UNIVERSAL
LIBRARY

PLANNING
INDIAN TOWN AND COUNTRY
IN THE INDUSTRIAL AGE
(With Sketches, Diagrams and Statistics)

B. N. CHAUDHURI
B.E., A.M.I.E., M.R.S.I. (Lond.),
Chartered Engineer.

Foreword by
PROF. RADHAKAMAL MUKERJEE, M.A., Ph. D.
Head of the Department of
Economics and Sociology, Lucknow University.

THACKER SPINK & Co. (1933) Ltd.
CALCUTTA.
1944

Published by
Thacker Spink & Co., (1933) Ltd.
Calcutta.

Price Re. 1/8/-

Printed by A. K. Bose,
At The Calcutta Printing Co., Ltd.
Calcutta.

FOREWORD

I am honoured by the request to introduce this original and interesting brochure on Town and Country Planning in India in a scheme of Post-War re-construction.

The author is a well known engineer and planner who has given much thought to the social and economic side of Indian village and city development and re-construction. Many industrial towns in India, such as Cawnpore, Ahmedabad and Calcutta, have grown from 80 to 100% during the last decade,—creating some of the worst slums in the world with profound effects upon insanitation and mortality,—especially infantile and maternal mortality. Industry also has been ill served, because of its being compressed between road and rail communications, that allow no space to expand. On the other hand, as industry grows,—it encroaches upon built-up residential areas steadily and gradually, extending its blight of social and moral deterioration. Traffic congestion in a city like Calcutta has now become appalling. During the working hours of the day, buses, trams and trains are so crowded that the passengers have to stand journeys which are fatiguing, while disease comes easy due to habits of uncleanliness. A few towns like Calcutta, Cawnpore and Bombay have their Improvement Trusts and Corporations, but there has been hardly any attempt towards systematic slum clearance, industrial zoning and development of suburbs in relation to the system of communication and functional arrangements of the cities.

There is need to-day of decongesting the existing industrial towns and of establishing new towns along both the arterial lines of communication and in the rural areas for utilising the stay-at-home labour for industrial development. In England, as a result of the Barlow Commission Report the industries of the London regions will be systematically dispersed and re-distributed, and an entirely new system of industrial orientation will eliminate the social, economic and strategic danger of the present urban or suburban sprawl.

Mr. Chaudhuri has vividly described some of the recent Western approaches to the solution of the problem of town planning that re-pay perusal by every social reformer, architect, engineer and town planner.

As important as the problem of the congestion and haphazard growth of the town is that of undirected and rapid development that has led to a profound lack of balance between town and village in India. Mr. Chaudhuri rightly insists that the real big task of planning in India is to commence in her villages, which traditionally have been built on sites that are often more suited for cultivation than for building purposes. The Bombay Plan envisages a big scheme of national housing for which Rs. 2,200 crores have been provided. Such a plan must have to be dovetailed with the scheme of industrial decongestion and redistribution, associated with the extension of electric power in the rural areas, that will give new opportunities for the development of agricultural industries and handicrafts in small towns and villages.

Indian industrial planning of the future will rest more on the new technical and social efficiency of the small town and village than on the organization of the existing big towns and cities, more on the utilization of idle and semi-idle labour in agriculture and village industries than on its migration to the existing factories and workshops. This would also involve the development of rural light railways, trams and buses and of water borne traffic and the use of bicycles on a scale met with in Holland, Czechoslovakia, Southern Germany and Japan. It is this alone that can give peace and security to the demobilized soldier and smooth the transition from war to peace-time industrial economy by absorbing the unemployed in the rural areas. Plans of model small towns, villages and cottages are, therefore, essential in order that the feverish tempo of post-war planning may not catch us sleeping.

Civilization, generally, conceived, previously, of two types of living and habitation, *viz.* urban and rural. Electricity, radio and modern communication and transport have in this age ushered into existence another semi-rural type of habitation, where many industrial enterprises may be undertaken with modern efficiency and where man can still remain in intimate touch with the land and with the primary groups that have moralised and socialized them through the ages. In the future, Indian civilization will be re-born not in the village but in this third type of habitation, the rural-urban centre, which will be the locus of a culture that will combine the mechanical and technical achievement of modern science and technology with

the social virtues of an ancient historical civilization. It is the duty of the sociologist, the industrialist and the town planner to speed up this rebirth.

RADHA KAMAL MUKERJEE,

Head of the Dept. of Economics. and Sociology.

The University, Lucknow.

The 17th September, 1944.

PREFACE

India is looking forward to a planned progress in all fields of national activity in the post-war age. Industry, Agriculture and Education have attracted the notice of Indian leaders and governments. The problem of Country and Town planning, however, has not been given the attention it deserves.

In these pages, the principles and problems of building healthy towns and villages, where teeming millions of India may live a life worthy of human beings, have been discussed. The writer will feel grateful if this humble attempt stimulates public interest in this important subject.

A portion of this brochure was published in the "Current Thought," a cultural quarterly published from Calcutta.

I am deeply indebted to my friends Prof. Nirmal Bhattacharya, M.A., B.L., Mr. R. R. Sinha, B.E., P.A.S.I. (Lond.), and Mr. P. C. Neogi, B.E., M.I.E., I.S.E. for material help I have received from them, and also to Prof. Radha Kamal Mukerjee for writing a foreword to this booklet.

June, 1944 B. N. C.
Calcutta.

CONTENTS

SKETCHES AND DIAGRAMS

PLANNING

INDIAN TOWN AND COUNTRY

IN THE INDUSTRIAL AGE

The growth of industry in the present century has been phenomenal, and things have been moving so quickly that there has been no time to think out the best methods of arranging for the new type of life and habitation which industrialism has brought into being. The result is that the towns have grown at an unprecedented rate. Buildings have been put up in any odd spot and dwellings have been packed with people wishing to live in close proximity to the centres of employment and business.

Prosperity of trade and commerce in towns is instrumental in providing electric light, water supply, sanitation, educational facilities, amusements and other social amenities, considered indispensable for modern civilization, within the reach of all classes of people. Amenities of modern life and facilities of earning one's livelihood lure people to the towns from their less congested but unhealthy living in villages, though, frankly speaking, the living condition of the people in town is anything but satisfactory.

But in spite of unsatisfactory living conditions in town, people continue to come to towns searching for a career. The result of this migration is the cause of the depopulation of villages and overcrowding of the already congested towns.

As soon as the people were aware of this evil, a movement with a slogan 'Back to the villages' was started by some social reformers. Instead of investigating into the real causes behind this depopulation of villages, which were mostly economic, attempts were made to improve the villages merely by introducing anti-malarial doses and public health measures such as water supply, drainage, etc.

The results are well known. Neither the villages became populated again nor was malaria driven out. The towns began to grow in volume and swallowed their neighbouring villages, converting them into suburbs. In course of time these suburbs also became badly congested, and living conditions became more unsatisfactory in the suburbs, in the absence of many town amenities. But people were satisfied, so long as they could live close to the centre of their economic pursuit.

The lesson of 1941 exodus from towns to villages made this point very clear. The townsmen sent away their families to distant country but were forced to bring them back to the danger zone of bombing, after suffering and experiencing the trouble and hardship of country life. Day by day the situation is becoming very acute, with the influx of people to town. The result is disastrous both for the town as well as for the country.

It is a well known fact that town and country are not two different units for living but one. One must live for the other; and *vice versa*. There is a good deal of difference in physical characteristics

between a town and a country. The mingling of these physical features tend to satisfy the need of the people. This means,—in a town residence, the people crave for a rural touch by placing their villas in a garden, whereas in a country residence people hanker for all the amenities that a modern town offers. Though the proposition seems so simple, it is really not so in its practical application. The main obstacle in providing a good sized building plot in an existing town is the high cost of land and the cost of providing amenities such as drainage, water supply, electricity, gas, road work, etc. This results in minimising the size of the building plots as much as possible, so that the total price of land in residential quarters may remain within the reach of average middle class people; even then land value in a town remains at a very high level. Due to the growth of industry and commerce in towns, it is natural for people to come to towns to meet the demands of trade.

In the absence of a definite scheme for expansion and of zoning laws, location of industry in residential quarters is a common sight. Shops in areas which are more suitable for other purposes, educational institutions in environments which are most unsuitable for the students,—this sort of chaos or mis-placement grows *parri passu* with the density of population.

Rate of Urbanisation

At this stage it will be interesting to have a look at the census figures to fully understand the growth

of urbanisation, with the industrialisation of our country.

In 1931 number of big-size towns in India was 2,575 and in 1941, the number increased to 2,703, *i.e.*, an increment of 5% only. Whereas the increment of urban population was from 38,979,211 in 1931 to 49,696,053 in 1941, *i.e.* an increment of 27.5%. The latest census of 1941, showing the population of India as 388,997,955, records an increase of 15.2% of the 1931 figure. In 1921, the percentage of urban population was 10.2 only. In 1931 it became 11.1% *i.e.* an increase of .9% in 10 years, but in 1941, it became 12.8. This means that during this time the rate of increase was double that of the previous period. In itself this figure of 1.8% appears to be insignificant. But when the total population of India with its small number of towns, together with the rate of increase of population in important towns, is considered the gravity of the situation will be apparent. It can also be assumed that during next ten years the percentage of urban population will soar much higher up.

In this race for increase of urban population, Cawnpore stands first with an increase of 99% to her credit.

	% of Increase since 1931	Population (1941)
Cawnpore	99%	437,000
Ahmedabad	88%	591,000
Calcutta proper ...	81%	2,108,891
,, including Howrah	67%	2,488,000
Hyderabad	57%	733,000

	% of Increase since 1931	Population (1941)
Lahore	56%	672,000
Patna	48%	176,000
Amritsar	48%	391,000
Nagpur	45%	302,000
Allahabad	41%	260,000
Lucknow	39%	387,000
Karachi	36%	360,000
Bangalore	33%	407,000
Madura	31%	239,000
Bombay	28%	1,490,000
Benares	28%	263,000
Delhi	23%	522,000
Agra	23%	284,000
Madras	20%	777,000

The above figures establish the fact that our industries are growing mostly in already congested towns, and the main reason behind such growth is the availability of 'power' or electrical energy and other facilities.

Electrification

In India, leaving aside the case of 655,892 villages, out of 4,223 eligible towns only 17% are electrified and 83% are not electrified. The following figures will be found illuminating:

No. & percentage of electrified towns:
(British India & States)

	No. of electrified town.	Percentage of electrification
I Towns with population above 100,000 ...	57	100%
II. Towns with population between 50,000—100,000	85	90%
III. Towns with population between 20,000—50,000	233	72%
IV. Towns with population between 10,000—20,000	152	21%
V. Towns with population between 5,000—10,000	188	6%

Taking the case of the province of Bombay, it is found that out of 304 towns, with population above 5,000, 68 towns only or 22.4% are electrified; and in Bengal out of 716 towns with population above 5,000, only 56 or 7.8% are electrified.*

This accounts for concentration and development of industries in or around the principal towns of India, where abundant power energy is available.

Now if the supply of electrical energy can be well spread over India, by means of suitable electrical grid system, then many industries can be established near the source of supply of raw materials.

Preliminary Survey

So to check further congestion of the existing towns and prevent unusual influx of population, the

*Vaidya on Planning for Postwar Electric Power (Inst. of Engr. Journal Dec., 1943.)

first step would be to create an Electric Grid system on an all-India basis. An Industrial and Economic Survey of the country, for the purpose of fixing the location of different industries, with reference to the climate, soil, mineral resources, availability of raw materials, etc., is also urgently needed.

Such a survey might outline the scheme of communication to all the centres of Industrial and Administrative importance.

At a conference of the Chief Engineers of the Provinces and States in India held at Nagpur in December 1943, the problem of post-war road development was discussed and a few recommendations were made, defining classification of different types of Roads and Highways. They are to be divided into four classes.*

Road Classification

(*i*) National Highways, to traverse several Provinces and to be of National importance for strategic, administrative and other purpose. National Trails for developing and opening up large tracts, deficient in communication.

(*ii*) Provincial or State Highways to serve as main roads of a Province or State.

(*iii*) District Roads to take traffic from main roads to the interior of each district.

---

*Post-war Road Development in India. Proceedings of the Chief Engineers' Conference, 1943.

(*iv*) Village Roads, to be designed and constructed for serving cultivation and as farm tracks only.

National and Provincial Highways and major District Roads are to be provided with a durable hard crust of 10—12 feet width, on a minimum formation width of 32 feet for Highways and 24 feet for District Roads, in plains. Village roads are to have a minimum formation width of 12 feet. Bridges (linear waterway over 20 feet) should have a minimum of 20 feet clear between wheel guards for Highways and major District Roads. It is estimated that the total approximate length of hard crust roads is to be 147,000 miles and that of earth roads (including soil-stabilized roads, trackways and trails) 253,000 miles, as against existing mileage of about 79,000 and 163,000 respectively, a large proportion of which is at present neglected.

Unfortunately in our country, roads were considered as competing with the railway system with the result that they were not really developed to the extent they ought to have been. The present war clearly demonstrated the necessity of a system of roads working as alternative routes to railway communications. This change of outlook in road planning will surely tend to place our towns and villages in closer interdependence with each other.

As soon as the broad basis of road planning and location of industries are determined the next step will be:

(*i*) to decongest the existing towns by creating satelite towns on the border and also by making surgical operation in the heart of the town,

(*ii*) to establish new towns on some pre-determined principle, taking into consideration the lessons of the past.

Requirements of a township

In trying to determine the principle on which a town or city planning is to be based, it is found that the major factors to be considered in this respect are to secure: *

1. Convenience and general efficiency of means of communication including waterways, railways, highways and streets.

2. Adequate facilities for development of industries and all economic activities, including the co-ordination of industry with the means of communication; the reservation of the most suitable sites for factories; planning of sites in relation to the places of residence and creation of healthful conditions for employees.

3. Wholesome housing conditions and pleasant surroundings for dwellings, including the restriction of densites of residential and other buildings and of areas for residences of different character; the development of good sanitary conditions and the reservation of adequate open space for recreation.

*Outline of Town and City planning by Adams.

4. Classification and zoning of land in harmony with the best economic use of the land for building or open development.

5. Orderly arrangement and design of building and other structure and maintenance of ample space for light and air about buildings.

6. Development of appropriate civic, transportation and cultural centres and sub-centres in relation to the system of communication and functional arrangement of the city.

While some of the problems, mentioned above are solved strictly on functional lines, the difficulty arises with the question of housing condition, surroundings and its design.

The roads, railways, industrial developments are all designed to maximum efficiency for serving people. They have a definite goal or purpose and the design is controlled strictly by such purposes. Unfortunately, there is no such fixed standard for the houses. They are designed to meet individual taste and requirement. Though in other sphere of our social life, the individual has to obey some codes of practice, he is absolutely free to build his house according to his own standard of taste and requirement. From time to time certain building bye-laws are enforced by City Corporations but we know how useless those bye-laws are. They have not been able to stop the present day chaotic state of our city housing conditions.

Social reformers and political leaders from time to time, have tried to improve the condition, either by enacting some laws preventing further growth of towns, or by establishing an Improvement Trust, to open up some space in the city. Such action is of the nature of patch work, and does not aim at a radical cure of the disease.

Satellite Towns

A few leaders and reformers, understanding the situation, have suggested the creation of Satellite towns, near the main city on Garden City principle.

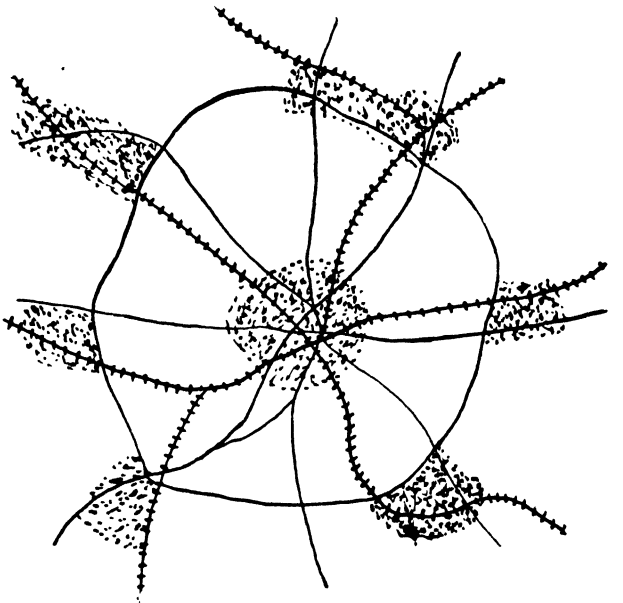

FIG. NO. 1. Satellite Town Arrangement. The principal town is at the centre, with a surrounding green belt of cultivation, forests and parks. Satellite towns are situated beyond this green belt and connected with the centre of the main town by railways and speedways.

The most notable among such leaders of thought, was Ebenezer Howard, who in 1898 published a book 'To-morrow'. It was a romantic appeal to the people for going back to land. He envisaged a Garden City where houses are all set in a garden, fully equipped with sanitary conveniences and the density is to be only fourteen houses per acre. In 1900 Mr H. G. Wells in his prophetic 'Anticipations' regarded the breaking down of the town-country anti-thesis as both inevitable and desirable. He was sure that by a process of confluence, the whole of the country-side was destined to become an urban region but at the same time there would be horticulture and agriculture going on within the urban regions and 'urbanity without them'.*

Garden Cities

The result of these publications ushered in the formation of a company in 1901, to undertake the construction of the first garden city in England. This garden city of Letchworth about 34 miles from London was planned by Sir Raymond Unwin and Barry Parker. An area of about 3,800 acres, formed the nucleus of the new garden city. The main principles on which the planning was done, were as follows.†

(*i*) A density of not more than 12 houses per acre

(*ii*) The houses were either of the detached and semi-detached type.

---

*Town Planning by Thomas Sharp.

†Town Planning in Practice by Sir Raymond Unwin.

(*iii*) All buildings are set well back from the street.

(*iv*) A good road width flanked with trees and grass sward.

This first experimental garden town, probably would not have been a success but for publication of a book 'The example of Germany' by Mr. Horsfall, first published in 1904. This book showed how in Germany, this problem of rapid development of towns had been dealt with on lines, akin to those advocated by Mr. Howard.

This movement gained a certain amount of success. A few more garden cities such as Hamstead Garden suburb, Wellwyn etc., were established following the example of Letchworth. A certain number of industries and factories were also established in this development. But it soon became apparent that rigid adherence to the rules of garden city development could not bring about the economic success aimed at. A house set in a garden is a tempting idea no doubt, but successful maintenance of the said garden is a problem for the owner. Each holding about 30′ × 100′ ft. in depth with fifteen to twenty feet front garden and thirty to forty feet kitchen garden at the back may sound correct theoretically, but the feasibility of the scheme from the standpoint of economic and practical consideration, will be found doubtful. There cannot be one universal key to the solution of the problem, which is variable with locality, climate and habits of the people.

Modern Dynamic Age

With the advent of the modern transport age there is another notable change and that is in the tempo of our life. The growth of industry is also taking place much more rapidly than it used to do at the beginning of this century. Motor car, Electricity Aerial transport, Radio and Telephones have brought about a revolutionary change in the mode of our life.

During working period, in this machine age our life is dynamic, be it in the business premises or in factories. To have the full benefit of this dynamic condition, to attain the maximum speed for efficiency, it is imperative for human being to have some static period of rest and relaxation, in as peaceful a surrounding as possible. It is there, where the rural touch comes to our rescue.

Ribbon Development

To avoid the din and bustle of the city during relaxation period, whoever can afford, can drive out of the town along the main road, stop in the country to pass his night just beyond the town limit. This practice, within a surprisingly short time, creates a development,—which goes by the much accused name of ribbon development. This ribbon development definitely creates congestion of traffic the main approach to the town, encroaches on agricultural and grazing ground around the c and affect the quality and quantity of vegetable sup of the city. But, however ill we may speak of this development, it is no good denying the fact that

most of our towns have grown bigger in size by this process and intensity of congestion has increased.

Classification of Town and Country

What then is the solution of this problem? Is there no way out of the present chaotic state of our towns and villages? Prof. Patrick Geddes, the great sociologist, was the first to direct attention to the need of classifying and studying the function of the several components of the regions. According to him, there are three classes:

(*i*) Primary: those that produce first hand human necessities such as the agricultural villages, fishing villages or the manufacturing town;

(*ii*) Secondary: those that act as head-quarters for exchange, marketing, ware-housing, exporting and importing of goods;

(*iii*) Tertiary: those that provide residential, recreational restorative or educational facilities.

This is a very broad classification and it is apparent that a region of pure type as per classification, is practically rarely to be found. Regions are mostly of mixed type. It is in the assessment of the predominance of function that the value of this classification consists. Prof. Geddes had also postulated the requirements of town according to the classification of place, work and folk. Geddesian

theories about towns, are brilliant, no doubt, but it is more true from the standpoint of a sociologist than from the view-point of a practical planner.

New Experimental Measures

For the solution of the problem, we have to enumerate the fundamentals that guide the function of towns and villages. We have to forego or to relegate to a minor place our age-old ideas about picturesqueness. We are to aim at function, order and efficiency. The biggest mistakes that we are apt to commit, are to agree to carry on with the present method of a little tidying up here and there, the widening up of an existing street or opening up a new one in a congested place. To a certain extent, these costly palliatives do improve the existing conditions. A classic example of this kind, of bringing an old town up-to-date was done by G. E. Haussmann, Prefect of the Department of Seine in the middle of the last century. He opened up admirable avenues through the heart of Paris with wonderful foresight. But, unfortunately, the bold and determined action of Haussmann, backed by his Royal Master, cannot be put into action now. The conditions have changed.

Different nations have tried to solve the problem in different ways. The geometrical pattern of road planning adopted by Haussmann, in his reconstruction of Paris, was also followed by Germany, till the publication of "Der Stadtebau" by Camillo Sitte in 1889, when the character of German town planning made a marked change. The example

of the town planning of Cologne may be cited as an instance of work during the transitional period, done with characteristic German thoroughness.

Zoning

Germany was the first country to introduce the zoning system,—by which in different parts of the town, the buildings were limited in the number of their stories, the amount of ground they could cover, and the use to which they could not be put. America also adopted the zoning system, as the creation of sky-scrapers due to high cost of building land there, produced a problem very complex in nature, and difficult of solution. Mr. G. B. Ford, Late General Director, Regional Plan Association, New York, in his book "Building, Height, Bulk and Form" has very ably discussed the problem of zoning with particular reference to tower buildings so common in American cities. After comparing and analysing zoning laws of the cities of New York, Pittsburgh, Chicago, etc. he has made a definite recommendation, for (1) height, (2) inner courts, (3) rear yards, (4) outer courts, (5) side yards, (6) step-backs for office buildings, apartments and garden apartments. America started with rectangular plots with road-ways at right angles to each other, forming a grid iron system of streets as done in Chicago. Later on radials or diagonal roads were introduced to relieve the monotony of grid iron streets and to effect economy and efficiency of movements.

Parkways

Though the American sky-skrapers, brought about a new type of congestion, they tried to compensate

the evil by introducing Park system; that is to say the working up of parks, playgrounds, open spaces and boulevards into an organised plan. The relation of

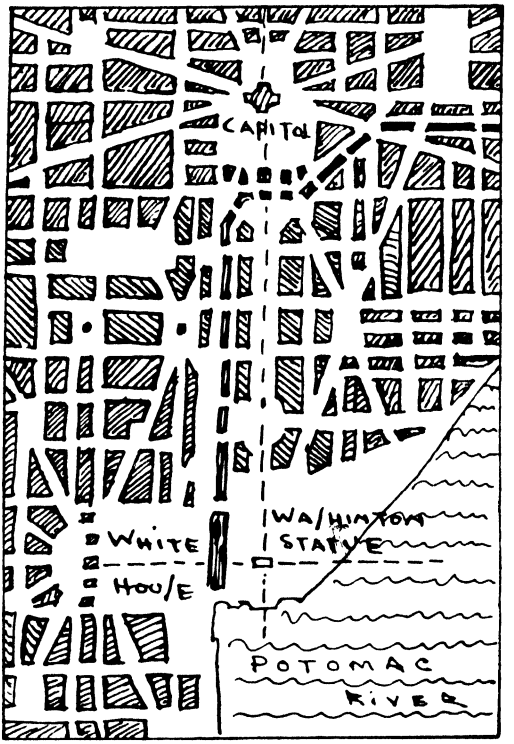

FIG. NO. 2. L'Enfants' plan for Washington done on primary street planning on a new site. The sites of the two main buildings the Capitol and White House were fixed first and a series of Avenues radiated therefrom.

open spaces to the number of population and linking them up together into a system and connecting the country by means of radial parkways and finally the safeguarding of a reserve of wild country

are all features of the typical American system. The idea was also developed regionally as at Boston, where the Metropolitan Park Commission extends over 38 neighbouring cities and towns and include 15,000 acres of parks and 25 miles of parkways. Different views have been held as to the planning of the park system. In Vienna, we find concentric belts of parkways whereas American cities have added radial park space gradually widening towards the country. The diagram shows how such a scheme would work in with a radial road system.*

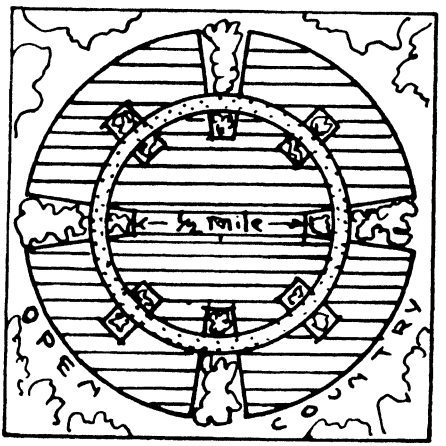

FIG. No. 3. Pepler's Park diagram with ring and radial system 1/5 of the town area.

One Hundred Towns

Collecting all the ideas of different nations, Mr. Trystan Edwards published a small book 'A Hundred New Towns for Britain.' The plans illus-

*Town and Country Planning by P. Abercrombie.

trate (Fig. No. 4—6) a new type of organic town in which each functional zone is capable of infinite expansion. Sky-scrapers, cottages and other intermediate types of buildings have all found place in these schemes. Mr. Edwards presumed that each town would have

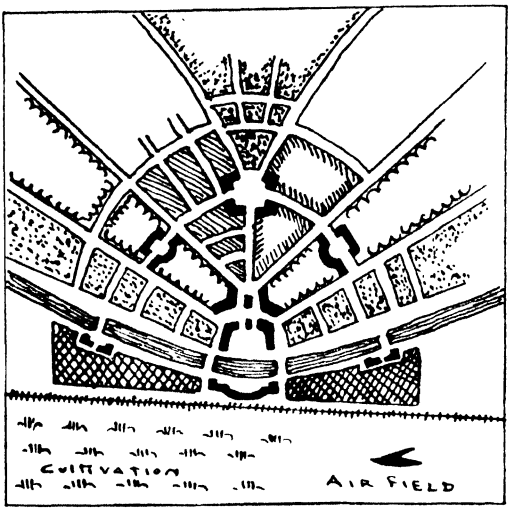

FIG. NO. 4. A new town on the bank of a navigable river with a railway line close by. The Industrial zone is placed between the railway line and river, and the residential zone on the other side of the river bank.

(*a*) Residential zone . . . shown dotted
(*b*) Tall tower building . . ,, solid
(*c*) Market zone . . . . . ,, side hatched
(*d*) Commercial zone . . . ,, fully hatched
(*e*) Industrial zone . . . ,, cross hatched
(*f*) Recreation zone . . . . ,, flowery border
(*g*) River . . . . . ,, paralell line
(*h*) Air-Field . . . . . ,, indicated by bird
(*i*) Cultivation . . . . . ,, ,, ,, tufts
(*j*) Historical and reservation sites . . . . . ,, by cross ×

about 50,000 inhabitants and one hundred such towns would cover only 1/200th part of Great Britain. He

contends that by such a project of urban development not only would existing town be relieved of congestion but the country-side would also be more easily preserved. The scheme of Mr. Trystan Edwards is probably the largest of town planning schemes ever proposed in a country and it might at first sight appear to be purely academic in character devoid of all practical utility. But on a perusal of his skefches,

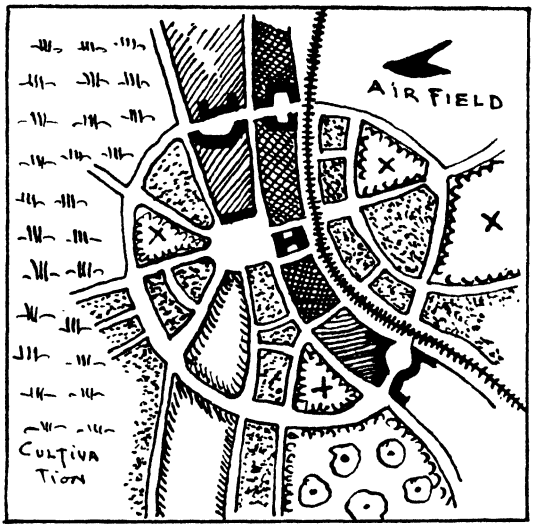

FIG. NO. 5. A new town with some pre-determined features such as temple, historical ruins etc.

one may feel that his suggestions, are clear, logical and practical. The relation of different zones, in his town-planning scheme are very clearly indicated. If some of the new towns are built on lines as sketched out by Mr. Edwards one is sure to find them much more comfortable to live in than our present-day towns and cities.

Professor Patrick Abercrombie, one of the most noted authorities on town planning, is also of the

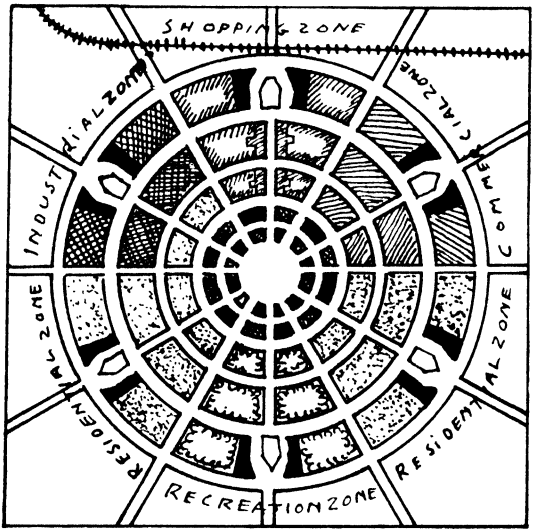

FIG. NO. 6. Another new town on a level site showing radial and ring roads with Residential zones sandwiched between working and recreation zone.

opinion that a couple of dozen real new towns in different parts of the country would be more constructive than a multitude of garden suburbs.*

A very brilliant and bold approach to the solution of the problem of town planning has been made by M. Le Corbusier, a French Architect of international repute.

In his book 'City of To-morrow,' M. Le Corbusier propounds his own theory of a modern town plan. According to him, the vital parts in a town are the

*Town and Country Planning by P. Abercrombie.

streets, the houses and open space, and the most important point is to find out the correct relation of these three parts with respect to each other. The basic principle to be followed are

(1) Decongestion of the centre of cities.
(2) Augmenting the density.
(3) Increment of the means of getting about.
(4) Increment of park and open spaces.

In working on his four main principles, he has created his own standard, much higher than the existing adopted standard in the continent.

Open Space Requirement

Five to seven acres of open space per thousand of population has been the general accepted standard, out of which ½ acre must be provided for children under 14, so distributed that no child should have to walk more than ¼ mile to reach a play space. Of the 5 acres of open space so provided, 3 acres are to be reserved for games and sports ground and 2 acres for parks and gardens. A complete system however should provide for all ages and moods of the population and should progress from small children's playground and town garden through elaborately landscaped parks and open playing fields with their boulevard and footpath connections to the open country.

City of To-morrow

M. Le Corbusiers' scheme is different. He advocates vertical development instead of horizontal

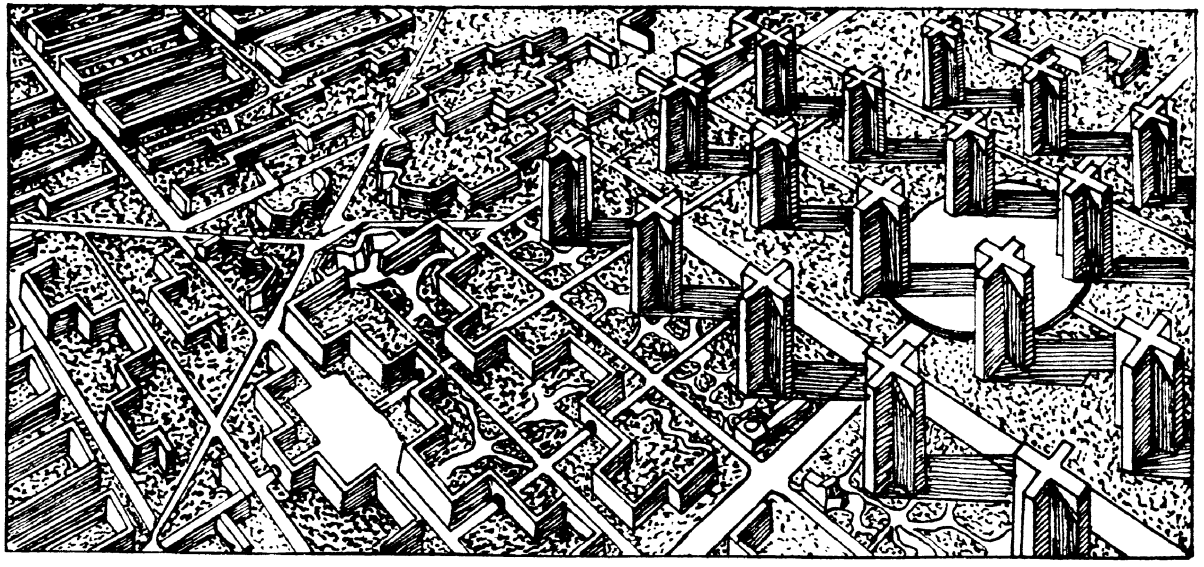

FIG. No. 7. A contemporary city of 3 million population showing sky scrapers, each having a capacity to accommodate 50,000 persons. The residential blocks with set backs, placed in open, covering only 15% area, having a density of 120 persons per acre. Residential blocks on cellular system covering 42% area, also placed farther away from centre, with a similar density.

and for this purpose his important unit is a sky scraper. But this sky-scraper is radically different from the New York type. These tall buildings about 700 ft. high are in the form of a cross and are set about $\frac{1}{4}$ mile apart, surrounded by large open spaces on all sides. These buildings are meant solely for commercial and business purposes and not for residence. There are vast open spaces (2400 × 1500 yds.) occupied by garden, park and avenues. Restaurants, cafes, luxury shops, theatres and garages are all to be housed in these parks.

On one side of the commercial centre are placed the Municipal administrative offices, public buildings, museums, etc. and on the other side, are placed the warehouses and residential quarters on cellular and set back principle.

All round the city is a protected zone of wood and green fields. Further beyond are the garden cities. This Garden City is different from the present-day model of its kind. To arrive at his formulation of the garden city M. Le Corbusier has stared with the classification of population, who are expected to reside in a city. (i) Citizen who work and live in the city. (ii) Suburban dwellers who work in the city and live in Garden City (iii) Mixed sort, who work in the city and bring up their family in Garden City.

The present-day garden city standard, described already, falls short of the purpose from the standpoint of practical difficulty. The alloted area of each holding, worked by individual owner, does not produce sufficient vegetables to meet the need of his

family.) To obviate this difficulty M. Le Corbusier suggests vertical growth (two to three storey) for residence, allowing more space for food crop. He advocates breaking up of barriers, so that a farmer may work on hundred such holdings, making intensive cultivation in a standardised and scientific way. This arrangement will ensure maximum utilization of land and production of fresh vegetables for the citizens all the year round.

Another type of dwelling, advocated by M. Le Corbusier, is in the form of great tenement blocks, about 6-storey high, set in open spaces consisting of lawns, football fields, bathing pool, etc. Each flat has its private garage. These blocks occupy only about 15 to 20% of the ground allotted to the holding; having gardens approximately 400 yds. by 200 yds.

At first glance, this scheme seems fantastic, but on analysis it will be clear that M. Le Corbusier is correct in enunciating the fundamentals of a modern town plan, which demands a sense of movement in general lay out.

To put it in actual shape, such a tentative scheme will have to meet many a compromise. But if we keep the true ideal in view even a compromise in the actual field will conform to a highly satisfactory standard.

Summarily speaking, in M. Le Corbusiers' scheme, it is found that he recommends, a density of 1,200 persons per acre in the sky-scraper or business zone

with 95% of open area and a density of 120 persons per acre in residential zone with 48-85% open area.

As compared to M. Le Corbusier's recommendation, it will be interesting to take into consideration the prewar condition (1938) of central London residential area and the recommendations of postwar reconstruction committee reports as prepared by Mr. J. H. Forshaw and Prof. Patrick Abercrombie for London County Council and L.R.R.C. Master Plan as prepared under the direction of R.I.B.A. with Mr. A. W. Kenyon as Chairman and eleven other noted architects and town planners.

Recommendations for post-war reconstruction

The maximum density of population, in Central London residential area was 436, according to 1938 census. The amount of open space for park and playing field varied from .1 acre in central to 6 acres in outer area and this too was very unevenly distributed.

Messrs. Forshaw & Abercrombie, recommended three standards of density *viz.* 100, 136 and 200 persons per net residential acre and 4 acres of open space per 1,000 population within a walking distance of half-a-mile. Of this 4 acres of land, 2 acres are to be reserved for general playing field, school playing fields, recreation and sports centre) $1\frac{2}{3}$ acres for large amenity parks, parkways, riverside pleasurance etc., and $\frac{1}{3}$ acre for small amenity gardens, squares and children's local play centre.

Another interesting recommendation about housing in residential area, is that in an area, having a

density of 100 persons, 55% of the people can be in houses mostly two storied and some three storied—and 45% in flats, some of which will have to be 7-10 storey high.

The corresponding figure in 136 density will be 33 and 67 while in the 200 density area, all would be flats, between 65-85% of these being 7-10 storey high.

Regarding removal of traffic congestion, this plan suggests creation of ring arterial road, with which only principal radial roads should be connected by means of specially designed round-abouts with over or under passes so as to facilitate fast flow of traffic. Car parking is to be provided for, in underground basement and in multi-storey garages.

Another remedy for reduction of traffic congestion and accident, is the removal of tramway from the city roads.*

Decentralisation of industry has also been recommended in certain cases.

The master plan for Greater London of the L. R. R. C. (London Regional Reconstruction Committee) of R. I. B. A. also made recommendations on similar lines.

This plan recommends, a density of 110-160 per acre in central residential area and suggests

*London County Council, Post-war Reconstruction Report by Forshaw & Abercrombie.

the creation of 4 ring road with radial trunkways for distribution of traffic. Fly-overs at all trunk road crossings are to be provided for fast uninterupted service. An inner air-port to serve the London centre has also been proposed, in an area which by rail and road connection is linked with all parts of the region. Educational institutions, hospitals, shop-areas, public open spaces, parks, playground, amusement centres, libraries, fire services have all found their places, evenly distributed, in this Master Plan.

The recommendation of Messrs. Forshaw and Abercrombie, about housing of population in London region, is very well comparable to the observations of Messrs. Whitten and Adams, based on survey of seventy-three American Cities.*

In American cities, having population of 500,000 and over, 42.3% live in single family dwellings and 57.7% live in flats and apartments.

In cities under 50,000, 67% live in single family dwellings, and 33% in flats and apartments.

Slum Clearance and Housing

The question of slum clearance and new housing schemes are two very important items, in the improvement of towns. Mr. L. H. Keay, the City Architect and Director of Housing of Liverpool, has published a report, containing very valuable recommendations in the matter of re-development. According to Mr. Keay in re-development areas there is great difficulty in reaching an estimate of the desirable

*Neighborhoods of small Homes by Robert Whitten and Thomas Adams. (Harvard University Press).

number of persons per acre due to the variety of ways in which the population can be accommodated in cottages and flats. Less area need be reserved for shops in a flat development as they can be built over shops.

Table I below gives details of various densities for both cottage and flat development; and a combination of the two is deemed suitable for redevelopment scheme.

Before applying the various densities of Table I to the land areas necessary in community sub-unit of 10,000 persons, particulars are given in Table II of the relation of total floor area to site for various types of development and the proportions between the ground space occupied by dwelling and the land as built upon, including access roads to the dwellings.

In Table 2, the total floor area of a house has been taken as 900 sft. and of a flat 800 sft. for three bed-room non-parlour type houses and flats, dwellings of these sizes being likely to form the greater proportion of the accomodation to be provided.

TABLE I.

Population densities per acre

	Type of Development	Dwellings	At 3.6 person per dwelling	At 4 person per dwelling
1.	Houses only	24	86	96
2.	Houses and flats of 3 & 4 storey	32	115	128
3.	Flats 3 storey ...	30	108	120
4.	,, 4 ,, ...	40	144	160
5.	,, 5 ,, ...	50	180	200

TABLE II.

	Description of Dwellings	No. of dwellings per acre	Total floor area	Covered area	Open area
1.	Houses only	24	44.58%	24.79%	75.21%
2.	Houses and flats of 3 & 4 storey ...	32	62.44%	25.10%	74.9%
3.	Flats 3 storey	30	55.10%	18.36%	81.64%
4.	,, 4 ,,	40	73.46%	18.36%	81.64%
5.	,, 5 ,,	50	91.81%	18.36%	81.64%

In Part III of his report Mr. Keay has sketched a very interesting housing lay-out on set back principle, with sixteen feet frontage at densities upto 24 to an acre. Regarding flats, he suggests a 3 storey type ordinarily, four and five-storey flats being built as exceptions. The introduction of a few blocks of eight to ten storey flats with automatic lifts in a development scheme, and limited to occupation by childless couples or even single persons would add interest to the development and reduce the area of land built upon, a factor of the greatest importance in high density districts.

Minimum Lot Size and Cul-de-Sac

In all development schemes for housing it is imperative to determine an economic lot size for a single family dwelling. This is a factor, which is dependable on the cost of open land and on the cost of making roads, laying sewers, and other services such as electricity, gas main etc. Use of Cul-de-Sac. in keeping down the cost of land development, has been advocated by many noted town planners. Messrs.

Whitten and Adams have recommended a length of 240 ft. as the minimum and 400 ft. as the maximum for such a Cul-de-Sac from the stand point of economic cost of construction.

In cases of odd shapes of land there may not be other suitable means of providing access to the centre of such plots for the purpose of sub-division; but from the standpoint of circulation such dead lanes are surely not commendable.

Many of these findings and recommendations, will be found helpful in solving similar problems of the existing towns in India.

Mr. J. M. Linton Bogle, late Chief Engineer of the Lucknow Improvement Trust, in his book "Town Planning in India" has made some very useful suggestions in this matter of street alignment, width and housing suiting local conditions.

Problems of Country

While planning of cities and towns are receiving so much of attention, it must not be understood that planning of country is in any way less important.

As a matter of fact the problem of town planning should be taken up along with the problem of country planning. They are not two separate units of living but are complimentary to each other. The town supplies the essential needs of the country, and the country supplies the essential food of the town.

So planning the country means planning its most important industry, namely agriculture. Correctly speaking no part of our land is in more need of scientific planning and development than the agricultural areas. The need of the population, the immense varieties of soil and wide variation of climatic conditions, demand the organization of agriculture on a regional basis. The existing method of cultivation, together with the soil condition and climatic variation, should be regulated so as to stimulate the productivity of suitable crops, arranging for their rotation so as to avoid interference from outside, such as urban building thrusting itself into and cutting up the shape of farm land into expensive units for production.

The crux of country planning is really a question of where to build and where to farm. It is a common practice now-a-days to find the growth of suburbs, encroaching on agricultural land, around a town. Such a practice is most detrimental to the cause of food production and, therefore, it ought to be stopped forthwith.

Food Requirement

To ascertain the extent and need of agricultural product, the first determinant is to find out the food requirement of the people. Along with food, it is necessary to have land for afforestation, to meet the demand of timber for building and other purposes; land for fishery, dairy, poultry, etc. All these lands for fishery, dairy, etc. should be as close to the centre of consumption as possible, so that the delay, loss of

food value and unnecessary transportation may be avoided. Mr. A. A. Rowse has made computation to determine the amount of land necessary to produce the perishable food stuff of urban population and he finds that a town of 50,000 inhabitants requires 5,000 acres of farm land, 3,000 acres being used for milk supply, the remainder being cropped for fruit, market garden, poultry, etc.

The above figures may not be quite correct for our country, but surely it suggests a line which should be followed to arrive at a satisfactory solution of the problem.

It may incidentally be pointed out here that approach to the problem of country planning should be quite different from that of town planning. The people of the country may not be catered with the same sort of amenities as in the town, but they should not be deprived of the minimum standard of comfort and educational facilities that can be easily arranged in a village. Lighting from an electric grid system, good drinking water from tanks and rivers, all-weather roads to the nearest important centre of trade and administration are essential factors in present-day life.

Village Sites

Many of the existing villages are in the wrong places. The agriculturists, due to their inclination of living close to the lands they till, build their cottages on lands which are more suited for cultivation than for building purposes. Many of these villages become

flooded during monsoon and remain cut off from the nearest lines of communication for a pretty long time, though it is a common sight to find high waste lands close-by quite uninhabited.

Supplementary Income

Another important point that is also to be considered is to provide the agriculturists with supplementary sources of income during the long period of their recess. In normal times the income of agriculturists from their produce is much lower than that of an average factory worker. The increment of income of the agriculturists can be done in two ways: (i) by increasing the yield of land per acre by the introduction of modern methods of agriculture, (ii) by providing agriculturists with equipments for cottage industries. While the first course is surely better, it is beset with many difficulties,—such as removal of the barrier of small holdings and introducing collective farming as done in Soviet Russia.

Machine in Agriculture

But the question of introduction of machinery in the fields of agriculture should not be relegated to a minor position, because to improve the present production of crops, help of machinery will be found invaluable. There is another factor and that is the drifting of the agricultural population to meet the demand of man-power with the growth of industry in our country. As an industrial labourer earns more than an average agriculturist, a day may come, when we shall be faced with the shortage of farm labour; and to keep the total food production at the required

level, there will be no other way but to introduce machinery in the sphere of cultivation.

Economic Development

A memorandum* recently published by eight well known industrialists and economists headed by Sir Purshottamdas Thakurdas, has very clearly brought to light our present low standard of living and has suggested a plan for our economic development. There are details with which one may not agree, but surely this scheme has introduced a ray of hopeful light in this atmosphere of gloom. In this plan, housing for the population has received its due share of attention. Out of a total of 10,000 crores of rupees, a sum of rupees 2,200/- crores of rupees has been provided for housing, *i.e.* 22% of the total.

We all know that an average village dwelling consists of mud walls, mud floors and thatched roof with no facilities of drainage and ventilation. These habitations are far below the minimum standard of housing condition, suitable for ordinary creature comfort.

To improve the situation a fresh start will have to be made beginning with siting and lay-out of housing on high waste lands with provisions for good drinking water, drainage, road, etc. In a town it is easy to find technical people for constructional work, but in rural areas, such facilities are totally absent. Arrangements will have to be made for construction of model villages for agriculturists with durable, yet cheap materials suiting the climate and social habits of the people.

*A plan of Economic Development for India by Sir Purshottamdas Thakurdas and others.

In India, out of her population of approximately 390 million persons, 340 million live in villages. There are only 3,279 towns which have a population above 5,000. This number is insignificant when compared to the total number of villages in India. The table below clearly shows the relation.

Province	No. of villages with a population				Town with a population over 5000
	under 500	501—1000	1000—2000	2000—5000	
U.P. ...	68,810	23,441	8,101	2,121	360
Bengal ...	51,307	18,092	9,696	4,551	716
Bihar ...	47,936	12,837	5,814	2,081	240
C.P. ...	30,096	6,453	1,969	458	128
Assam ...	27,967	4,098	1,741	259	25
Orissa ...	21,685	3,597	1,175	191	22
Punjab ...	19,161	9,069	5,167	1,751	323
Madras ...	12,465	9,228	8,203	4,929	1,012
Bombay ...	11,481	5,562	3,093	1,217	304
Sind ...	5,885	1,493	132	70	29
N.W.F.P.	1,498	618	445	223	70
	298,191	90,488	45,536	17,851	3,279

Starting Point of Planning

So the real big task of planning in India is to begin with her villages, not the towns, where there is some sort of organisation to look after and control her growth if there is a will to do so. But there is no such organisation to look after the planning of the villages. There is another important point, to be borne in mind, the economic condition of the cultivators. Many of them can not afford to build, stable

and healthy cottages unless some sort of financial aid is arranged for them.

The next step is to find out the minimum standard of housing suitable for agriculturists.

In England, the Ministry of Health has standardised a few types of cottages for her agricultural people. The same types may not be found quite suitable for our purpose but on the same line, it will not be difficult to determine the average requirement of an ordinary peasant family of our country.

Agriculturist's Cottage

Though the climatic condition and habit of the people are widely variable over the different provinces of India, it appears that a three-room cottage with a separate store and kitchen, verandahs in front and back may serve as a very useful unit for them. Each room may have an area of about 120 sft. and arranged in a way so as to freely admit air and light into them directly. The cottages should be built in masonry or other suitable pre-cast materials with timber trusses and asbestos cement or country tile roof, having a total area of about 720 sft. as detailed below—

3 rooms	...	$3 \times 120 = 360$ sft.
2 verandahs	...	$2 \times 90 = 180$ sft.
Store & kitchen		$2 \times 90 = 180$ sft.
Bath & w.c.	...	$2 \times 30 = 60$ sft.
		720 sft.

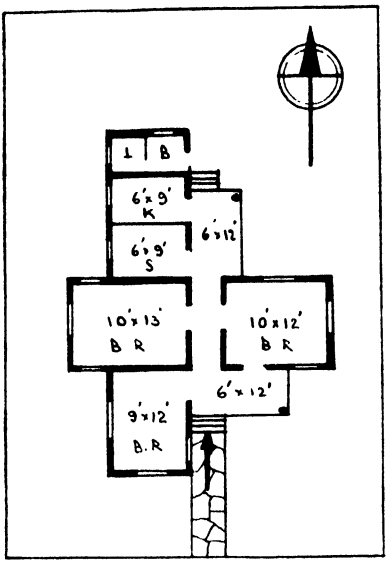

FIG. No. 8. Plan of an Agriculturist's Cottage with 3 bed-rooms, front and back verandah, separate store, kitchen and bath.

In addition to the above accommodation, each peasant family requires a shed to house their cattle, poultry and implements of agriculture.

The next important item is to provide the area of land, necessary to produce vegetables for their daily household consumption. This is also a very variable factor but an unit of about 45 feet by 160 feet (800 sq. yds.) may be found to be quite suitable Now comes the question of the unit size and lay-out of a typical village. From the table on page 37, it is found that a vast majority of villages (298,191) have population below 500. So taking this as an unit, it may be estimated that about 90 cottages will form a small village. Such a unit should be provided with a

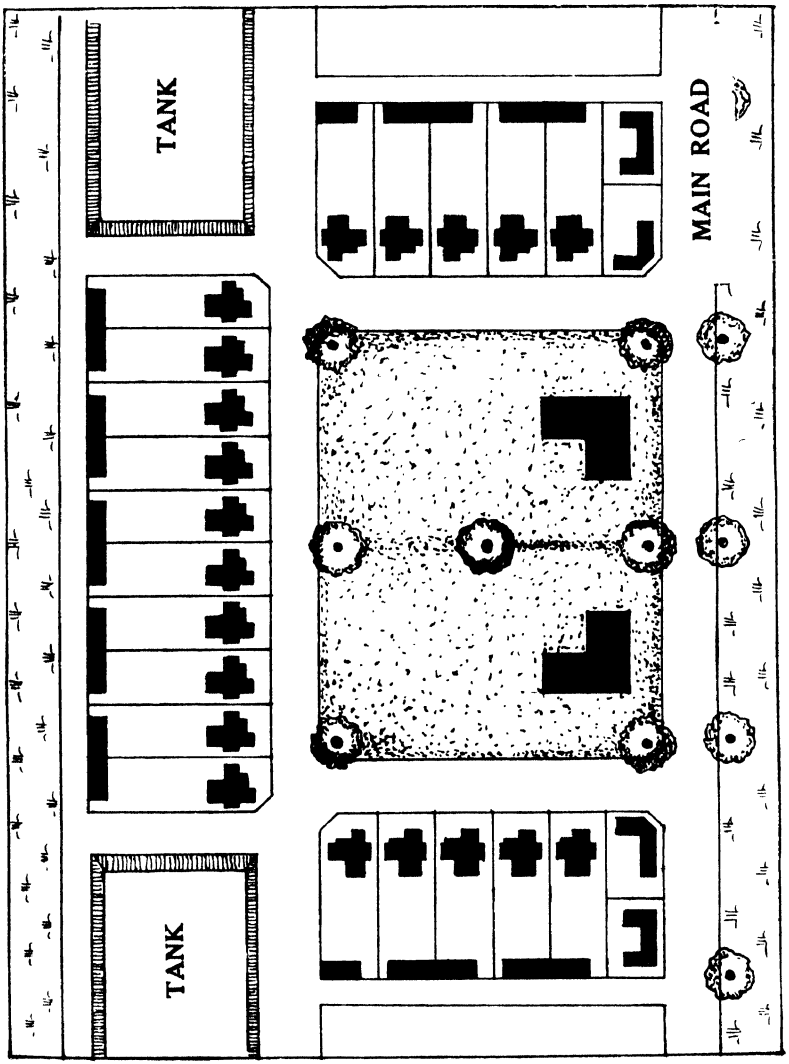

FIG. NO. 9. A Lay-out plan of an Agriculturists' Village. The blocks on the main road, are Shops. The Dispensary and Primary School are on the Central Court. Children can play on the Central Court.

primary school, a dispensary with a two-bed hospital, a few shops and separate tanks for drinking water and washing purposes.)

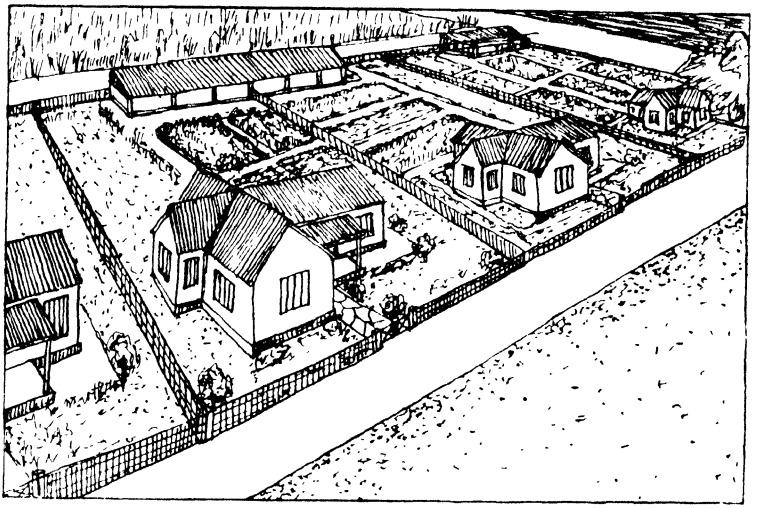

FIG. NO. 10. View of the cottages, showing cattle shed at the back. All cottages are set back about 15 ft. from front road.

The plan here (Fig. 10) shows the lay-out of 22 cottages around a central court. The shops are on the main road, the primary school and dispensary are located on a portion of the central court. The open portion of the court may be used as a playing field for the children. The primary school building may also be used as the recreation centre for the adults. The tanks are placed away from the main road, at the same time quite central to different blocks, so that the women folk, may use them quite freely. A lay-out on this line will require about 25

acres of land, for a population of about 500, on the basis of 5 persons per cottage.

Unit Plan

It is also necessary to prepare a unit plan for a primary school, a dispensary and hospital to serve the village community. The housing of the school teacher, medical officer, etc. are also to be considered along with this matter. While a school teacher can be provided for in each village unit, it may not be possible to provide a medical officer on such a small unit. If the villages are close to each other, say within a radius of a mile, one medical officer can look after 3 or 4 such units.

Department of Planning

For all these purposes, the first step should be the creation of a Department of Planning or Development with experts on various subjects. The primary function of this department should be to prepare a survey of National Resources. This survey should form the basis of all future planning for building, housing, transport, location of industry, agriculture, afforestation, national park, holiday resort, etc. Such a job is not a part-time job of a few people but a whole time work of quite a number of people, well versed in Architecture, Agriculture, Engineering, Economics, Public Health and Industry. It may not be possible for one Central Department to deal with all the regional and local details of planning. It will be necessary to appoint a series of Regional Commissions to assist the central body in discharging their duties. A very illuminating recommendation

has been made by Scott Committee, about duties and work of the Department of Planning*.

Lessons from Russia

The lessons from Soviet Russia in this respect will also be of great help to us. The conditions prevalent in 1928 in Soviet Russia was in no way better than our present state but with the help of co-ordinated planning, Russia within a short time of fifteen years has greatly improved her condition. The planning machinery in Russia, was set up as early as 1920, when the civil war was not completely over. To start with, the State Commission for Electrification (Goelro) was set up for electrification of the whole country within 15 years. This was later on replaced by the State Planning Commission (Gosplan) in 1921. It was an advisory body, the Council of Labour and Defence being the executive authority. The total personnel of the Gosplan was only forty to start with, consisting mainly of Economists and Engineers. By 1923 the staff was enlarged to 300. In 1925 subordinate branches of Gosplan were set up in the republics, regions and provinces, linked with and sub-ordinated to the parent body†

The above outline for a Department of Development or Planning may be found wanting in some small details but such imperfections are remediable at any stage. The most important point is the setting up of

*Country and Town—Penguin special containing a summary of Scott and Uthwatt report.

†Planning for India by Bimal C. Ghose.

the central organisation with its sub-centres for different regions and to take up work as per their recommendations in right earnest.

Things have been allowed to grow in the most haphazard way resulting in the present chaos. We ought to take our lessons from the past and shape our future accordingly, in the most ordered and planned way.