CHAPTER 6

PATTERNS OF RURAL SETTLEMENT
Settlement pattern denotes the shape or arrangement of settlements in relation to natural or man-made features or designs such as streams, ridges, canals and roads.\(^1\)

The pattern of settlement is determined on the basis of the location of houses and the highways. It shows the shape of the settlement. The villages represent a sort of growth within the physical and cultural setting of the region. The pattern of settlement exhibits the relationship between one dwelling and the other, sometimes irrespective of site. Often a pattern is unrelated to site. Similarly the site may have no bearing on pattern.\(^2\)

While studying the pattern of settlement many things have to be borne in mind. First, the pattern should be abstracted from the habitat. Secondly the pattern would depend on the kind of house the one has in mind. The house may consist of cattle sheds granary and outhouses. Sometimes a store, garage, post office or school may determine the pattern of settlement.

From time immemorial the village has been a basic and important unit in the organisation of Indian social polity.\(^3\)

---

The villages in the Ganga-Yamuna Doab are generally self-sustaining and self-sufficing. Yet we cannot regard the Indian village community as static. Time and the interplay of historical and sociological factors and forces have influenced the structure, organisation and ethos of these communities in many significant ways.

The villages differ greatly from one another in shape and pattern by reason of contrast in the arrangement of streets and houses. As a matter of fact the street system within the settlement is the most essential element. When houses are built in groups, the street often plays the decisive role and the house usually faces not the east or the west but the highway i.e. the street or the road. Besides the street system, other cultural elements such as temples and mosques render a peculiar character to the dwelling site.

Thus the grouping of houses due to certain reasons takes different forms as a result of which many distinct patterns of settlements are developed. Yet there may be settlements where no pattern may be recognizable. As such patternlessness becomes a

---

pattern in itself and it is usually achieved by the criss-cross working of various causes and functions of settlements.  

As such the Doab offers a great variety of settlement patterns and house types according to the climatic conditions mainly the amount of rainfall. Originally the information of an Aryan village used to follow the plan of a Swastika. The crossroads of an Aryan village ran north and south and east and west and were terminated by the four principal gates dedicated to the four positions of the Sun.

TEMPORAL ANALYSIS OF SETTLEMENT PATTERNS IN ANCIENT TIMES

In the Ganga-Yamuna Doab it appears that there has been hardly any proper planning of the rural settlements. Some of the plans of rural settlements have been discussed elaborately in the ancient Sanskrit texts like Manasara Shilpashastra.

8 The Swastika was a sacrificial symbol indicating the direction of the circumambulatory rite Pradaksina.
10 Shilpashastras are old Sanskrit texts which were possibly compiled about the 5th or 6th century B.C., but the tradition which they indicate are of far greater antiquity (Vide Havela, Ancient and Medieval Architecture of India, 1915, p.7 footnote) P.K.Acharya translated them into English with his own comments entitled as Indian Architecture in five volumes in 1927. (See Singh, R.L., "Evolution of Settlements in Middle Ganga Valley", The National Geographical Journal of India, Vol.I, Part 2, 1933, pp.75-77.
According to plan eight types of villages are distinguished: Dandaka, Sarvatobhadra, Nandyavarta, Padamaka, Swastika, Preastara, Karmuka and Chaturmukha.  \(^{11}\) (Fig. 14)

It is obvious that most of the plans are rectangular or square and do not appear to differ in essentials. Each village is surrounded by a wall and ditch for defence purposes. There are generally four gates in the middle of the four quarters. The centre of the village is generally occupied by a temple, tank or public hall. The four quarters are further subdivided by straight streets. Each block is inhabited on the basis of caste or profession, the best quarters being generally reserved for Brahmins and the other high castes. The castetric axis of the general plan and the intersection of the main street by north-south running shorter streets bear relationship with climatic conditions. Such an arrangement ensured the advantage of sun light and the proper circulation of fresh air.

The plans of rural settlements discussed above do not seem to have survived in their true form. However, the study of the present village plans is of vital interest. When one speaks of the village plan, one refers to the layout of the Basti (inhabited site) resulting from the arrangement of houses and village streets or lanes.  \(^{12}\) In this sense a definite pattern


ANCIENT VILLAGE PATTERNS

DANDAKA

SARVATO BHADRA

NANDYAVARTA

PADMAKA

SWASTIKA

KARMUKA

PRASTRA

CHATURMUKHA

INDEX

<table>
<thead>
<tr>
<th>TANK</th>
<th>DITCH</th>
<th>TEMPLE</th>
<th>PASSAGE</th>
</tr>
</thead>
</table>


FIG. 14
has emerged only in the case of compact or linear settlements which are very limited in number in the Ganga-Yamuna Doab. At times the settlements are so irregularly huddled together that it becomes rather very difficult to recognise the definite pattern.

THE LAYOUT OF VILLAGES IN THE GANGA-YAMUNA DOAB

However an attempt has been made to distinguish a few common patterns of rural settlements within the Ganga-Yamuna Doab.

(a) Linear Pattern

Such patterns are produced when the attractive forces of the site encourage growth in one direction or when restrictive forces make the growth impossible source within certain fixed limits or when both work simultaneously or successively in different directions. The houses located either on the bank of a river or canal or by the side of the road form the linear pattern. In this group may be included street villages in which two continuous rows of houses follow a street forming a linear pattern. This pattern is also known as Ribbon pattern or String pattern. Such a pattern is characteristically developed in the Dun Valley. Majri, Dharmawala and Dhalipur may be listed as typical examples of linear pattern of settlements (Fig.15)

(b) Chessboard Pattern

In its most characteristic form, the chessboard or gridiron plan denotes a "rightangled mesh of streets with or without a central rectangular market place." When two main lanes intersect each other at the centre serving as the main lines of movement of carts or pair of bullocks. The lanes are rectangular in shape and also perpendicular form the chessboard pattern. This pattern is also known as checkerboard pattern. In the Upper Doab region, Dauntai is the notable example of this pattern (Fig.15)

(c) Rectangular or Squared Pattern

The rectangular or squared plan is simple as it can be recognised easily and conveniently by any one. This pattern rather appears to be the heritage of the ancient village plan. In it all the houses are either rectangular or square-shaped and have their main axis North to South and East to West as a result of which they get the maximum sun light. Whenever human habitation are agglomerated, the plan of the village conforms, broadly speaking, to some rectangular plan and when it is a sort of natural growth the usual pattern is generally like a rough and irregular rectangle or square. Narangpur, Mau Rashidabad and Raipur Khas are the typical examples. (Fig.15)

When two rectangular blocks of houses met each other at right angles "L" shaped villages are formed. The smaller limb represents the new growth. Such a pattern is the result of two linear forces of the site intersecting at right angles. Sometimes two sides of a rectangular pond or sharp bend of rivers also result in "L" shaped pattern. Ikhtiyarpur (Ghaziabad) presents a suitable example of "L" shaped pattern.

(d) Radial Pattern

When the village is of circular shape a number of streets converge at its centre, the settlement becomes of radial pattern. The market place, open or built-up, or some religious institution occupies the central nucleus. In non-circular villages too, radial plan may be observed. The Patla, Niwari, Chitsauna, Mandauna, Khilwai and Sonda form the suitable examples. Asilpur in Meerut district is an excellent example of this pattern (Fig.15).

When in a radial pattern more houses are constructed or the village spreads further, the radial pattern is changed to star pattern. Dahana and Bhtauna may be cited as examples of star pattern.

(e) Circular or Semi-circular Pattern

Under this pattern, the houses are located either on any circular lake or pond or centrally around a located house or round a banyan tree. Circular villages are rather the
remnants of ancient villages. The rounded form is a natural result of maximum aggregation round the house located in the centre or around the banyan tree. Kishanpur and Kat in Lower Doab may be cited as noteworthy examples of circular pattern (Fig.15)

Sometimes a semi-circular settlement may develop following the crescent shape of a meander or bend of stream. A few villages showing a 'horse shoe pattern' may be observed along the sharp bend of some of the rivers, Sometimes when a road meets at one end of the acute bend of another road, the village occupying the bend of the main road also extends towards the main road and thus forms a semi-circular shape. Kampil in the Middle Doab is a living example of semi-circular pattern (Fig.15)

(f) Amorphous Pattern

When the village lands are dotted with numerous hamlets, all being very small rectangles linked with the central hamlet by village paths, no definite patterns may be recognised. Such villages of loose concentration may be called amorphous. This is the most common pattern in the whole of the Ganga-Yamuna Doab.

In this pattern, the houses were established according to convenience before the construction of roads or paths and this...

---

### Typical Settlement Patterns in Ganga-Yamuna Doab

<table>
<thead>
<tr>
<th>Pattern Type</th>
<th>Location</th>
<th>Source</th>
<th>Sheet No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linear Pattern</td>
<td>Majri (Dehra Dun)</td>
<td>S.O.I.</td>
<td>53</td>
</tr>
<tr>
<td>Linear Pattern</td>
<td>Dhamawala (Dehra Dun)</td>
<td>S.O.I.</td>
<td>53</td>
</tr>
<tr>
<td>Linear Pattern</td>
<td>Dhalipur (Dehra Dun)</td>
<td>S.O.I.</td>
<td>53</td>
</tr>
<tr>
<td>Radial Pattern</td>
<td>Asilpur (Meerut)</td>
<td>S.O.I.</td>
<td>53</td>
</tr>
<tr>
<td>Rectangular Pattern</td>
<td>Narangpur (Meerut)</td>
<td>S.O.I.</td>
<td>53</td>
</tr>
<tr>
<td>Chessboard Pattern</td>
<td>Dautai (Ghaziabad)</td>
<td>S.O.I.</td>
<td>53</td>
</tr>
<tr>
<td>Square Pattern</td>
<td>Raipur Khas (Farrukhabad)</td>
<td>S.O.I.</td>
<td>54</td>
</tr>
<tr>
<td>Semi-Circular Pattern</td>
<td>Kampil (Farrukhabad)</td>
<td>S.O.I.</td>
<td>54</td>
</tr>
<tr>
<td>Rectangular Pattern</td>
<td>Mau Rashidabad (Farrukhabad)</td>
<td>S.O.I.</td>
<td>54</td>
</tr>
<tr>
<td>Circular Pattern</td>
<td>Kishanpur (Fatehpur)</td>
<td>S.O.I.</td>
<td>63</td>
</tr>
<tr>
<td>Circular Pattern</td>
<td>Kot (Fatehpur)</td>
<td>S.O.I.</td>
<td>63</td>
</tr>
<tr>
<td>Amorphous Pattern</td>
<td>Dhumai (Allahabad)</td>
<td>S.O.I.</td>
<td>63</td>
</tr>
</tbody>
</table>

**Fig. 15**
accounts for the irregular shape of the settlements. As such a settlement does not have any particular shape, it is known as Irregular or Amorphous. N.K. Bose calls such a pattern as shapeless cluster. Such villages are however met in all parts of the Doab. Ladpura, Pipai, Gandhu Nangla in Upper Doab, Fatehpur, Gangpur in Middle Doab are the various examples of this pattern. In Lower Doab Dhumai is an apt example of such a pattern (Fig. 15).

FACTORs CONTRIBUTive TO THE DEVELOPMENT
OF DIFFERENT PATTERNS OF SETTLEMENTS IN
THE DOAB

Among the various factors responsible for the development of rural settlements in the Ganges-Yamuna Doab the physical, social and economic factors are the most important.

Among the physical factors which influence different patterns in the Doab region, the most important and effective is the relief and the local topography of the region itself.

In the flat and monotonous khadar lands of the Ganges and the Yamuna the dwellings stand isolated from each other but in the Bhangar lands the settlements are most compact or semi-compact and the pattern may be rectangular, square or chess-board formations.

The ribbon pattern has been evolved along the lines of structural contact or along the zone of break in slope.

The presence of a stream and its nature have also determined the pattern of settlements in the Doab region. These streams may be seasonal or perennial in character. The hill torrents in the dry summer months completely dry up or carry only insignificant amount of water, while during the wet season, they become rushing torrents, and cause much damage to the fields. The settlements developing at such dry points become compact blocks or radial or star shaped in character.
Moreover rivers like the Ganges and the Yamuna carry with them enormous amount of silt and as a result of their depositional work in course of time raised platforms on their banks are built-up. These raised platforms, being at some height from the channel form suitable sites for settlements. These levees are seldom continuous but they are definitely elongated and thus the settlements which develop over them tend to be attenuated forming a linear or ribbon pattern. An excellent example of such a ribbon pattern is provided by the bank of Ason river in Dehra Dun in the Sub-Himalayan region (Fig.16)

The incidence of rainfall the direction of winds, the slope of the land and such other causes are also important factors in the development of particular patterns of settlements in the region.

Apart from the physical conditions with which the arrangement of houses is related the local economy of the village or 

village may be responsible for the development of a specific pattern. The sites of markets, the extent and nature of cultivation, the need for cooperation in agriculture, and the effect of fragmentation of holdings result in the development of specific patterns.

It will thus be seen that the patterns of settlements that have evolved are directly or indirectly related to the physical character of the dwelling site, surface water, soil fertility,
cultivation layout of the plots and other cultural forces like village paths, temples and mosques.

The role of social factors causing internal differentiation cannot be ignored. The form of the village is vitally influenced by the social condition of its founders.

The social setup of the community, its division into classes and the perpetuation of these classes as rigid castes also manifests itself in the pattern of settlements. The low caste people build their houses at the outskirts of the village. The ahirs (the milk men) who are rather engaged in cattle rearing and grazing find it more convenient and suitable to live at the outposts of the village in order to be nearer to the grazing grounds and the supply of water for their livestock.

The caste system generates centrifugal force while the feeling of clan solidarity or family associations generates centripetal forces and results in the development of a particular pattern in which the members of the clan or family not only flock together but build back to back or front to front houses. The back to back houses may have a common door for inter-communication. Such a pattern develops from considerations of safety. The front to front houses are constructed for developing a greater measure of inter-communication between one household and the other.
REGIONALIZATION OF SETTLEMENT PATTERNS

I. THE GANGA-YAMUNA DOAB

In order to have a clear view of the different settlement patterns in the Ganga-Yamuna Doab, four sample areas having different terrain have been selected from the different parts of the region. One sample has been taken from Dehra Dun district to represent the Sub-Himalayan Region, the second from Ghaziabad district representing the Upper Doab, the third from Farrukhabad district which represents the Middle Doab and the last one from Fategpur district which represents the Lower Doab region.

(a) The Sub-Himalayan Region

The Dun Valley has a variety of settlement patterns. Scattered villages lie all over the valley. Almost every village is developed around some nucleus. The dwellings are found adjacent to each other. The paths are so narrow that they do not allow more than one bullock cart to pass. The layout of the whole village has resulted from the gradual addition of the houses according to the needs of the people, as a result of which the lanes are narrow and winding and do not show any kind of symmetry or shape. Govindwala and Partinagar, are the typical examples of such a pattern of settlement in the Dun Valley. This pattern may be said as irregular or amorphous in nature.
In the dry basins of the rivers which are seasonally flooded, dispersed farm homesteads are found. Here enough land is available for crop cultivation. The cultivation of crops is dependent on rain water. The homesteads are situated on raised grounds above the fields which are seasonally flooded.

In the Dun Valley all along the canals and roads, the development of the linear pattern is the most characteristic feature of the region. Throughout the entire valley linear villages can be recognised along the roads and canals. The canals provide a good source of water supply not only for agricultural purposes but also for domestic requirements as well.

Thus linear pattern of villages is the characteristic feature of the whole Dun valley. The linear pattern has been successfully developed along the seasonal streams, canals, roads and cart tracks. Kunja Grant, Aduwala, Shahpur, Ramgarh, Dhalipur, Dhakrani, Gangbhawa Basoli, Haripur, Herbatpur, Hambagh, Fatehpur and Bairagiwala provide suitable examples of linear pattern (Fig.16)

On the slopes of the Mussoorie range which forms the northern boundary of the Dun Valley scattered villages and hamlets are found. The settlements assume the shape of a ladder and are described as the ladder pattern.
With the above analysis it is clear that the linear pattern of settlement dominates the entire Sub-Himalayan Region. On the hill slopes the number of houses decreases with an increase in elevation. Water is the dominating factor responsible for the location of the settlement.

(b) The Upper Doab

In the Upper Ganga-Yamuna Doab one comes across different varieties of settlement patterns. The Khadar lands of the Ganges and the Yamuna rivers have developed linear pattern. Inayatpur Alampur, Bhagwantpur, Mukimpur, Muhammad Shakarpur and Abdulapur in Ganga khadar provide suitable examples of linear pattern (Fig.17). On account of floods dispersed linear pattern is developed.

In the Ganga-Yamuna Interflue the Bhanger lands rectangular, squared, chessboard, radial and amorphous patterns have flourished. The houses have east-west orientation so that they may enjoy the benefit of sun shine. The main streets run East to West and are crossed at rightangles by North and South streets. Dotai, Atseni are the good examples of chessboard pattern while Jharina provides an example of rectangular pattern (Fig.17). Although various patterns of settlements are visible in the Upper Doab region yet the most pronounced pattern is that of rectangular/
grid

squeezed plan. Most of the villages in the Upper Doab region come under this category. The rectangular/grid plan has been successfully developed from North to South in the Upper Doab region.

(c) The Middle Doab

In the Middle Doab region scattered linear hutment pattern is also observed in the khadar areas of the Ganga and the Yamuna rivers. These hutments are rather temporary or permanent and are locally known as Nanglas especially in the Ganga khadar. Most of the Nanglas are flooded during the rainy season and are surrounded by flood waters of the Ganga and its small rivulets. People living in these areas lead a very hard life. Mostly the villagers travel on foot for long distances for marketing to places like Kaimganj, Kampil, Farrukhabad, Kamalganj and Kannauj.

Physical factors such as relief, soil and water have caused the dispersion of land resources - the base of agriculture. Consequently there is a dispersion of settlements. Dharampur, Nurpur, Chakharia, Sanauli, Hazju Nangla, Punthar, and Nunera are some of the notable examples of the scattered linear hutment pattern (Fig.18).

In the Bhanger lands mostly the settlements have rectangular-amorphous layout. Raipur, Hamidpur, Atalpur and Mau Rashidabad provide the typical examples of such pattern. (Fig.18)
SETTLEMENT PATTERN IN MIDDLE DOAB REGION

INDEX

POND
ROADS
RAILWAY
SETTLEMENTS

SOURCE: SURVEY OF INDIA SHEET No. 54 M/6

FIG. 18
In the Ganga-Yamuna Interfluve the general pattern of settlements is rectangular or amorphous throughout the entire region as a whole. Thus in the Middle Doab generally the rectangular and amorphous pattern is found.

(d) The Lower Doab

In the Lower Doab region semi-circular and amorphous pattern is developed in the northern Bhanger lands. In the rest of the area in Ganga and Yamuna khadar scattered linear hutment pattern is the characteristic feature.

The mushrooming of ponds indicates the ever changing channel of the Yamuna river and ponds are the remnants of the oxbows. The ponds in the area play an important role in the formation of settlement patterns in the region. Circular or semi-circular pattern has been developed around the ponds. The settlements like Ahmadganj, Rari, Ekdala and Godha provide the typical examples of the circular pattern, while Kachhra, Barar, Ghazipur, Dhana, Deulatpur may be cited as suitable examples of the linear pattern (Fig.19) Physical factors specially the Yamuna river’s regime decides the settlement pattern in the region.

Thus it is clear from the above closeup study of the settlement patterns in the Ganga-Yamuna Doab that the linear, rectangular-grid, rectangular-amorphous and semi-circular and amorphous patterns have been well developed within the region (Fig.20)
DISTRIBUTIONAL PATTERN OF SETTLEMENTS

Robert Hammond and Patrick McCullagh have suggested a technique to measure the degree of dispersion (or concentration) of a point distribution in relation to Dispersion about the Median (or mean) centre. This can be measured by a spatial equivalent of an interquartile range. The spatial equivalent of a quartile is called a quartilide which is a line dividing a distribution in the ratio of three to one (i.e., three quarters on one side and one quarter on the other). It will be seen from Fig. 21 that \( M \) is the Median Centre and \( EQ, SQ, WQ \) and \( EQ \) are the northern, southern, western and eastern quartilides of distribution. The area of the rectangle enclosed by the four quartilides is a measure of the dispersion of the distribution about the centre, a large area means considerable dispersion, a small area means concentration near the centre.

It is possible to derive a simple index (\( Id \)) ranging from 0 (maximum concentration to 1 (maximum dispersal) which is independent of the size of the area over which points are distributed. This can be obtained by dividing the area of the quartilide rectangle (\( Q \)) by the total area (\( A \)) of the unit containing the distribution. Thus

\[
Id = \frac{Q}{A}
\]

A uniform distribution will have a quartile rectangle with an area of about a quarter of the whole distribution and will have an index of about 0.25.

In order to analyse the distributional pattern of rural settlements in the Ganga-Yamuna Doab the above technique has been employed. Four sample areas have been selected from the Ganga-Yamuna Doab for applying the technique of dispersion from the Median Centre. The four selected areas belong to contrasted terrain and climatic zones, with the help of the above mentioned formula the results have been tabulated in (Table 5).

Table 5
Index of Dispersion

<table>
<thead>
<tr>
<th>Sample Area</th>
<th>District</th>
<th>Region</th>
<th>Area of the Quartilide (A)</th>
<th>Total area of the Unit (A)</th>
<th>Index of Dispersion (Id)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Dehra Dun</td>
<td>The Sub-Himalayan Region</td>
<td>5.06 sq. km.</td>
<td>25 sq. km.</td>
<td>0.20</td>
</tr>
<tr>
<td>B</td>
<td>Meerut</td>
<td>The Upper Doab</td>
<td>9 sq. km.</td>
<td>36 sq. km.</td>
<td>0.25</td>
</tr>
<tr>
<td>C</td>
<td>Farrukhabad</td>
<td>The Middle Doab</td>
<td>12.20 sq. km.</td>
<td>36 sq. km.</td>
<td>0.33</td>
</tr>
<tr>
<td>D</td>
<td>Fatehpur</td>
<td>The Lower Doab</td>
<td>7.83 sq. km.</td>
<td>36 sq. km.</td>
<td>0.22</td>
</tr>
</tbody>
</table>

Source: Based on the computation of the author.
DISTRIBUTIONAL PATTERNS OF SETTLEMENTS
(SAMPLE AREA DEHRADUN DISTRICT)
(SUB-HIMALAYAN REGION)

FIG. 21

SOURCE: SURVEY OF INDIA
SHEET NO 53H

1000 500 0 1000 METRES
It will be seen from Table 5 that in Sample area A of Dehra Dun district the (Id) is 0.20 which shows the maximum concentration from the Median Centre. In the east there is much concentration while in the west there is relatively less concentration (Fig. 21)

In Sample area B which belongs to Meerut district there is a uniform distribution, as the Index of dispersion (Id) is 0.25. This region has a quartile rectangle with an area of about a quarter that of the whole distribution (Fig. 22)

The third Sample area C of Farrukhabad district shows a tendency towards dispersion in comparison to the above mentioned areas. Here the Index of dispersion (Id) is 0.33 i.e. approaching to dispersion about the Median Centre. In the west the dispersion is thus much greater (Fig. 23)

Lastly the fourth sample area D of Fatehpur district shows the Index of dispersion (Id) as 0.22 which is nearer to the uniform distribution. Here the dispersion is much greater from the Median Centre than in the East (Fig. 24)

BEST FIT ANALOGICAL APPROACH

Cole and King have suggested a make shift way of describing distributions verbally. This is usually done either by
DISTRIBUTIONAL PATTERNS OF SETTLEMENTS
(SAMPLE AREA MEERUT DISTRICT)
(UPPER DOAB REGION)

LOCATION

SOURCE: SURVEY OF INDIA SHEET No 53

FIG. 22
DISTRIBUTIONAL PATTERNS OF SETTLEMENTS
(SAMPLE AREA FARRUKHABAD DISTRICT)
(MIDDLE DOAB REGION)

SOURCE: SURVEY OF INDIA
SHEET No 54\(^{M} \) 6

FIG. 23
DISTRIBUTIONAL PATTERNS OF SETTLEMENTS
(SAMPLE AREA FATEHPUR DISTRICT)
(LOWER DOAB REGION)

SOURCE: SURVEY OF INDIA
SHEET No 63 G/2

FIG. 24
quick analogy with some familiar object or with some descriptive words.\textsuperscript{19}

In order to apply this approach four sample areas have been selected from the Ganges-Yamuna Doab. They are from Dehra Dun, Meerut, Ferozepur and Fatehpur districts (Fig. 25).

It is rather interesting to note that the distribution of settlements in the Doab is such as it can be compared to the shape of distinct animals, if these settlements are looked from a distance. These settlements fit the shape of elephant in Dehra Dun, camel in Meerut, goat in Ferozepur and rabbit in Fatehpur districts (Fig. 25).

The success of a verbal description of a distribution could be measured by its adequacy as a basis for its reproduction by any other person who has not seen it.\textsuperscript{20}

Thus within the Ganges-Yamuna Doab great elephant, camel, goat and rabbit patterns have been developed in the Sub-Himalayan Region, the Upper Doab, the Middle Doab and the Lower Doab respectively.


\textsuperscript{20} Ibid.
ANALOGICAL PATTERNS OF SETTLEMENTS IN GANGA-YAMUNA DOAB

(SAMPLE AREA DEHRADUN DISTRICT)

(SAMPLE AREA MEERUT DISTRICT)

(SAMPLE AREA FARRUKHABAD DISTRICT)

(SAMPLE AREA FATEHPUR DISTRICT)

FIG. 25