan of temples.\textsuperscript{64}

The square plan, is considered as the essential and fundamental form of Indian architecture, and "a mark of order, of finality to the expanding life".\textsuperscript{65} However, archaeological
excavations have also unearthed building, temples, stūpas, monasteries and fortification walls, yet on the basis of these meagre finds no generalization can be put forth until and unless a large scale horizontal excavations are carried out to unearth the large and extensive settlements of the period which would definitely help us understand the relevance of the square plan.

In connection with town-planning the architectural treatises specify distinct directions for the different caste/class groups. This distinction is found in the Arthasaṭṭha, where the northern direction is reserved for the king and nobility. In the eastern direction ksatriyas, merchants and experienced artisans should have their dwellings. The vaiśyas, prostitutes and the musicians should live in the southern area, and in west artisans manufacturing worsted threads, bamboo mats as well as the people of śūdra caste should dwell.66 The Agni Purāṇa assigns northern area of the town to the brāhmaṇas, monks and other holy personages; in southern direction dancers should dwell; however, the south-western area was reserved for the actors, potters and fishermen; and merchants and fruit-sellers in south-eastern direction have their dwellings. The weavers should live in western part of the town.67 The text further allots four different directions to four castes. The brāhmaṇas in the north, ksatriyas in the east and southern and western were reserved for the vaiśyas and sudras respectively.68 The Mayamata states that the people of all classes should live in the town and they should run their own business.69 The temple formed the main feature of the city plan and the houses of all castes
to be constructed at some distance from the temple, whereas the caṇḍāla and kolika huts were to be built two hundred poles beyond the town to the east and south-west.\textsuperscript{70} The \textit{Samarāṅgasūravadāra} discusses it in greater details. It recommends south-eastern direction for the goldsmiths, which is also recommended by the \textit{Agni Purāṇa}.\textsuperscript{71} The vaiśyas to dwell in the south as is also found in the \textit{Agni Purāṇa}.\textsuperscript{72} The eastern and northern direction to be reserved exclusively for the kṣatriyas and brāhmaṇas respectively.\textsuperscript{73} The text makes further recommendations that the fisherman's house to be built in the south-west and physicians should inhabit all parts of the town and likewise the army should also be installed.\textsuperscript{74} Similar recommendations are also found in the \textit{Agni Purāṇa}.\textsuperscript{75} The śūdras should inhabit the western side of the town. The text stipulates that burial grounds should be situated outside the premises of the town.\textsuperscript{76}

The \textit{Aprājitapucchā} also makes recommendations regarding the location of four castes in different directions of the city. According to this text eastern direction to be reserved for the brāhmaṇas, southern for the kṣatriyas, western for the vaiśyas and northern for the śūdras.\textsuperscript{77} It is further prescribed in the text that the craft guilds and degraded class should live in the outer premises of the city whereas the sthapatis to reside within the city.\textsuperscript{78} The \textit{Aprājitapucchā} further refers to the traders and merchants quarters to be built in crowded places where people congregate.\textsuperscript{79} The sellers of cloth should reside
in the north-east, south-east, north-south and east. The leather workers should dwell in the south-eastern area of the town. The silpin should have their quarters in the north-eastern direction; the goldsmiths, perfumers and ivory workers in the east. The weavers should dwell in the north-west. The text refers to temple as the integral part of the town, which is also pointed out in the Agni Purana, Mayamata, and Samarāṅgaṇasūtradhāra.

The palace constituted one of the most important constituents of towns. The palace was constructed on the square plan of sixty-four squares. It was to be constructed in the centre of the town along with the temple. The Arthasastra, an earlier text, stipulates same kind of location for the palaces of the kings in the towns. Three kinds of the palaces are described according to the size of the respective towns; jyestha (the big size madhya (the middle sized) and kanistha (the small sized). However, the Mānasāra describes nine different kinds of palaces with regard to the size and rank of the king such as Chakravartin, Adhirāja, Narendra, Pārshnīka, etc.

A large palace complex has been unearthed at Gaṅgaikondacōḷapuram. The roof of the palace was covered with flat tiles and to enhance its beauty polished pillar made up of wood were used. Burnt bricks were used for the construction of different storeys of the palace. Excavations at Paḻayārai district Tanjore have also revealed some parts of the palace complex of the Cōlas which covered a wide area. But more details
regarding the location of palaces, their size are still awaited, and a fair treatment is possible only if excavations on a wider scale are conducted in the capital cities of early medieval India.

The ruling class used to adorn their capitals, with buildings, assembly halls, tanks and parks. The gardens also enhanced the beauty of the palace of kings, (in beauty they were compared to the abode of god). 96

The temples formed an important feature of early medieval urban and rural settlements. They were constructed where there were rivers, groves, springs and mountains etc., as it was believed that gods love such places. 97 These were of different shapes such as square, circular, rectangular, episdal, hexagonal and octagonal. 98 The Samarāṅgasūtradharma describes different shapes of the temples such as square, 99 rectangular, 100 circular 101 and eight-sided. 102 Lakshmīdhara offers great importance to the construction of the temple in the centre of the town and adjacent to the kings' palace. The temple in the heart of Mathura, in addition to the small temples all around the town, suggest that the biggest temple was constructed in middle of the town. 103

The epigraphic evidence also refer to temple as an important feature of all settlements. They were supposed to bring beauty and prosperity to the towns. The town of Ratnapur is described as the rich city decorated with many temples and the town looked like a heaven. 104 An inscription from the temple
at Garbināth refers to Pehowa a sacred place on account of the
temple of Viṣṇu built there. The inscription of tenth
century from Ahar records many temples of great importance;
for instance, the temple of Kanakdevī was the most important
beside this there were temples dedicated to other brahmanical
deities. The town of Sīyaḍoni was also adorned with temples
of various deities; for the maintenance of these temples grants
were made by the artisans and the traders. The town of
Viṣṇu was founded by Vaśistha, a son of Dāmodara, which was
endowed with a garden and funds for the functioning of the
temple. The capital town of Kanauj is also mentioned having
lovely high topped temples of various gods.

The temple was considered as an important constituent of
urban settlements in south India also. All important towns had
one or more temples representing different gods. In many cases
temple centres developed into important urban settlements and
large exchange centres. The kings and the chiefs constructed
temples for the attainment of spiritual merits. The epigraph of
Saka 993 of Someśvara II records the construction of a Jain
temple in the city of Anṇigre, and for its proper functioning
certain grant was made. Another inscription of the same
king of A.D. 1074-5 records a temple of the god in the capital
town Vijayāpura and proper arrangement made for the
functioning of the temple. Excavations conducted at some
sites have revealed that temple formed an important constituent
of both urban and rural settlements. Excavations conducted at
Mehar mound have revealed a brick temple. The exploration
conducted in district Sirohi has unearthed the ancient town and the capital Chandravati of the Paremāras of the Abu branch. The township covers a wide area. Apart from roads, streets and several residential quarters, the town has many traces of Śaivite, Vaiśnavite and Jain temples. These are constructed on the rectangular plan. These findings suggest that it was an important administrative and cultural centre of the period, Similarly, exploration in district Simla has yielded remains of several brahmanical temples, inscriptions, sculptures and other architectural fragments. Surviving temples of Khajuraho are another important example of temple architecture of this period. It was a capital of the Chandellas of Bundelkhand, and witnessed greatest artistic activity. These temples are the only vestige remains of the township of the Chandellas.

The intensive explorations carried out in district Tanjore indicate that Brihadeśvara temple, a multistoreyed structure, was located within the encroachment provided by the rampart and a moat. The other traces discovered from the place indicate that it might have been a royal city of the Cōlas. The temple which is intact to date at Ellora has been described as the world's greatest rock poem because of its superb execution and surpassing beauty. The Mahābalipuram temple of the Pallava time is a spectacular example of exquisite art activity practised in India. The temple complexes at Tiruvannāmalai, Madurai, Chidambaram are also living examples of art activity of the south Indian ruling elites. The above description show that temple was an important unit of urban and rural settlements, and in
The houses for the common people were of many storeys and varying measurements. The Matsya Purāṇa describes four kinds of houses as catuhšālā, triśālā, dvīśālā and ekaśālā. The Mayamata, however, refers to six types of houses with one, two, three, four, seven or ten main buildings for gods, brahmānas and other classes. The work further specifies that the houses with single main building are appropriate for gods, brahmānas and the people of other classes. The Samārāṅgaṇa-sūtrakṛt, mentions caste-wise construction of houses and a number of storeys suitable for different castes. The brahmana was to dwell in the houses having seven and a half storeys, whereas Mayamata assigns nine or ten-storeyed building suitable for the brahmānas. The kṣatriya in a six and a half, vaiśya not more than five and a half storeys and śūdra not more than three and a half storeys.

The houses were to be constructed only after the careful selection of the site. The Mānasāra lays down that best architect should construct dwelling houses in the village, city, trading centre, on sea or river and by the side of a hill.

The houses were generally constructed on a square plan and in some cases rectangular also. It is further specified that...
if it is rectangular, it should only exceed in length in the case of brāhmaṇas by one tenth; one eighth in the case of kṣatriyas; one sixth in the case of vaiśyas and in the case of śūdras it should exceed by one fourth in length. It was so because the square is considered sacred in the hierarchy of Indian architectural symbolism.

Excavations carried out at Mahal mound have revealed residential houses built on square plans and the rooms were arranged in "L" shape and were finely built. The practical application of a square becomes further clear by the exploration of town Chandravati in district Sirohi. The northern end of which was marked by a two hundred and fifty metres square fortified area, however, a few temples have rectangular plan. The inscription of the reign of Akālavarsa Kṛishṇa III of Śaka 868 records twenty-four houses constructed on a rectangular plan (seven cubits in lengths and five cubits in width) were donated along with the fixed revenues to the brāhmaṇas.

The houses were of considerable dimensions. They normally consisted of a room, toilet, store-room, open courtyard, etc. There were big houses which were used both for residential and business purposes alike. The houses were provided with the proper ventilation. They were also provided with wells, tanks and reservoirs for the proper supply of water to the residents. Hearths were also constructed for the cooking purposes.
For keeping the house and its surroundings clean, they were provided with the covered drains with lime plastered floorings. Excavation carried out at Anand Bhawan campus yielded a covered drain, fifteen cm in width and seventeen cm in depth. The floor and the covering of drain are of stone slabs, and walls are made up of bricks. The drains from the houses fall into a lime plastered open gutter which is situated in the middle of the street. Through the drains the water used in the private houses for domestic and bathing purposes fell into the main gutter, and so drains and houses remained clean.

The gardens and parks marked the special features of early medieval town-planning. Much attention was paid towards the beautification of towns in general and houses in particular. Inscriptional and literary sources refer to parks, gardens, tanks, fruit-trees, etc., as important requisites of towns. A literary text of eleventh century considers the land having rivers, lakes and gardens as an ideal site for laying out the city. The text further mentions gardens around the temples, which enhanced their beauty. An inscription of eighth century records a capital town Vārāṇḍa which was surrounded by gardens, groves, bowers, many flowers and fruit-trees which were watered by springs and produced flowers and fruits of various kinds. The epigraph of eleventh century of Pūrṇapāla mentions the ancient town of Vaṭa in the old Bastar state, which was adorned with ramparts, orchards, tanks and lofty mansions.
Three epigraphs from Lakshmeshwar refer to the town of Purikara as the best and most charming, on account of the lotus pools, the multitude of brilliant ponds and the bright parks of sandal trees.\(^{146}\) The inscription of Jayakesi III mentions the town of Halasige which was adorned with mango-trees, citron-trees, ponds with lotuses, streams and beautiful parks. On account of its beauty the town was compared to the Nandana garden of Indra.\(^{147}\) An inscription of A.D. 1187-8 suggests that Toragel situated in the Dharwad district was adorned with arecanut trees, betel creeper, groves of mango trees and row of gardens, temples and rivers, the place appeared exceedingly beautiful and shining like pearls.\(^{148}\) It appears from the above analysis that the town planners played special attention towards the surroundings of the towns, which must possess beautiful and healthy environment, and should serve as a convenient living place for the people.

The planning of streets and roads formed the other important feature of early medieval town-planning. The architectural treatises of the period suggest that the town was divided into specific areas on the class/caste grounds. This would practically mean that the town was divided into sub-division and different castes were assigned different directions in the town.\(^{149}\) The towns were divided into different blocks, by streets and roads, and in those blocks residential quarters and markets were constructed on either side of the roads.
The towns were divided mainly on the basis of streets. The *Mayamata* refers to twelve, ten, eight, six, four or two streets running from east to west and prescribes the same number of streets from north to south. The text refers to eleven streets in a town of ordinary size, whereas the *Samarāṅgana-sūtradarpa* mentions thirty-four main streets in addition to the number of lanes and by-lanes. The *rāja-mārga* or the central road to be located in the middle of the town and its breadth varies from twenty-four, twenty to sixteen hastas according to the variety of city as big, medium and small. The text further mentions four vehicle streets (*vāna-mārga*), having dimensions of four hastas (approximately six feet). The highways or *mahārathya* of twelve, ten and eight dimensions are also mentioned. Besides this it mentions that *vāna-mārga* should also have two *jaṅgha-pathas* or footpaths on both sides of three, two and a half and of two hastas.

The *Aparājitaprapochā* prescribes nine, thirteen and seventeen main roads in the small, medium and big cities respectively. The *Mānasāra* refers to one to twelve large streets in the town. The *Upamitibhavapraṅchakathā* describes that the city should have large streets, *mahārāja-mārgas* which run from one direction to the other and crossed each other at the centre. In addition to these small roads *rathya* and *mahārathya* were also constructed in the city.

The epigraphic records from north and south India refers to royal roads, big roads, main streets and lanes. These streets
had multistoreyed buildings on either side for the wealthy and distinguished people.\textsuperscript{160} An inscription of tenth century refers to big streets (which were the main streets) and \textit{kurathya} (small streets) were the branch roads. There also existed \textit{hatta-marga} or main bazar streets where markets were located on either side of the streets.\textsuperscript{161}

The explorations carried out at the capital town Chandravati, revealed five main roads which divided the residential area into six main rectangular blocks. The longest road running from north to south was about eighty metres broad and other four roads of different length and breadth joined the main road at right angles. As per the prescriptions given in the architectural texts, the residential quarters were situated on either side of the main roads.\textsuperscript{162} Similarly an epigraph of eleventh century records the erection of a beautiful town Padamāvatī which was crowded with lofty rows of street having palatial dwellings on each side.\textsuperscript{163} The epigraphs also refer to the royal roads (\textit{rāja-patha}) and smaller roads existing in the towns.\textsuperscript{164}

This shows that special attention was paid towards the planning of cities. But the exact application of the stipulations given in architectural treaties can only be examined if large scale horizontal excavations are conducted on early medieval sites. However, street-planning formed the important canon of town-planning and special technicians were employed who worked under the supervision of master architect.
Special attention was paid to the construction of markets or hattas which were the basic factor in the expansion of urban network. The large number of markets existed in the country for the consumption of large-scale commodity production. Every big and small town had a market centre where numerous articles of daily use were bought and sold. While laying out the town, the selected and measured site was perhaps divided into sixty-four equal squares, and then allotted to different establishments of the city, which include the palace complex, the habitation of different socio-economic classes, the temple, etc. Different socio-economic classes were allotted distinct quarters in the different directions of the city. The Agni Purāṇa refers to goldsmiths and smithy-shops in the south-eastern quarter of the city. The weavers in the western part and vaisyas in general to be in southern part of the city. The Mayamata makes an extensive treatment of proper distribution of residential quarters and markets stalls. The text states that along the streets leading to the centre the markets of gems, gold, clothes, madder, black pepper, pepul seed as well as honey, ghee, oil and mendicaments are found. The street encircling the centre of the town should have bazar for betel, for fruits and articles of value. Between the square of Īṣa and Mahendra (north-west and west) there should be bazar for the meat and fish, dried products and vegetables. In the Mahendra gate (west) and the square of Agni (south) is the bazar for solid and liquid foods. The iron mongers in the south-east and in the south-
west is the shops of copper-smiths and in the eastern direction should also be bazar for grains, rice and fodder, the fabric market should be situated in the northern part of the town along with the market for oil and salt. In the north and north-west, sellers in perfumes and flowers should have their dwellings.

The Samarāṅgasūtradhāra allots south-east direction of the town to the goldsmith and other artisans, the southern part to the vaiśyas, potters and cart-wheelers. The north-west direction was reserved for the distillers and sellers of the wine, and north-east for the sellers of commodities like butter and fruits. The mercantile class should be installed in all the quarters of the city, so that the people should sell and purchase things which are not locally produced. The Ağrājitaprocha refers to goldsmiths and ivory workers, perfumers, etc., to have their dwellings in the eastern direction; dealers in betels, fruits, flowers to dwell in front of the palace or in the public palaces. The southern direction of the town was reserved for the dealers in iron. The cloth merchants should have their dwelling in the north-east, south-east, north, south and east. The weavers and the sellers of liquor should have their dwellings in the north-west and south-west respectively.

The details given in these texts show that the different parts in the towns were set apart for members of different castes.
This sub-division of city area according to castes would practically be the sub-division of city into industrial areas. This sub-division and locations of trade and industries in distinct directions might have definitely helped the workers in carrying out their trade efficiently in all quarters of the town.

Regarding the size of shops and stalls nothing concrete can be said. The sources refer to small and big shops, residential-cum-shopping centres working in the cities. The sources do mention shops or āvāris having three rooms of burnt bricks whereas other āvāris have more than three rooms. In some markets a custom house or mandapikā was attached to them, which shows that big bazars existed at such places. The establishment of a mandapikā for the collection of different cesses in cash or kind was essential, and it served as an exchange centre too.

The inscriptions and literary sources refer to markets full of different commodities for sale. Many markets had general articles of merchandise and a few others dealt only in articles of special kinds. A Rāṣṭrakūṭa inscription of tenth century refers to gurjarāpana or the markets of gurjaras, the most frequented market place. The Kaman inscription of tenth century refers to kambali-hatta which was a permanent market for the sale and purchase of cattle in Rajasthan.
An epigraph of twelfth century refers to paddy market in the city of Sedambāl, where paddy was bought and sold exclusively.  
The general market for jewels, cloths, pots, betel-leaves, oil, corn, etc. existed as mentioned in an epigraph of A.D.1123 at Terdāl, a merchant town situated in southern Maratha region.

Similarly several markets and stalls are referred to in the Tattāndapura inscription where goldsmiths had their dwelling in the middle portion of the eastern bazar; the dwellings in the north-eastern direction of the town had to provide saffron, incense, flowers, lamps and flags to the temple in the town which indicate that they dealt in these mercantile articles.

Similarly the twelfth century inscription from Kolhāpur records cloth merchants, goldsmiths, betel-sellers, sellers in green ginger, garlic, flowers and potters carrying out their business in Kolhāpur, and were subjected to certain kind of revenues which were donated to the temple of Rūpa Kārāyāṇa.

This description shows that markets had separate stalls for the purchase and sale of articles. Merchants were rich and made certain donations to the temples and brāhmaṇas. The king also took initiatives for establishing market places and donating shops for the merchants. They also worked further for the comfort and convenience of the sellers and purchasers by constructing streets and houses so that they could carry on their trade successfully. However, archaeology has not been of much help in revealing the practical application of prescription given in the architectural texts regarding the size of buildings, their location and the size of shops and stalls.
The forts and fortification of towns was the special feature of early medieval town-planning. The city was defended mainly by walls, moats and gates. The digging of moat around a city was a very old practice. The *Arthasastra* recommends digging of moat and mountain fortification to defend populous centres.\textsuperscript{190} The text further refers to digging of three moats at a distance of six feet from each other.\textsuperscript{191} The *Samarāṅgasūtradhāra* supports the stipulation given in the *Arthasastra* that big cities should be surrounded by three moats.\textsuperscript{192}

Almost all the big and small cities were fortified by moats. The epigraphic sources also refer to moats surrounding the cities for security purposes.\textsuperscript{193} The archaeological excavations have also revealed extensive fortifications of towns in early medieval India by digging moats and other ways. The traces of moat surrounding the capital town of Gaṅgaikōṇḍacōḷapuram have been noticed.\textsuperscript{194} The inscription of king Maraṅjadaiyān refers to erection of walls around city of Karvandapuram. He is said to have surrounded the fort city by deep moats.\textsuperscript{195} The excavations carried out there have revealed a moat around it.\textsuperscript{196} The fortification of an administrative town Banavāsī has been unearthed by the excavations carried out there. It revealed a deep moat surrounding the town on the three sides and the river Varada on the fourth.\textsuperscript{197} The inscriptive evidence refers to Banavāsī as an important cultural and exchange centre where traders were rich and made various donations for the functioning of the
temples. Tanjore, a capital town of Colas, was also surrounded by a moated fort for the defence purpose.

The elaborate system of fortification by north-eastern kings in early medieval times have been disclosed by the survey of districts of Rangpur and neighbouring regions of Cooch Bihar. There were number of places called dûrs (passable forts) in the country intersected by many rivers. Similarly ruined city of Dariyon in eastern India revealed four broad moats surrounding the cities, which contain water even during the driest season.

The construction of ramparts, towers and gates represented the other methods of fortification. The Samarângana-ûtradrâma refers to a rampart wall known as prakâra set with towers and turrets, constructed to defend cities. The Arthaśāstra also refers to prakâra built of brick surrounding big cities for the purpose of security. Perhaps the same tradition continued from Kautilya to Bhoja's period. The Aprâjitaprochā recommends the construction of prakâra around the cities for the security purposes along with other towers and gates. To make the wall impregnable it was provided with the destructive weapons.

The inscriptions also refer to city ramparts protecting the cities. The Jodhpur inscription of eighth century refers to the high ramparts of the fort of Mândavyapura or
Mandor which frightened the enemies and it was made almost impregnable. An inscription of twelfth century refers to fortification of Jalor fort by extensive ramparts, built by the king Samerasiṣṭha. The inscription at Teridāl of A.D. 1123-4 records extensive fortifications of market towns Teridāl by hill forts, ditches filled with water, owing to this the town appeared always peaceful in the whole world.

Explorations carried out at a few sites reveal that prakāra or fort wall was the special feature of the capital towns. The town of Chandravati was surrounded by a fort wall which was about two metres thick. The excavations conducted at Antichak district Bhagalpur revealed traces of wide boundary wall with three metres thickness built during the Pāla period; probably the place was a centre of Buddhist learning as the traces of stūpa and monastic settlements are the major findings. Similarly excavation at Gaṅgai-konḍacōḻapuram exposed a major baked brick wall extending in all directions. This fort wall was surrounded further by a moat to make this flourishing city of Cōḷas as impregnable.

Dhāranagari, a capital city of the Paramāras as described by Bhoja, was encircled by a city wall having four gateways with broad and strong doors and crowded with people. However, the archaeological finds from the place do not show any such traces, possibly the remnants of the time of the Paramāras have since been destroyed.
The surrounding walls continued to be a prominent feature not only of early medieval towns but also a special feature of town-planning of most countries in the world right down to the eighteenth century.\footnote{213}

In addition to the fortified towns we have references to \textit{durga}, \footnote{214} \textit{kot}\footnote{215} and \textit{pura}.\footnote{216} The architectural texts do not show much distinction between the town and a fort. However, a separate discussion on the fort and its classification is found in the sources. Kautilya's \textit{Arthasastra} reveals that forts were in many cases fortified towns.\footnote{217}

The main difference was that \textit{durga} was mainly constructed for the defence purposes though it performed other functions also whereas a village and a town primarily meant for habitation,\footnote{218} and were provided security by walls, ditches and towers. The \textit{Mayamata} refers to \textit{durga} mainly constructed for the defence purposes and must be impregnable.\footnote{219} It also served at times the capital of kings, having within it a palace complex, other architectural edifices, shops and stalls.\footnote{220} The \textit{Mansāra} does not distinguish between the fortified cities and forts as the fortified cities also worked as forts for practical purposes.\footnote{221}

The \textit{Aptālitaprocchā}, however, does not deal with the planning of \textit{durga} separately, probably the fort planning was similar to the city planning.\footnote{222}
The inscriptional sources refer to several forts which emerged because of political upheavals in the country. The petty kings ruling in different parts of country raised their own forts and fortifications for the defence purposes. With the passage of time these military units developed into exchange centres and centres of political importance. The fort of Gwalior under Gurjara Pratihāras was not only a military unit but it also functioned as commercial centre where the merchants represented in the city council. An epigraph of ninth/tenth century refers to the fort of Kollam or Quilon in south India which developed into a centre of international commercial activity. The merchants from foreign countries constructed factories, warehouses and residential quarters in the town, and it became rich and populous centre. Kotṭāru, the Cola military outpost, was a developed centre of exchange where merchants came from neighbouring regions exclusively for trade purposes.

The forts were not solely equipped with defence artillery but they had temples and gardens too. The fort of Paralaiyūr was surrounded by moats on all sides and had gardens and temples which increased the beauty of the fort town. Danayakankottai, a fort town of south India, during explorations yielded many traces of old fort building and irrigational channels which indicate that the land was highly cultivated and it was a flourishing city surrounded by moats and ditches. The traces of fort town have been revealed at Gopāla in the east of Sidlipura in Bhadrāvati taluk situated on the river Bhadra.
The ruined fort and other material remains found here reveal that it was an important agrahāra town during the twelfth century.\(^{228}\)

The material used for the construction of houses, palaces, temples, forts, walls, etc., is of great relevance in the present study. The material remains reveal that mainly mud-bricks, burnt bricks, wood, stone, etc., were used for the construction purposes. The *Matsya Purāṇa* describes baked-bricks, wood and earth for the house construction.\(^{229}\) The work further recommends that timber for house could be procured from the nearby forests.\(^{230}\)

The *Mayamata* makes similar recommendations for the building material. The text refers to wood, bricks and stones used for the building purposes.\(^{231}\) The *Śaṁarāṇīgaṇasaūṭrādhāra* also recommends wood for the construction of houses.\(^{232}\) The text lays down that bricks and mortar were also used for the building purposes.\(^{233}\)

The excavations conducted at Tardih in district Gaya have revealed houses constructed of burnt bricks.\(^{234}\) The houses constructed of baked bricks and of well-dressed slate stones have also been revealed from the excavations conducted in district Bilaspur.\(^{235}\) The excavations conducted in district Furi revealed brick structures that show the bricks, baked or mud-bricks, were mainly used for the constructional purposes.\(^{236}\) In most cases local stone was used for the building purposes.
The excavations conducted at Tumain, district Guna, revealed the buildings of Gurjara Prathāras were mainly built of locally available stones. It was because of inadequate transport facilities which hampered the availability of other building material.

The above survey makes it clear that there were some set principles stipulated in the texts for the town planners. But how long were those actually practised is as yet uncertain in the case of towns. Their validity, however, in the case of temples has been examined by scholars. This examination indicates that the temples displayed fixed architectural techniques and sculptural composition. These were generally constructed on square based plan. The application of these stipulated prescriptions in the case of towns can only be sought if a large scale archaeological excavations are conducted on horizontal basis. This would definitely reveal the entire lay out of the towns in general and can sufficiently throw further light on the urban planning in particular.

Notes and References

1. B.B. Dutt, Town planning in ancient India, Calcutta, 1925, p.18.
2. C.P.V. Aiyar, Town planning in early south India, rpt., Delhi, 1987, p.xix.
3. Mackay, Early Indus civilization, ch.I and ch. IV.
4. Taittirīya Āranyaka, I, 6, 23.
5. Ibid., I, 11, 31.
6. Srāvastī, an important city, mentioned in the Buddhist texts is also confirmed by the archaeological excavations. Similarly excavations at Basrah have revealed traces of a well-organised city, *ASI AR*, 1903-4, pp.87-8.


11. Archaeological excavations are the most important sources of history but unluckily very few early medieval sites have been excavated and so no overall picture of urbanization can be made and not much can be known of the planning of towns. Though in a few cases like Gaṅgaikondačoḷapuram excavations have been very helpful in exposing the palace complex and other buildings made of burnt bricks in south India.


21. **Anūpa** is a fertile region with rivers, all around plentiful trees, fish and meat in abundance and full of verdure, *ibid.*, ch. VIII, 4.

22. **Sādhārana** is a place of moderate climate neither too hot nor too cold and which has the common qualities of both of them, *ibid.*, ch. VIII, 5.


24. *Ibid.*, ch. VIII, 8, 17; other fourteen kind of land are discussed in the text such as dhānyā, bhogya, kāntā, sitagocararaksini, apāśravavati, khanimati, atmadhārini, dravyasampannā, amitraghātini, āśrenipurusā, sākyasāmantā, devamātrikā, hastivanopetā and surakṣā, *ibid.*, ch. VIII, 7 ff.

25. *Mayamata*, chs. III and IV.


30. **EI**, vol. i, p. 32.


37. *Ibid.*; other texts such as *Mānasāra, Mayamata* and *Aparājitaprcchā* also support this.
41. *Yuktikalpataru*, p.22.
42. *Agni Purāṇa*, ch. CVI, p.429.
52. *Samarāṅgaṇasūtradhāra*, ch. X, 60.
57. *IAR*, 1955-6, p.27; the explorations conducted in Tamil land show a massive rectangular fortification in the surroundings of Gaṅgaikondacōlapuram which was the flourishing city of the Cōḻas.
61. Ibid., p. 32.
62. Ibid., p. 25.
65. Stella Kramrisch, The Hindu Temple, vol. i, Calcutta, 1946, p. 22. She further says that it is the square vedī in Hindu temple which makes the sacred ground, ibid., p. 25; many nāgara temples of Himachal Pradesh such as Śiva temple at Hat Koti, Bāsheśvar Mahādeva temple at Bajaura, Śiva temple at Jagatsukh confirm the practical application of sixty-four square plan in their construction.
68. Ibid., p. 430.
70. Ibid., p. 46.
72. Samarāṅgaṇasūtradhāra, ch. X, 90; Agni Purāṇa, ch. CVI, p. 430.
73. Samarāṅgaṇasūtradhāra, ch. X, 91-2, 100.
74. Ibid., 10-11.
75. Agni Purāṇa, ch. CVI, p. 430.
76. Samarāṅgaṇasūtradhāra, ch. X, 102.
77. *Apṛājitapračchā*, ch. LXXII, 41-6.
78. Ibid., 42, 45-8; similar kind of recommendations are found in the *Mayamata*, ch. X, p.46; cf. *Silparatna*, ch. V.
79. *Apṛājitapračchā*, ch. LXXII, 32.
80. Ibid., 37-8.
81. Ibid., 48.
82. Ibid., 47.
83. Ibid., 33-4.
84. Ibid., 48.
85. Ibid., ch. LXXI, 12; ch. LXXVI, 1.
89. Ibid., ch. XV, 1.
92. *Samarāṅgaṇasūtradhāra*, ch. XV, 7; *Mayamata* also describes big and small palaces in relation to the size of the towns, ch. XXIX, p.259.
95. Ibid., p.79.
97. *Brihat Saṃhitā*, ch. LV, 4-8.
100. Ibid., 77-9.
101. Ibid., 84-9.
102. Ibid., 94-5.
103. Elliot and Dowson, The history of India told by its own historians, vol. ii, p.44.
104. EI, vol. i, p.32 ff.
105. Ibid., p.186.
108. Ibid., p.172.
109. Ibid., p.82.
110. Kuḍamṭukku, Kāñchī, Tiruvvidaimarudūr and Tanjore were such centres where the temples played an important role in the progress and prosperity of the towns.
111. EI, vol. xv, p.338.
112. IA, vol. x, p.127.
114. IAR, 1977-8, p.49.
117. IAR, 1983-4, p.79; 1955-6, pp.27-8; cf. ASI AR, 1904-5, p.31.
120. Matsya Purāṇa, p.348; Catusālā houses have four entrances and four ante-rooms.
122. Ibid., p.205.
123. Samaranganasutradhara, ch. XXXIX, 21-4.
125. Samaranganasutradhara, ch. XXXIX, 21-4, whereas Mayamata assigns seven to eleven for monarchs, and three or four storeys suitable for the merchants and sudras; cf. ch. XI, p.49.
127. Mayamata, ch. XXVII, p.237 stipulates that the house whether rectangular or square (the area thus delimited) is to be divided into sixty-four parts.
129. Stella Kramrisch, op.cit., p.28.
130. IAR, 1983-4, p.62.
131. Ibid., p.49.
133. Ibid., vol. xxiii, p.139.
135. EI, vol. xxiii, p.139.
136. A.M. Shastri, India as seen in the Kuttanimata of Dāmodara Gupta Delhi, 1975, p.231.
137. IAR, 1977-8, p.49.
138. IAR, 1979-80, p.31.
141. IAR, 1957-8, p.25.
143. Ibid., ch. X, 110.
145. APR WC, 1906-8, p.53.
146. EI, vol. xvi, p.42.
147. Ibid., vol. xxviii, p.259.
149. K. Rangachari, "Town planning and house building in ancient India according to śilpa śāstras", IHQ, vol. iv, no. 1, p.106.
150. Mayamata, ch. X, p.43.
151. Ibid., p.42.
152. Samarāṅgaṇaśūtradhāra, ch. X, 15.
153. Ibid., 6-7.
154. Ibid., 10.
155. Ibid., 9.
156. Ibid., 12-13.
157. Āprajitaprocchā, ch. LXX, 8.
159. Upamitibhavaprapāṇchakathā cited in Dashartha Sharma, Early Chauhan dynasties, Delhi, 1959, p.297.
160. EI, vol. xxii, p.145; the inscription shows that privilege of multistoreyed buildings and mansions were given only to a few people.
161. Ibid., vol. xix, p.57.
162. IAR, 1977-8, p.49.
163. EI, vol. iii, p.147.
165. Aprājitapračchā, ch. LXXII, 33 ff.
168. Ibid., p.44.
169. Ibid., p.45; Silparatna, ch. V, 72.
170. Mayamata, ch. X, p.44.
171. Ibid., p.45.
172. Samarāṅgaṇasūtradhāra, ch. X, 89-90, 95.
173. Ibid., 101.
175. Ibid., 36.
176. Ibid., 37-8.
177. Ibid., 48.
178. Ibid.
179. Rangachari, op.cit., p.106.
185. Ibid., vol. xix, p.41.
188. Ibid., p.35.
191. Ibid.
192. Samarāṇganasūtrakrama, ch. X, 17; Aprājitaaprecha also recommends three deep and big moats should surround the capital, ch. LXXII, and the width of the moat should be of seven cubits (saptahastapramanatāh), ch. LXXXV, 34.
193. Almost all the cities mentioned in the inscriptions of this period were fortified; SII, vol. iii, pt. 3, p.421; TAS, vol. i, no. 7, p.152; TAS, vol. iii, pt. 1, p.56.
196. IAR, 1970-1, p.35.
197. Ibid., p.29.
199. ASI AR, 1904-5, p.31.
200. Ibid., 1924-5, p.88.
201. Ibid.
204. Aprājitaaprecha, ch. LXX, 21-3.
207. ASI AR, 1908-9, p.119.
209. IAR, 1977-8, p.49; it is mentioned in the epigraph of twelfth century A.D. as the capital of the Paramāra kingdom of Abu and records certain grants made by the kings to the god Kakalesvara; cf. APR WC, 1910-11, p.39.


214. The dūrga was a settlement which has a difficult access or approach, impassable, cf. Monier Williams, *A Sanskrit English Dictionary*, p.487.


216. The purā in earlier period represented a fort but during this period purā represented important urban settlement; *Mayamata*, ch. X, p.40, however refers to purā as a settlement in a forested country and contains houses for all classes, and shops.

217. Forts had markets, residence for all classes and castes; they performed functions like towns; cf. *Arthaśāstra*, book II, ch. IV, pp.53-5.


225. K.R. Hall, *Trade and statecraft in the age of Colas*, p.216; it has been referred to as erivirapattinam in Cola inscriptions, *ibid.*, p.143.
226. **TAS**, vol. iii, pt. 1, p. 56.