# NOTHING GAINED BY OVERCROWDING !
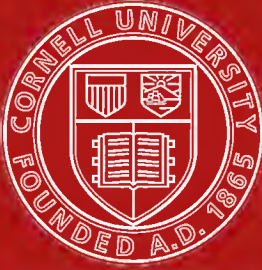
How the Garden City type of development
may benefit both owner and occupier.

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1912

**3d.**

# NOTHING
# GAINED BY OVERCROWDING

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THE Garden City movement, as the name implies, stands for a more harmonious combination of city and country, dwelling house and garden. The rapid growth of towns and cities during the eighteenth and nineteenth centuries, due to the organisation and concentration of industries, took place without any proper regard being shown for health, convenience or beauty in the arrangement of the town, without any effort to give that combination of building with open space which is necessary to secure adequate light and fresh air for health, adequate un-built-on ground for convenience, or adequate parks and gardens for the beauty of the city.

Many attempts and proposals had been made to conteract this evil, but it was only after Mr. Ebenezer Howard had put forward the bold proposal to build a city on new lines, and with his supporters actually commenced to carry out that proposal, and only after Mr. Horsfall had explained what was being done to regulate the growth of towns in Germany that the public realised either the extent of the evil or the possibility of the remedy.

Mr. Howard's suggestions included then the proper planning and limiting of a town, so as to keep it always within reasonable touch of open country ; this may be called the larger aspect of the question ; but they also included the proper arrangement of the individual buildings and the limitation of the amount of building in relation to the area of open space, and this may be called the detailed aspect of the question.

What is meant by the founding of a new Garden City is now fairly generally understood, but it is perhaps too often assumed that the Garden City principle is only applicable where it is possible to start a new and entirely independent town right away in the country. Mr. Howard in his book recognised that it is not possible to regulate the aggregations of population in such a way that there shall be only detached towns of a limited size scattered about independently of one another. He fully recognised that one such town having reached the prescribed limits might need to provide for the development all round it of subsidiary towns at a short distance, intimately connected with it ; that in fact there might be developed a federated group of towns recognising one general centre. It is important to regard this principle as forming a constituent part of the Garden City movement because of its applicability to existing towns.

The fact that many of these towns have already far exceeded the limit of size which is deemed desirable by the advocates of the Garden City is, no doubt, unfortunate, but it can hardly be urged as a good reason for making no protest from the Garden City point of view against these towns being allowed to continue to grow in a homogeneous manner, swallowing up and obliterating the country all round, like the

spreading of flood water over a shallow valley. Nor is it enough that the Garden City movement should urge that suburban development be carried out with such a relation between the amount of building and open space as would accord with the detailed principles advocated for a Garden City. If it is deemed desirable to limit the size of a new town like Letchworth to something like 35,000 people and to plan for an agricultural belt to intervene between this town and the federated townlets which may be permitted to spring up around it, surely it is still more desirable to make some effort to secure definite belts of open space around existing towns and to encourage their development by means of detached suburbs grouped around some centre and separated from the existing town by at least sufficient open ground to provide for fresh air, recreation and contact with growing nature.

This federal aspect, if we may so term it, of town development has the great advantage of expressing in outward form the natural organisation of a large community.

People tend to flock together in villages or towns that they may enjoy the advantages of social intercourse with the wider opportunities for pleasure and culture that spring from it, and that they may enjoy the material advantages which arise from the co-operation of many individuals working for some common purpose. But it is impossible to secure effective action from any large number of people if they all try to act directly. Effective individual co-operation is limited to the comparatively small number who can have immediate personal knowledge of each other and can come into immediate and constant personal relation. Such a limited number of individuals form a group, and where other similar groups exist they cannot effectively co-operate as individuals, but each group must as a whole come into contact with another group through the medium of some central person representing the group. In the same way when the number of minor groups results in the selection of so many representatives that they exceed the number possible for individual co-operation, these representatives must again form a larger district group and come into contact with others through some district representative. This is what we mean by organisation, and though it takes many different forms the essential features are common to all the forms, whether to the companies and regiments of an army, acting through and controlled by their officers, the lodges or districts of a friendly society, or the departments and workshops of a great industry.

This basic principle of organisation should find its expression in the form of the town which, instead of being a huge aggregation of units ever spreading further and further away from the original centre and losing all touch with that centre, should consist of a federation of groups constantly clustering around new subsidiary centres, each group limited to a size that can effectively keep in touch with and be controlled from the subsidiary centre, and through that centre have connection with the original and main centre of the federated area.

In the development of existing towns therefore, the Garden City principle has much to offer which is of the greatest value because it is based on the natural principles of organisation and would give expression in outward form to such organisation. Detaching the units or suburbs one from another, giving them each their subsidiary centre around which they should be grouped and upon which they would depend, while the overgrown centre might have to remain a larger unit than is desirable, it would yet be possible to secure limitation to the units constituting the new growth and to secure between these units and between them and the parent town some defining and dividing belt of open land which would be of inestimable value.

Many towns are beginning to regulate their growth by means of the **Town Planning Act**. Now, therefore, is the opportunity to press upon the notice of the public this

aspect of the Garden City movement and to secure if possible some recognition of the principle.   See Diagram VII.

In many cases development has, in fact, taken place along some such lines.   An examination of the map of London, and of many other large towns, will show how their growth has largely consisted in the absorption of older townlets or villages which had sprung up near the town around some centre point.   In many cases the old centre remains, and is still a focus of life and local movement within the larger town.

Such places as Westminster, Hampstead, or Dulwich, in London, date back to the ancient villages well outside the town, and still constitute effective centres of local organisation.   The Garden City principle would recognise these centres, would maintain their definition by limiting their growth and the growth of the town in such a way as to preserve some belt of open country, meadow, park, or woodland, sufficient to give outline and emphasis to each unit and to provide for the ready access to the country of all the individuals living within the urban area of the unit.

But, as in the larger field the Garden City movement defines the proper relation and proportion between urban and rural areas, so within those urban areas it defines in detail the relation and proportion between the buildings themselves and the ground surrounding them ;  and it is this aspect of the question I wish chiefly to consider, for it will be found that much the same economic principles which determine the possibility of limiting the proportion of the individual building to the surrounding garden space, will also influence the limitation of the proportion of urban area to surrounding country.

The overcrowding of buildings upon the land has been so generally practised, and is so generally assumed to be necessary, that one cannot hope to advance far without first considering carefully whether there is any economic difficulty standing in the way of limiting the number of houses or other buildings to be erected upon a given area of land, and, if so, what that difficulty is.
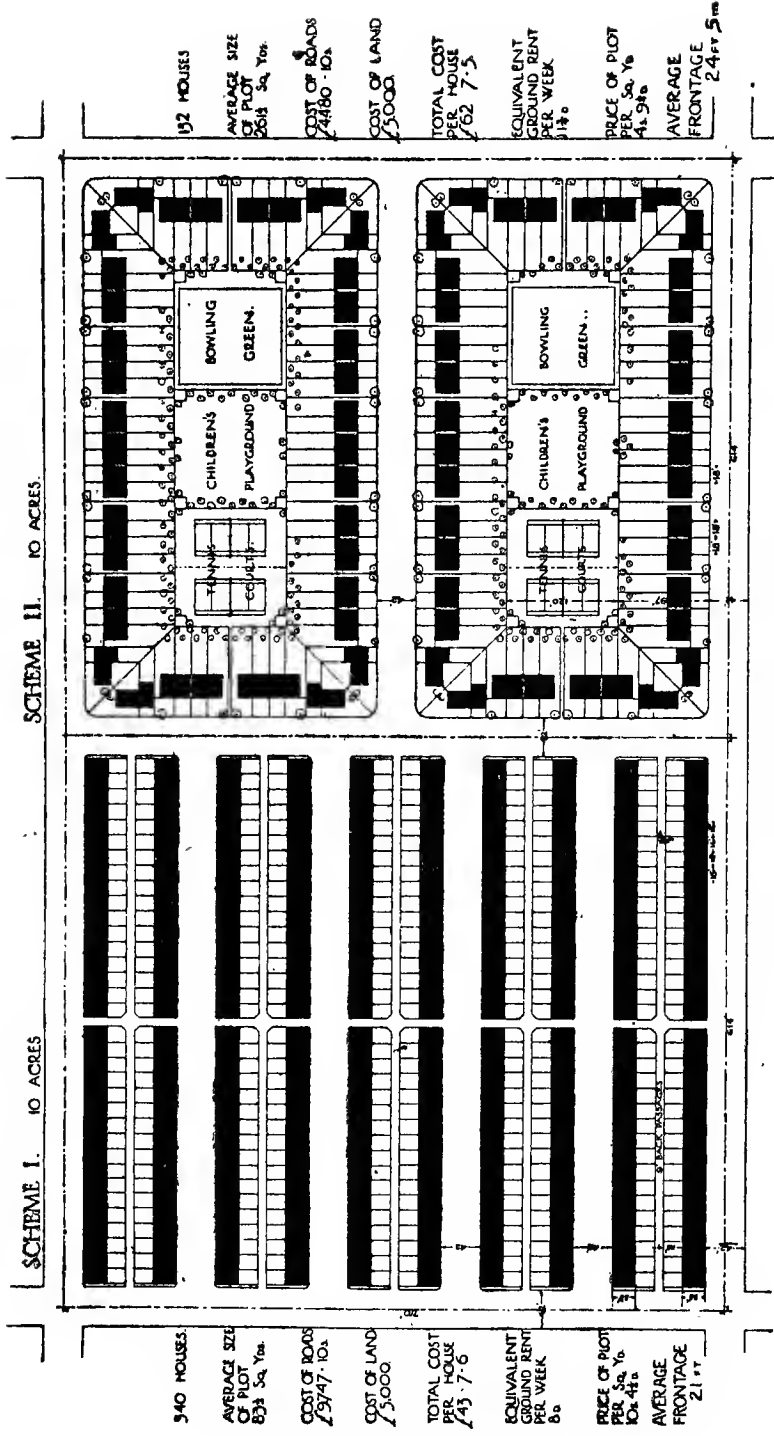
To most people, whether they are interested in the land as owners or builders, or are disinterested inquirers, it seems at first sight so obvious that the more houses you put upon each acre of land the more economical is the use made of that land, and the less will each person have to pay for it, that few have really troubled to test the matter.   It has generally been assumed that though it may be necessary, to some extent, to put a limit to the number of houses that may be crowded upon an acre, that this limit should be made as high as possible, and that any limitation must necessarily be a serious tax upon the community.

It can, however, be shown that this view is very far from correct ;  that on the contrary, the greater the number of houses crowded upon the land, the higher the rate which each occupier must pay for every yard of it which his plot contains, the smaller will be the total return to the owners of land in increment value, and, indeed, the less will be the real economy in the use of the land.

I do not say that nobody can obtain advantage from overcrowding buildings ; that point we will deal with later ;  but first let us, by definite figures, thoroughly establish the facts.   This can best be done by taking two exactly similar areas of ground and working out the costs of development with the larger and the smaller number of houses to the acre.

As a first example we will take the conditions as they exist in many large towns, where by-laws of the usual type are in force, and where provision is made for a back road to give access to the cottage yards, and we will assume two schemes of development for similar areas each containing ten acres of land, measured to the centre line of the surrounding road.   See Diagram I.

# Diagram I.



SCHEME I.   10 ACRES.

SCHEME II.   10 ACRES.

**Scheme I:**

340 HOUSES.

AVERAGE SIZE OF PLOT 83¼ Sq. Yds.

COST OF ROADS £9747·10s

COST OF LAND £5,000

TOTAL COST PER HOUSE £45·7·6

EQUIVALENT GROUND RENT PER WEEK 8d

PRICE OF PLOT PER Sq. Yd. 10s. 4¼d

AVERAGE FRONTAGE 21 Ft.

**Scheme II:**

152 HOUSES

AVERAGE SIZE OF PLOT 261½ Sq. Yds.

COST OF ROADS £4480·10s

COST OF LAND £5,000

TOTAL COST PER HOUSE £62·7·5

EQUIVALENT GROUND RENT PER WEEK 11¼d

PRICE OF PLOT PER Sq. Yd. 4s. 9¼d

AVERAGE FRONTAGE 24 Ft. 5 in.

TWO SYSTEMS OF DEVELOPMENT CONTRASTED

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Scheme No. I. shows one of these ten acres developed with approximately the maximum number of houses permitted under modern improved by-laws, assuming the type of house which occupies 16 feet of frontage. It will be seen that a total of 340 houses can be placed upon the ten acres, at the rate of thirty-four houses to the acre, the roads being included in the measurement. These houses are built up to the road line ; the roads are made 42 feet wide, and back passages are provided 9 feet in width.

Scheme No. II. is developed in accordance with the Garden City principles. The houses are to be of the same size and occupy the same frontage as before ; but instead of being built in continuous rows they are built in groups of two, four, or six, and a space is left between each group ; in addition to this, provision is made for passage-ways through the groups so that direct access is obtainable to all the gardens from the front roads, and no back roads are required. In this case only 152 houses are arranged for on the ten acres, that is at the rate of 15.2 houses per acre, considerably less than half the number of houses in Scheme No. I.

In both cases the value of the land before development is assumed to be £500 per acre, the main roads to cost £7 5s., and back roads £1 per lineal yard. These costs of course include not only the making of the roads and the laying of the drains, but also the making up of the roads when they are taken over by the Local Authorities, as both these costs have, in one form or another, to be borne by the cottage. Although very often the owner or builder may incur the first cost, and he may leave the purchaser of each plot to bear the second, it is necessary, for fair comparison, to take the total cost of the road.

The following table gives the cost of development in each case, that is, the main costs of land and road making, together with the average size and cost of plot and the equivalent ground rent on a 4 per cent. basis. Some of these figures are also given at the side of each scheme in Diagram I.
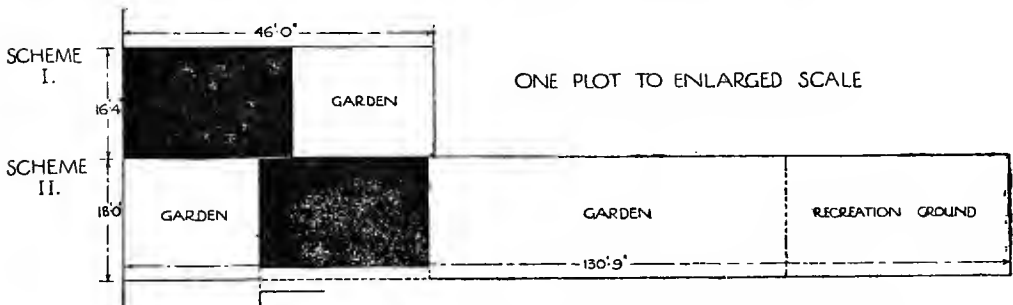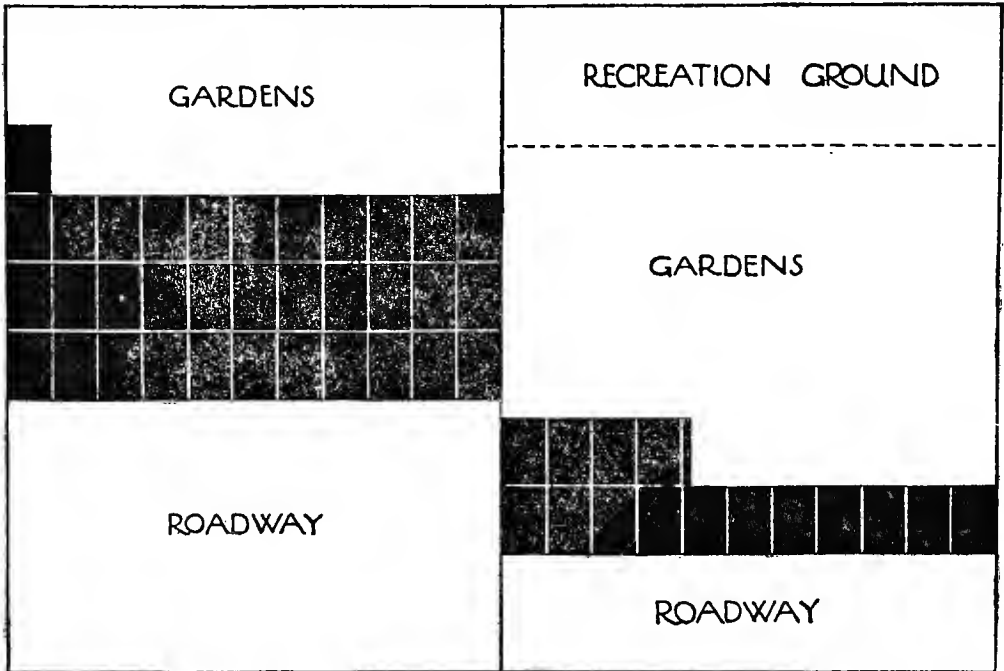
| TABLE I. | Scheme I. With land at £500 per acre. | Scheme II. With land at £500 per acre. | Scheme II. With land at £250 per acre. |
|---|---|---|---|
| Number of houses .. .. .. | 340 | 152 | 152 |
| Average size of plot.. .. .. | 83½ sq. yds. | 261½ sq. yds. | 261½ sq. yds. |
| Cost of roads .. .. .. | £9,747 10 0 | £4,480 10 0 | £4,480 10 0 |
| Cost of land .. .. .. .. | £5,000 0 0 | £5,000 0 0 | £2,500 0 0 |
| Total cost of land and roads per house | £43 7 6 | £62 7 5 | £45 18 6 |
| Equivalent ground rent per week .. | 8d. | 11¾d. | 8½d. |
| Price of plot per sq. yard .. .. | 10/4½ | 4/9¼ | 3/6 |

It is apparent that in Scheme No. I a large proportion of the ground must be occupied by the roads, to provide frontage for the large number of houses. In Scheme

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No. II. the greater part of this land is available to be added to the gardens, or to be arranged as recreation grounds in addition to the gardens, as shown in the diagram.

## Diagram II.

SCHEME I. ONE ACRE. SCHEME II. ONE ACRE.



| | |
|---|---|
| GARDENS | RECREATION GROUND |
| | GARDENS |
| ROADWAY | ROADWAY |



SCHEME I.    46'0"    GARDEN    16'4

ONE PLOT TO ENLARGED SCALE

SCHEME II.    18'0    GARDEN    GARDEN    RECREATION GROUND    130'9"

EFFECT OF TWO SYSTEMS OF DEVELOPMENT ON EACH ACRE AND EACH PLOT.

Now roadways represent perhaps the most expensive form in which open space can be provided : not only so, but every additional road means a serious loss of frontage available for building, because at every point where one road joins another there is

lost not only the frontage occupied by the width of that roadway but the frontage occupied by the depth of the building and plot. In Scheme No. I it will be seen that the whole of the frontage of the vertical roads is occupied in this way, and is therefore ineffective for the purpose of affording frontage for buildings. There is, of course, a similar loss at each corner in Scheme No. II. but there are only eight corners where the loss can occur, while there are twenty such corners in Scheme No. I. Thus it happens that the greater the number of houses crowded upon an area of land, the greater must be the length of road provided per house, the greater the proportion of the land occupied by roads, or, in other words, the greater the waste of the land. It will be seen from the table how this affects the area of the plot and the cost of the roads. In Scheme No. I there are only 83½ square yards of ground actually available for the building and backyard, while in Scheme No. II. an average of 261½ square yards is available. Although the number of houses has only been reduced by rather more than half, the area of the plot has been increased more than three times.

The cost of the roads in Scheme No. I comes out at £9,747 10s., while in Scheme No. II. in spite of the much more liberal provision of frontage, to allow for passages between every pair of houses and spaces between every group, it only comes to £4,480 10s. The cost of the land in each case would be £5,000. If this is added to the cost of the roads in each scheme, and that total divided by the number of houses arranged for, it will be found that in Scheme No. I the cost of the small plot of 83½ square yards is £43 7s. 6d., equivalent to a ground rent of 8d. per week on a 4 per cent. basis, while in Scheme No. II. the cost of the large plot of 261½ square yards has only risen to £62 7s. 5d., equivalent to a ground rent of 11¾d. per week. From the point of view of the tenant, therefore, in Scheme No. I, he pays £43 7s. 6d. for the freehold of 83½ square yards of land, equivalent to a price of 10s. 4½d. per square yard. In Scheme No. II. he pays £62 7s. 5d. for the freehold of 261½ square yards, which is at the rate of 4s. 9¼d. per square yard.

Let me ask whether in purchasing any other commodity, the public are content to take such very bad value for their money. Supposing there were two village shops, and one offered to supply eighty-three common marbles for 8d., and the other one offered 261 marbles of the same size and character for 11¾d., can it be supposed that there would be any village boy who would not know which shop to patronise ? To put it quite bluntly, these are the two offers, made by the old-fashioned speculative builder on the one hand, and by the Garden City or Garden Suburb on the other. The exact effect upon each acre of ground is illustrated by means of Diagram II. in which the roadway, the houses, and the gardens are collected into separate areas. Comparing these sample acres from the two schemes, it will be seen how the space occupied by the roadway and by the additional number of houses swallows up so much of the total area of ground as to leave very little to be divided among the larger number of houses as back yard or garden for each.

The financial effect of reducing or increasing the number of houses to be placed upon a given area of ground will, of course, vary as the cost of land and road making varies.

Where the land is comparatively expensive, and road making comparatively cheap, the advantage in the price per plot to be gained by overcrowding will be greater than where land is relatively inexpensive and road making relatively dear. It is important also to distinguish between variation in the number of houses to the acre and variation in the building frontage provided to each house.

It will be well to take one other example of two comparative developments, adopting land at the cheaper rate of £300 per acre, and taking the total cost of roads

per yard lineal in both cases at £5 8s. A comparison of the figures in this case is still more remarkable, as will be seen from the following table:—

| TABLE II | Scheme IA. With land at £300 per Acre. | Scheme IIA. With land at £300 per Acre. | Scheme IIA. With land at £150 per Acre. |
|---|---|---|---|
| Number of houses .. .. .. | 252 | 106 | 106 |
| Average size of plot .. .. .. | 98 yds. | 398 yds. | 398 yds. |
| Cost of roads .. .. .. .. | £7,942  0  0 | £2,478  0  0 | £2,478  0  0 |
| Cost of land .. .. .. .. | £3,000  0  0 | £3,000  0  0 | £1,500  0  0 |
| Total cost of land and roads per house | £43  8  6 | £51 13  7 | £37 10  6 |
| Equivalent ground rent per week .. | 8d. | 9½d. | 7d. |
| Price of plot per sq. yard .. .. | 8/10¼ | 2/7 | 1/10¾ |

In Scheme IIA the frontage of the individual buildings has been varied to suit particular types of cottage adapted to the aspect shown. In some cases the frontage of the actual building is as much as 25 feet, in others as little as 15 feet. In order to compare quite fairly with Scheme IIA, the frontage of the actual buildings in IA has been taken at 20 ft. 6 in., which is exactly the average frontage of buildings in Scheme IIA ; and in addition to the 20 ft. 6 in., passages have been allowed between every pair of cottages so that direct access is available to all the back yards without any back roads.

It will be seen, on comparing these figures, that the economic results of overcrowding are even less favourable than in the first example taken ; that as compared with Scheme IA, with twenty-five houses to the acre, there is only an increased cost equivalent to a ground rent of 1½d. per week in Scheme IIA, with only ten houses to the acre, which allows a large area of land either for big gardens or for recreation grounds, as shown in the diagram. While the tenant would only pay for his large plot of 398 square yards at the rate of 2s. 7d. per yard, he would have to pay for the small plot of 98 yards, just a quarter of the size, at the rate of 8s. 10¼d.

This remarkable result is not only due to the fact that so much of the land is occupied by the numerous roads to give access to the additional number of houses, but to the further fact that, to provide for the same actual frontage of buildings, a greater amount of road is required per house in overcrowded schemes of development, than in less crowded schemes. In this case, taking the whole of the road length, in Scheme IA there is an average of 15 ft. 3 in. of road, or 30 ft. 6 in. of road frontage per house, although the frontage of each building averages only 20 ft. 6 in. ; while in Scheme IIA, with the same average frontage for the buildings, there is only required an average of 13 ft. of road or 26 ft. of road frontage per house, in spite of the fact that in addition to passages between every pair of houses, as provided for in Scheme IA, there are provided wider passages between every group of houses. This is due to the waste of frontage that occurs at so many road junctions in Scheme IA.

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# Diagram III.



SCHEME IA.
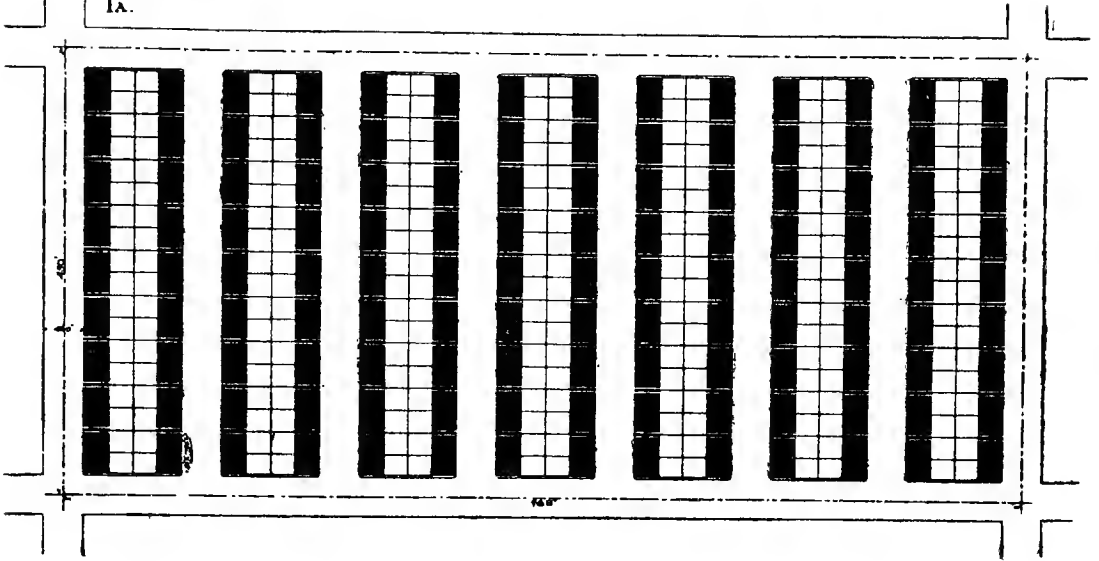
SCHEME IIA.
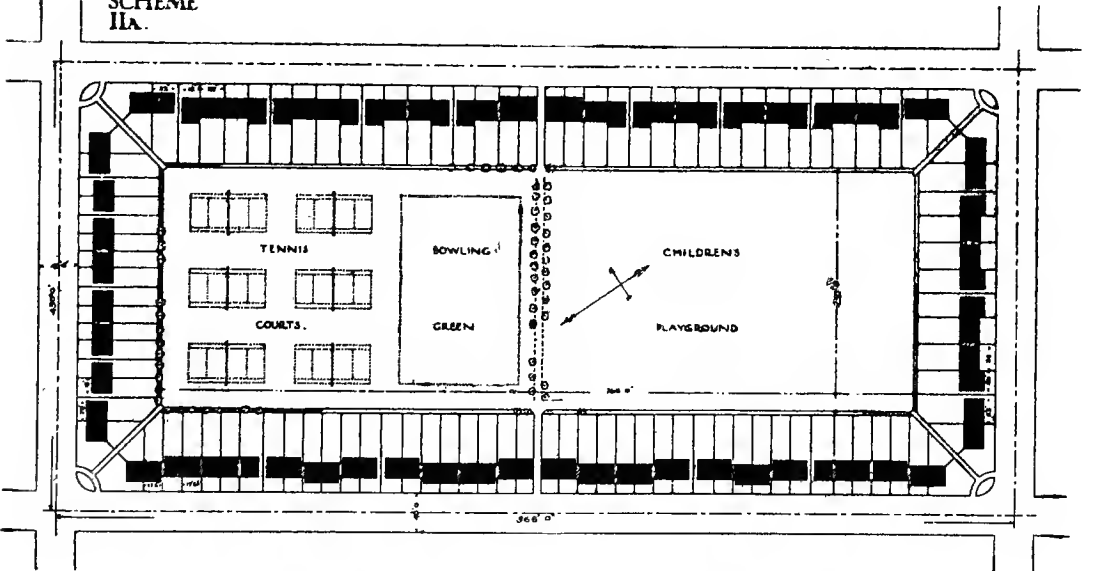
TWO SYSTEMS OF DEVELOPMENT CONTRASTED.
SEE TABLE II, PAGE 8.

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This point must be clearly borne in mind, because there is a general impression that for development with a few houses to the acre, a greater expense of roads, drains, etc., is required per house than would be needed if more houses were placed upon the acre. This impression is no doubt partly due to the fact that it has usually happened that schemes which have been planned with a reduced number of houses to the acre have also given greater frontage per building and greater distance between the groups of buildings, but in order to understand clearly the effect of reducing the number of houses to the acre this complication should be eliminated. If the building frontages are taken to be exactly the same in each case, as in the scheme now under consideration, it will be seen that there is required, in the overcrowded development, an average length of 15 ft. 3 in. of sewer, surface water drain, gas, water supply pipes, etc., for every house built ; moreover, if all the roads are to be equally patrolled, the policeman and the scavenger's cart will have to travel 15 ft. 3 in. for every house ; whereas in the scheme with a reduced number of houses to the acre, there will only be required 13 ft. of road, sewer, gas, water, etc., per house. Setting back the houses from the road and leaving a small front garden does indeed increase the cost of scavenging slightly, because the distance to be walked in each case is that much greater ; but reducing the number of houses to the acre need not, by itself, increase the cost of any of these services.

It is possible, however, that to a slight extent the cost of main drainage will be increased by reducing the number of houses to the acre, because, necessarily the houses will cover a larger area and the lines of main drainage and main gas and water pipes will have to be carried further at a larger size to distribute over the greater area, but generally speaking this will only mean a slightly larger pipe for a greater distance along a main road, and can be but a very small matter, whereas we have seen that a positive saving per house in the length of road, and therefore of all the services, may result from reducing the number of houses to the acre.

The figures given in connection with the two schemes we have discussed have sufficiently demonstrated the first proposition which we set out to prove, namely, that the greater the overcrowding of houses upon the land the higher must be the price that the tenant will pay for the available land which he can use. We have seen that, in one instance, he pays more than double the price per yard, and in the other instance more than three times the price per yard in the overcrowded systems of development, compared with what he would have to pay in the less crowded system advocated, to provide for the owner the same price per acre for the undeveloped land in both cases.

The second statement, that the return in increment to the owners of land is *reduced* by the crowding of houses to the acre instead of being increased thereby, as is generally supposed, still needs to be proved ; for at first sight it will seem that, in the particular cases under consideration, the landowner was not affected by the different systems of development, because the land was assumed to be sold by him at the same price per acre in both cases. But the increment which we are considering, being the difference between the value of land for building purposes and its agricultural value, is affected not only by the price at which the land is sold, but by the quantity of land which is converted from agricultural to building uses. From this point of view let us see how the two systems of development affect the owner of a large estate upon which there is developed some new centre of population. Suppose for example, that coal is discovered under the estate, and that several coal-pits are sunk. If we assume that, as a result, there are required 6,678 new houses to accommodate the miners and their families, together with the necessary complement of

professional men, tradesmen and artisans, or a total population of something like 33,000 people ; if, further, we assume that the surface value of the land for agricultural purposes is £40 per acre and that its value for building purposes is £300 per acre, it will be easy to compare the result to the owner of developing all the building areas on his estate on the old-fashioned, crowded system shown in Scheme IA with what it would be if he adopted the Garden City method shown in Scheme IIA.

To accommodate 6,678 houses on the basis of Scheme IA he will be able to sell—

$$\frac{6{,}678 \text{ houses}}{25.2 \text{ houses per acre}} = 265 \text{ acres of land, at £300} \quad .. \qquad £79{,}500$$

Deduct agricultural value of 265 acres at £40 .. .. 10,600

Gross increment due to the building operations .. .. £68,900

If, however, having come under the influence of the Garden City Association, he should decide to limit the number of houses per acre to an average of 10.6—that is, as in Scheme IIA, the result will be as follows : He will now sell—

$$\frac{6{,}678 \text{ houses}}{10.6 \text{ houses per acre}} = 630 \text{ acres of land, at £300} \quad .. \qquad £189{,}000$$

Deduct the agricultural value of 630 acres at £40.. .. 25,200

Gross increment due to building operations .. .. £163,800

or an additional increment of £94,900

So long, therefore, as the estate of the owner is large enough to accommodate the whole of the development, however much it is spread out, the owner's profit or increment is reduced as the overcrowding increases. Where many owners are concerned this would be true of the owners as a class, but might not be true of the individual owner who might sell the whole of his land in any case. The amount of this increased increment due to the limitation of the number of houses to the acre by the Garden City method of development of course depends on the land being sold at the same price. There seems, however, no reason why the land should be sold at the same price, no justification for the Garden City method of development conferring this enormous increased increment value upon the owner. We have seen that increment is due to the increased value of land for building purposes, and it would seem more natural that it should be estimated rather in relation to the amount of building than in relation to the size of the garden attached to the building, and it is obvious that the owner of land could afford, without loss to himself, to estimate his increment at so much per house instead of so much per acre, and where larger gardens are provided, let or sell the land at a reduced rate sufficient to recoup him first for the loss of agricultural land, secondly for the amount of increment due per house.

Let us now see at what price on these lines the owner could afford to sell the greater quantity of land required to accommodate the population we have been considering under the Garden City type of development shown in Scheme IIA. If the increment is to be per house instead of per acre, he will need to receive the same amount of increment in both cases, and the total sum which he ought to receive for the 630 acres would be as follows :—

630 acres deducted from his agricultural land, at £40 per acre .. £25,200

Add the increment value assumed to be received under Scheme IA £68,900

Total .. .. .. .. .. .. .. £94,100

If we divide £94,100 by the 630 acres, we shall find that this represents in round figures £150 per acre. We see therefore that if the landowner in this case were willing to accept a certain increment per house, irrespective of the size of the garden, he could afford to supply the land to a Garden City Association undertaking the housing of the whole of the population springing up on his estates on the basis of Scheme IIA, at the rate of £150 per acre, and be in the same position as if he had allowed the old-fashioned speculative builder to develop the land for the same population on the basis of Scheme IA, and charged £300 per acre for the land.

If now we refer to Table II we shall see that the result to the tenant of this reduction in the price of land is that he may have, under the Garden City system of development a plot of 398 yards at a cost of £37 10s. 6d. or at a ground rent of 7d. per week, without reducing the return to the owner of the land; whereas, under the old fashioned system he would have had to be content with 98 yards of land which would have cost £43 8s. 6d., or 8d. per week ground rent ; while the actual cost per yard of his plot would be 1s. 10¾d. in place of 8s. 10¼d.

There would, however, be certain allowances to be made ; the larger garden would cost a little more for fencing and the cost to the owner would no doubt be slightly greater in providing a larger area for building operations, if only in the matter of survey expenses, so that in all probability it would be necessary for the tenant to contribute at least the same ground rent and perhaps a fraction more in order that the larger plot should give the same return to the owner ; but the point which I wish to emphasise is this, that there is no economic difficulty in providing for the development of land on Garden City principles, but that for practically the same cost it is possible, if the owners of land will accept the same total return in increment, to give every house a garden, which, even from the point of view of the value of its produce will be worth vastly more than the 1d. or 2d. per week that it may sometimes cost.

In the above example we have assumed the simplest case of a large estate which could accommodate the whole of an industrial population settling upon it.

By way of further example we may consider the result due to the steady growth of a town, which would follow from each of the systems of development shown in the first example, Schemes I and II; and in this case the results to the owners will be true of the owners collectively, but not necessarily of the owners individually.
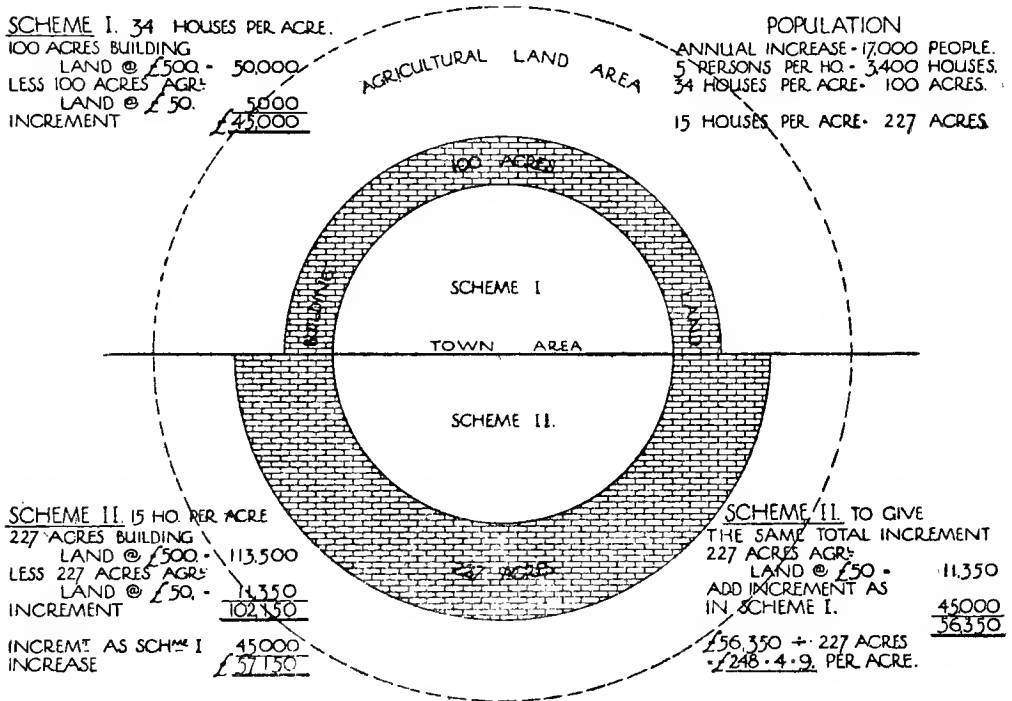
Diagram 4 illustrates the effect when the two Schemes are applied to a town in which an increase of population of 17,000 people takes place every year. Assuming five people to the house, that would mean 3,400 houses to be built every year. The upper half of the diagram shows the development before the adoption of a town planning scheme, the lower half shows the development after the adoption of a scheme limiting the number of the houses in the same proportion as we have limited them in Scheme II, as compared with Scheme I, and the figures show the total increment value and also the reduction of the price per acre which would give the same increment value in both cases; while the third column in Table 1 shows how the reduction of the price of land here arrived at would affect the cost of the individual plots.

It will be worth while at this point to consider the effect which the extra acreage required to provide for the population with the limited number of houses to the acre will have upon the size of a town ; because at first sight it might be imagined that a very serious difficulty would arise in the increased distances to be travelled from the centre to the circumference. Owing, however, to the fact that the area of a circle increases not in proportion to the distance from the centre to the circumference but in proportion to the square of that distance, it follows that the increased radius

required to give an area sufficient to provide each year for a given increase to the population of a town is a rapidly diminishing one: a glance at diagrams V and VI will illustrate this. Further it is probable that the application of town planning to the development of land around towns will lead to considerable economy in its use. It is only necessary to examine town maps or to move about outside the central area of any town to realise that for want of good planning there is much waste of land.

It may be useful to illustrate this question of expansion by reference to the city of London. The area of inner London administered by the London County Council represents a circle having a radius of 6¼ miles. The present population of this area

## Diagram IV.



SCHEME I. 34 HOUSES PER ACRE.
100 ACRES BUILDING
    LAND @ £500 · 50,000
LESS 100 ACRES AGR⁵
    LAND @ £50.    5000
INCREMENT    £45,000

POPULATION
ANNUAL INCREASE · 17,000 PEOPLE.
5 PERSONS PER HO. · 3,400 HOUSES.
34 HOUSES PER ACRE · 100 ACRES.

15 HOUSES PER ACRE · 227 ACRES

AGRICULTURAL LAND AREA

100 ACRES

SCHEME I

TOWN AREA

SCHEME II.

227 ACRES

SCHEME II. 15 HO. PER ACRE
227 ACRES BUILDING
    LAND @ £500. · 113,500
LESS 227 ACRES AGR⁵
    LAND @ £50. -   11,350
INCREMENT   102,150

INCREM⁵ AS SCH⁵ I   45000
INCREASE   £57,150

SCHEME II. TO GIVE
THE SAME TOTAL INCREMENT
227 ACRES AGR⁵
    LAND @ £50 ·   11,350
ADD INCREMENT AS
IN SCHEME I.   45000
     56,350
£56,350 ÷ 227 ACRES
· £248·4·9. PER ACRE.
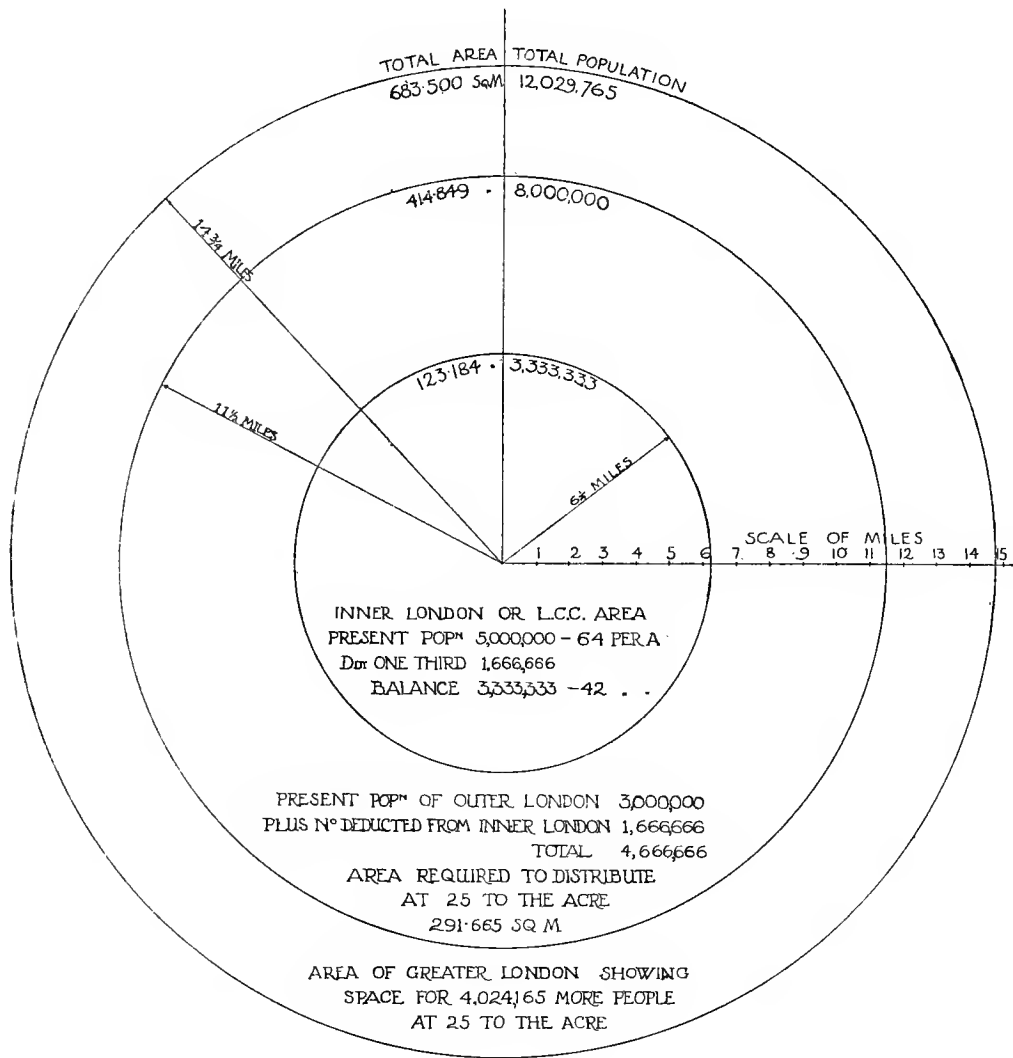
is approximately 5 millions, equal to sixty-four people per acre on an average. There are still considerable areas quite unbuilt upon within this district of inner London. Supposing it possible to reduce the density of population of inner London to an average of forty-two per acre by inducing one-third of the people to live outside the boundary, let us see how this would affect the distribution of population in Greater London. The Metropolitan Police Area is approximately represented by a circle having a radius of 14¾ miles. The present population of this outer area is about 3 millions. If we were to add to this the 1⅔ millions which we have assumed to be persuaded to move out we should have increased the population of Outer London to 4⅔ millions of people. See Diagram V.

In the Hampstead Garden Suburb there will, when it is completed, be an average of something like seven houses to the acre, but the Suburb being a residential area does not have its full proportion of land occupied by business premises and

## Diagram V.



TOTAL AREA | TOTAL POPULATION
683·500 SqM | 12,029,765

414·849 · | 8,000,000

13¾ MILES

123·184 · | 3,333,333

11½ MILES

6¾ MILES

SCALE OF MILES
1  2  3  4  5  6  7  8 ·9 10 11 12 13 14 15

INNER LONDON OR L.C.C. AREA
PRESENT POPⁿ 5,000,000 – 64 PER A
Dᴏᴛ ONE THIRD 1,666,666
BALANCE 3,333,333 –42 . .

PRESENT POPⁿ OF OUTER LONDON  3,000,000
PLUS Nᵒ DEDUCTED FROM INNER LONDON 1,666,666
TOTAL  4,666,666
AREA REQUIRED TO DISTRIBUTE
AT 25 TO THE ACRE
291·665 SQ M

AREA OF GREATER LONDON  SHOWING
SPACE FOR 4,024,165 MORE PEOPLE
AT 25 TO THE ACRE

workshops.   If we add to the area of the Suburb the greater part of the eighty acres of open space around which it is planned, to represent an area devoted to these purposes, we should then find that the average population to the acre would be something like twenty-five people, equivalent to about five houses.   Assuming that

# Diagram VI.

DIAGRAM SHOWING RELATIVELY SMALL INCREASE OF RADIUS REQUIRED
TO PROVIDE AREA SUFFICIENT TO HOUSE A GROWING POPULATION
TAKEN AT AN AVERAGE OF 25 PEOPLE TO THE ACRE.
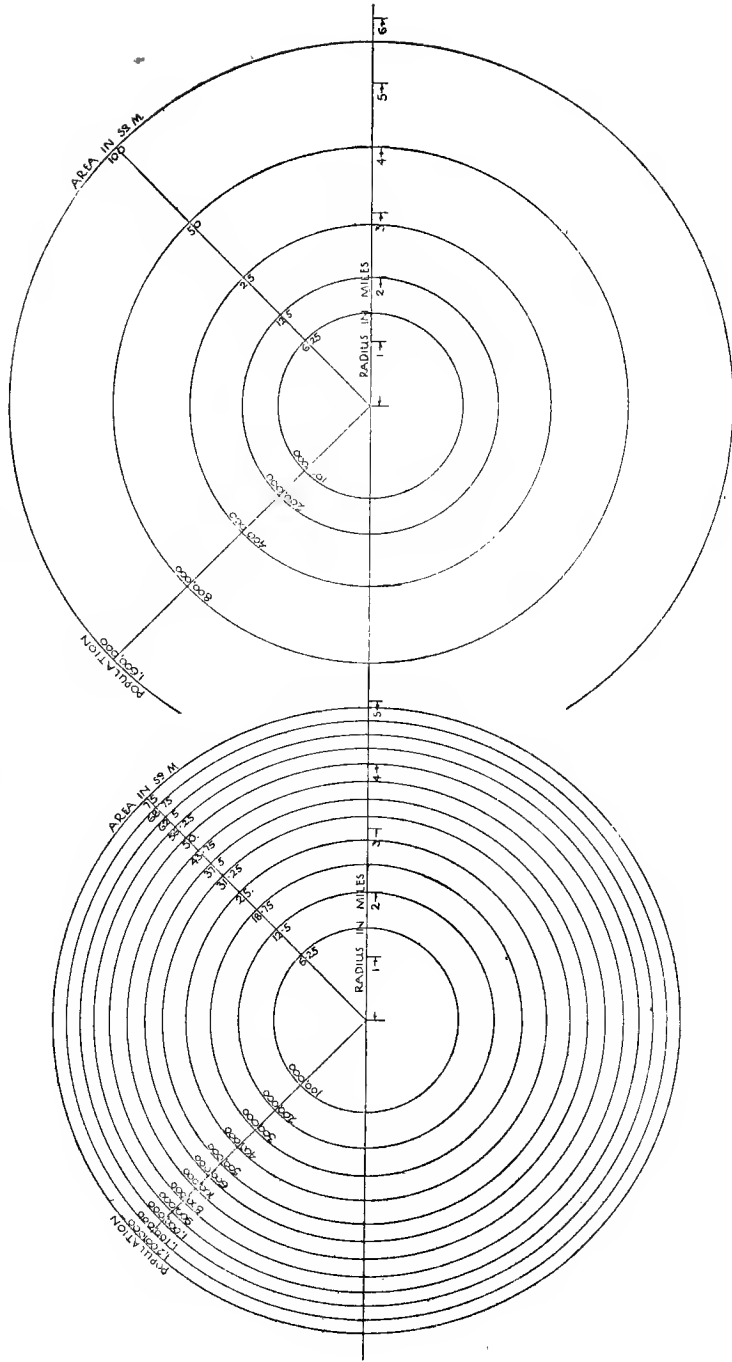
the 4⅘ millions of population, which we have considered should be provided for in Greater London, were to be spread out on this basis of an average of twenty-five to the acre, I find that including the population supposed to be left in Inner London, the total of 8,000,000 people would only need an area having a radius of 11¼ miles, while the present area of Greater London would allow of the population increasing from eight millions up to twelve millions distributed on this same basis.

It will be seen, therefore, that the total additional distance to be travelled as a result of preventing overcrowding is a comparatively unimportant matter. Indeed overcrowding, though very bad in certain areas, is very much a local evil, and it is remarkable to find how small is the average number of people to the acre in many districts of London, where one knows that the overcrowding on certain individual acres is very bad. We may, therefore, safely say that there is no sound argument against reducing the number of houses to the acre on the score of seriously increasing the distances to be travelled. See Diagram VI.

It may well be asked, how is it if the economic advantages of overcrowding are so small and the disadvantages so great that the overcrowding system has so generally been adopted? The reason is simply this, that the one person who can secure the advantage happens to be the person who is generally able to settle the type of development, namely, the individual who, having a limited plot of land, sets out to secure the maximum return he can from it by building upon it; and it is true that the value of land as a definite stand for a building is greater than its value as garden land around the same building. In the case of the owners of land, the reason is probably due to the fact that they have not thoroughly thought out or understood the matter, and have looked at the price per individual acre, and have not realised, for example, that if they could sell two acres of land for £300 every year, they were doing better than if they sold one acre of land for £500. But, unfortunately, the majority of people, and particularly the occupants of small houses, which are the ones usually most overcrowded, care chiefly to get a house of some sort at the least cost, and have no means of knowing, because no choice is ever put before them by which they may judge, that they are paying at an extravagantly high rate for their small plots as compared with what they might pay for much larger plots.

When a hard pressed working woman goes to look for a house she considers chiefly the rent, and it will be seen that even in the most favoured circumstances, unless there is some alteration in the value of land, the bigger plot does cost a trifle more. In our first example the difference is the substantial one of 3¾d. per week, a difference which is truly small compared with the difference in the size of the plot, but is a substantial one none the less.

So long as each individual speculative builder looks at his own acre of land only, having bought it and paid the price for it, it is probable that he can sweat out of that land a little more profit by building the maximum number of houses upon it, because in spite of the increased cost of development, under present circumstances the return, whether he sells the land or lets the houses, will increase a little the more buildings he puts upon it, and increase a little faster than the increase in the cost of development. But if the number of houses to the acre around a growing town is limited under a town planning scheme, this does not mean that the builders will get less profit in the future. It may mean that an individual speculator, who has bought an individual plot, will make less profit out of that particular piece of land than he would have done, though, as has been shown, the difference will be very much less than he imagines. He need not, however, lose anything of his profit per house, because the same number of houses will be required; and though it may require a little more

capital to purchase enough land for the same number of houses, there seems no reason to suppose that the limitation of the number of houses to the acre is in any way liable to reduce the builder's profit either on the buildings themselves or on the increased value of the land due to development, if this profit is estimated per house, as it should be, and not per acre, as at present is the custom. And we have seen that this is true for the owner of land also. In spite, therefore, of the fears of the landowner and the speculative builder there does not seem to be any reason why town planning should not prove to be to the real benefit of both parties. It is, of course, not contended that the limitation by a town planning scheme of the maximum number of houses that may be erected upon the acre of land will not cause loss to anyone. It is probable that no change can be introduced, however beneficial, that will not cause individual hardships.

When anyone purchases land he estimates its probable value and takes the risk of increase or diminution. If a railway station is opened adjacent to his land, its value will go up ; if a factory is built on the next plot, it may go down. In one case benefit and in the other injury results ; but the fact that these risks may work hardship does not prevent either the station or the factory from coming ; and there seems no reason why the community should refrain from putting upon the use of land for building purposes a limitation of the number of houses to the acre, because this may diminish the value of certain pieces of land and increase that of others. Indeed, there is another point of view which might be put with some force by those who have purchased land a little farther out of the town. May it not be put thus : A. has purchased land on the assumption that the overcrowding of buildings would continue to be allowed long enough for him to develop it. If, in the interests of public health, that overcrowding is forbidden, he has simply made a mistake in his speculation, and he loses thereby. But can he really claim that there is any injustice ? For B., who has purchased some other land a little further out, has calculated that the general tendency to check overcrowding which has marked the development of by-laws for some time past, would, at an early date, bring a building value to his land, and he will be a loser if overcrowding continues. Could he not, with equal force, say that it is very unjust to him that so many houses should continue to be allowed to be built to the acre that building value is prevented from reaching his land, a value which would accrue to it if such overcrowding were prevented, as it ought to be in the public interest.

It seems to me that in matters of this kind it is the obvious duty of the community to provide for the right system of development, and not to be turned aside because of hardships that may fall upon a few individuals who have laid their plans on the assumption that they would continue to be allowed to do something which has proved to be detrimental to the community. The fact is that nobody can acquire a prescriptive right to injure the community.

But, however this point may be regarded, I think that the figures which I have given prove that the hardship to anybody of limiting the number of houses to the acre would be very much less than is generally supposed, owing to the fact that the advantage due to crowding houses upon land is a constantly diminishing one as the crowding increases; and I think, further, I have proved that the overcrowding system is injurious to all parties and really beneficial to nobody.

It is quite startling to see the extent to which this is true, and it shows how a haphazard system of growth in a community may result in the introduction of the most serious evils on account of some supposed interest, which, when this method is contrasted with the rational and co-ordinating system, proves to have the very

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smallest·amount of real weight, out of all relation to the evils which have been caused.

Startling as the figures above are, it is important however, in framing regulations for limiting the number of houses to the acre, that the fact should not be overlooked that a particular plot of land is more valuable in proportion to the amount of building put upon it. Where there is no limit to the number of houses which may be built on any area of land, it is obvious that the larger the house the fewer the number that can be built, and therefore the cost as between the different sizes of house tends to adjust itself. It is only to some extent, however, because it is quite true that the smaller the house the greater in proportion to its cost must be the costs of the plot on which it stands, and the cost of the roads required to give access to it.

Now, the limitation of the number of houses has the effect of securing that every individual plot is large enough to hold quite a considerable sized house. Quite apart, therefore, from the cost of the plot the result of limiting the number of houses to the acre is to take away even such natural tendency as at present exists for the cost of the plot to be adjusted to the cost of the building by reducing the size of the plot as the buildings grow smaller. We have seen that with ten houses to the acre the average size of the plots will be about 400 yards. Now, on a plot of 400 yards area, there are often built in suburban districts houses costing £600 or £700, and even then a fair-sized bit of back garden is left. The extra road frontage required for such a building to be put on a plot over that required to erect upon it a small cottage, costing about £200, is small in proportion to the difference between the costs, while the actual price of the land of the plot remains the same in both cases. But there can be no doubt that the ground rent which could be charged to such a plot, with a £600 house upon it, would be very much greater than the ground rent which could be charged if there were a £200 cottage upon it.

A very considerable inducement will therefore result from the limitation of the number of houses to the acre for the builder to use each plot for the biggest type of building for which he can secure a demand. Experience has shown that where plots have been laid out by a land owner, not of the minimum size, and where they have been let at a fixed ground rent, it is very difficult to induce the speculative builder to erect upon them small cottages, even where the demand for small cottages is very great. In many towns, of which Cardiff affords a notable instance, it will be found that the builder has erected upon each plot a large type of cottage, having three rooms and a scullery on the ground floor and three or four bedrooms on the first floor. This large house is so costly that the workman cannot afford to pay the whole of the rent himself, and is therefore forced to take in another family to lodge in part of the house to help pay the rent. I think it is of great importance, therefore, when limiting the number of houses to the acre, whether this is done by a town planning scheme or by an individual owner leasing or selling land for building purposes, that the reduction of the number of houses to the acre should not be by means of a simple flat rate of ten or twelve, but should be in accordance with a scale bearing a relation to the size of the house. In this way only can the tendency to build larger houses than are required in any district be checked, and in this way only can the excessive overcrowding of the medium and larger sized house in places where there is a great demand for them be prevented. In several cases of development on Garden City and Garden Suburb lines, in order to secure that too large buildings should not be erected on the more generous sized plots there provided, it has been necessary to fix for each plot a maximum size of building to be erected upon it. The following scale has been adopted in one instance, as between the landowner and the Society developing the land, and it affords an example of the way in which the limitation of the number

Diagram VII.



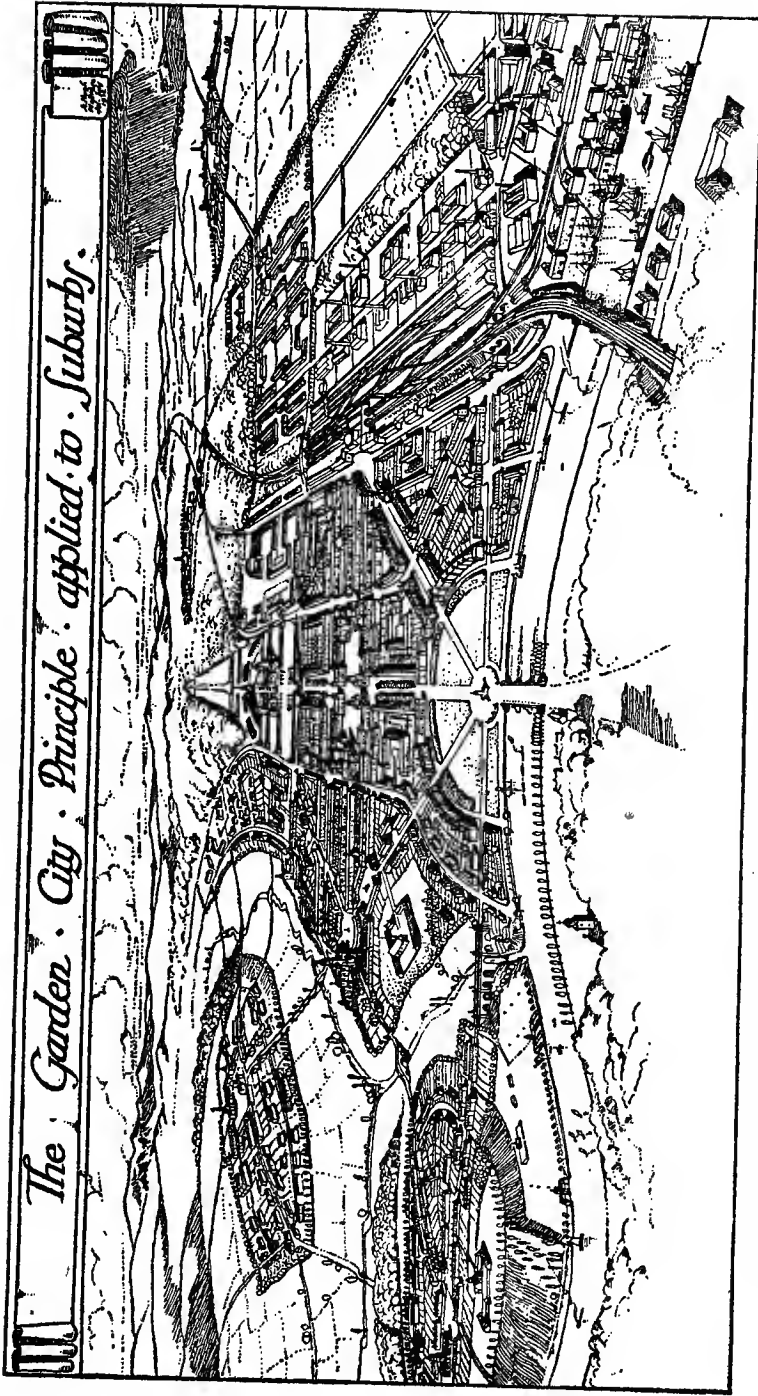The · Garden · City · Principle · applied · to · Suburbs.

Diagram illustrating the development of a town by means of self-contained suburbs with
defining belts of open space.   See page 2.

of houses to the acre can be secured while to some extent guarding against the difficulties that have been referred to :—

<div align="center">TABLE III</div>

Houses not exceeding in cost,
when cubed at 6d. .. .. £225 not to exceed 14 to the acre nett.
do. do. cubed at 6d. .. .. £350 ,, ,, 12 ,, ,,
do. do. cubed at 6½d. .. .. £500 ,, ,, 11 ,, ,,
do. do. cubed at 6½d. .. .. £700 ,, ,, 10 ,, ,,
do. do. cubed at 7d. .. .. £900 ,, ,, 8 ,, ,,

The average over the whole Estate not to exceed 7 to the acre, gross measure.

In framing the regulations at the Garden City at Letchworth it was sought to meet this point to some extent by the following provisions :—

1. That in the case of houses on ordinary sites, not more than one-sixth of the site should be covered by buildings.

2. By stipulating that dwelling houses costing less than £200 should not exceed 12 to the acre ; houses costing from £200 to £300 should not exceed 10 to the acre ; houses costing from £300 to £350 should not exceed 8 to the acre ; and so forth.

These regulations being framed under the Company's lease, it was possible to allow more discretion in their interpretation and application than would be practicable if they were to be enforced by Local Authorities as building regulations under a town planning scheme. But it is suggested the difficulty may be met by some such arrangement. Certainly to limit to a fixed amount, say ten or fifteen for example, the number of houses irrespective of size which may be erected on the acre, would be a very rough and ready way of securing the ends desired ; and the alternative method which has been suggested of limiting the number of cubic feet of building to the acre, although accommodating itself more scientifically to one aspect of the subject, is nearly as crude as the previously mentioned flat rate limitation, because quite unrelated to another aspect. The fact is that there are two important and different considerations which make some sort of limitation desirable. One has relation to the amount of building and the other has relation to the population, and the desired end can only be attained by some scale which takes into account both these relations.

A limitation of the cubic contents of the building would have the effect of requiring one acre of ground for a single house when it reached a certain size, and that not a very large size, if, at the same time it was to have the effect of preventing more than ten to fifteen families living on the acre. For the purposes of general amenity, a certain amount of open space in relation to cubic size of building is desirable ; but, on the other hand, it is perhaps even more desirable that there should be sufficient area of open ground for garden and recreation purposes for each family, irrespective of the size of the house it occupies. It is for this reason that I think a scale system of limiting the number of houses to the acre would be found to be on the whole simplest and most satisfactory. Such scale can be arranged to allow sufficient space in proportion to the increased cubic size of larger houses, and at the same time provide for the proportionately larger area of garden per family, which is desirable as compared with the cubic size of the smaller types of cottage.

It has the additional advantage of following closely the lines laid down in the Housing and Town Planning, etc., Act, 1909, which permits " restrictions on the number of buildings which may be erected on each acre, and the height and character of those buildings."

# The Garden City Method of Development.
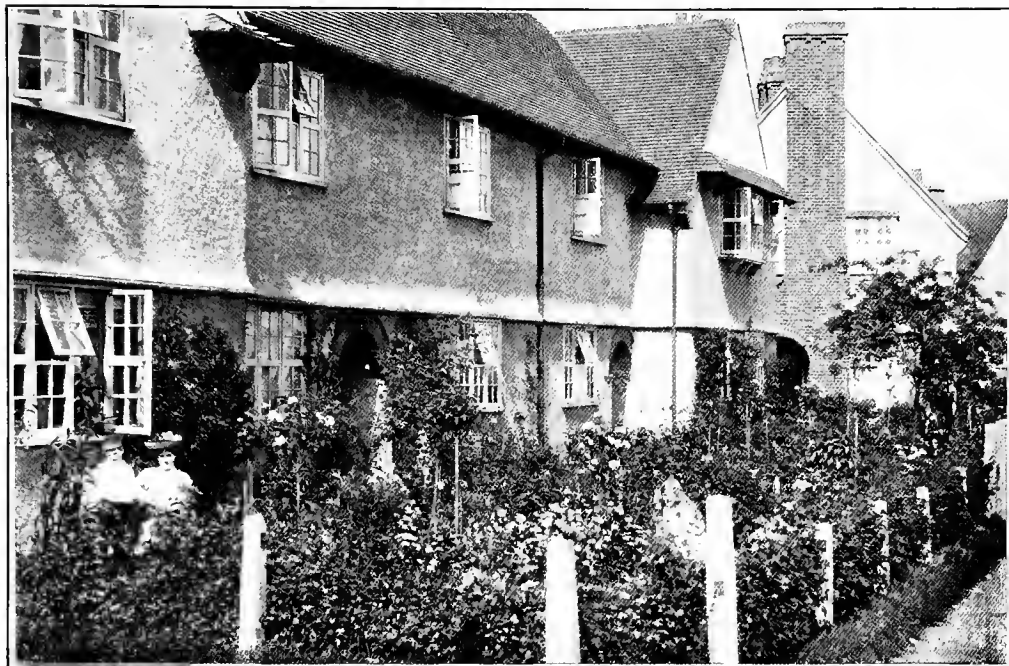


FRONT GARDENS TO HOUSES UNDER TOWN PLANNING

# The By-Law Method of Development.



ORDINARY SUBURBAN VILLAS, SHOWING AMOUNT OF SPACE FOR FRONT GARDEN.

# Garden City Method of Development.



FRONT VIEW AT HAMPSTEAD GARDEN SUBURB, ILLUSTRATING 12 HOUSES TO THE ACRE NET
OR ABOUT 10 GROSS.



BACK VIEW, SHOWING THE AMOUNT OF OPEN SPACE, WITH 12 HOUSES TO THE ACRE NET, OR
ABOUT 10 GROSS. AS IN SCHEME IIA,

# The By-law Method of Development.



CHARACTERISTIC STREET OF ARTIZAN HOMES IN INDUSTRIAL TOWNS AND CITIES.



BACKS OF ARTIZAN HOMES.

# The Garden City Method of Development.



BACK GARDENS, 12 HOUSES TO THE ACRE NET.

# The By-law Method of Development.



BACKS OF SUBURBAN VILLAS, SHOWING AMOUNT OF GARDEN SPACE IN REAR.