planner may be able to prevent this happening, but he must consider the consequences of doing this. If it causes the incoming population to settle in other parts of the area, then this must be facilitated, and the effects on such factors as the extra loading of internal transport routes considered. If it prevents the population from coming in, then the effects on industrial and other activities in the town must be calculated. If the planner ignores the consequences of his actions, he may find that the efficient use of the urban area within his plan is reduced, for example, by increasing congestion on the transport routes and systems, or by industry moving out of the area.

It is impossible for the planner to foresee all the possible influences on an urban structure in the future. He can try to meet any unforeseen contingencies in two main ways. Firstly, by making the plan as flexible as possible, consistent with the aims of the plan. He must do this whilst keeping uncertainty to a minimum since this may have undesirable effects. As outlined earlier in this chapter with reference to the use of roads, it may be able to achieve a degree of flexibility with non-profit uses by making adaptations to different uses easy and relatively cheap as a result of the planning. With regard to profit uses, flexibility may be achieved by reservations of land between zones of different uses which can be used for any purpose.

Secondly, some unforeseen contingencies may be assimilated without any detrimental effect on the efficient use of an urban area by allowing as much freedom in the private uses of land as possible. For example, the changing demands for different goods and services will manifest themselves by changing demand for the space in which to produce and sell the goods and services. If planners place the necessary limitations on the private uses of land, rather than plan the allocation to individual private uses themselves, then such adaptations are made easier. The detailed planning of private uses would make adaptation more difficult and require much more knowledge of the forces, which change urban areas.

Planners require a knowledge of the forces which make for urban change for another reason. They are often faced with an intransigent attitude in society towards planning, and are only able to carry piecemeal planning as the pressures from these forces build up in the form of congestion on the roads, urban blight, etc. Prediction that these pressures are developing will enable them to persuade their opponents that it is necessary to carry out their plan, even if only in the area under consideration. Modern town planning could be said to be partly a consequence of the inability of urban areas to adapt to meet the requirements of modern society and bring about their fullest possible utilization without intervention by a public authority.

16.6 HOW ECONOMIC FORCES ADAPT TO PLANNING

It should be part of the planner's task to try to assess the economic effects of his actions. By making an estimate of the possible pressures from economic forces, which are likely to build up within his plan, he may be able to change those parts of the plan which could lead to inefficiency. It is probably much easier and cheaper to make alterations to a plan when it is in the earlier stages than to wait until the pressures from the economic forces have built up when fundamental alterations to the urban structure can only be made at great expense. Knowledge as to how economic forces adapt to planning will also help in another way. If it is known how these forces react to various aspects of planning, it may be possible to use planning to achieve given economic aims. For example, if it were known that rigid zoning without density limitations in industrial areas led to combinations amongst firms, and if this was considered economically-desirable, then planning might be used to achieve this aim.

Unfortunately, little empirical work has been done on this subject. All that can be done at this stage is to postulate that an imaginary plan in an urban area has given results, and outlined some of the possible adaptations, which could take place in response to the situation. Suppose planning had brought about an imbalance between the job opportunities and working population in an urban area, if the working population is larger than the job opportunities within the urban area, then in the short run, there is likely to be unemployment, or if there are job

opportunities within commuting distance of the town, a net commuting out, with the possible effects on the transport routes. In the long run, there may be persistent unemployment with a net emigration out of the area. If it is mainly the young which emigrate, then industry in the area may suffer a lack of vigour. If there is full employment elsewhere, there may be pressure to bring in more industries, which may require major alterations to the plan.

It is possibly more realistic in an era of relatively full employment to look at the opposite situation, where planning in an urban area has brought about a situation where the job opportunities are greater than the working population. If it is possible, there may be a net commuting in from surrounding areas. The demand may force up wage rates within the town as employers compete for labour in both the town and the surrounding area. If wage rates are lower in the surrounding area, there will be the tendency for them to rise in order to retain the labour. Overcrowding may take place in the residential accommodation in the town in the form of doubling-up with relatives and taking in of lodgers. These expedients in the face of a fixed supply of housing accommodation are likely to result in a surplus of persons living in the accommodation above what is the currently-accepted standard. There is likely to be pressure to build more residential accommodation, which may require major alterations to the plan, as land allocated to shops, schools, roads, parking, etc. may have been on the basis of the present population.

It is interesting to look at the possible reaction of the employers in the urban area to such a situation. If they were unable to obtain the labour required, they may in time contract their activities in the town. If they do not expand their activities elsewhere at the same time, this is likely to be bad from an economic point of view since there may be a loss of production potential. Even if they do transfer part of their activities elsewhere, there may be a reduction in efficiency, since they are being forced to separate activities which they would prefer to keep together. The transfer of activities is likely to take two forms: the opening of branches of the firms or new plants elsewhere, or the contracting of work to other firms. With the establishment of new branches or plants, there is likely to be a permanent loss of job opportunities in the town. This may be cumulative and gather momentum as

the branches and plants develop to a size comparable to the original one, with the result that over time many more job opportunities are lost than were signified by the original transfers of activities. Sub-contracting is a more temporary loss of job opportunities since it can be terminated if the labour supply is increased. At the same time as transferring activities elsewhere, because of the shortage of labour, the firms may be forced to leave machinery and plant idle. This is a waste of resources, since the machinery and plant must be duplicated elsewhere in order to produce the goods required.

Employers may respond by trying to work the labour available more intensively by overtime working, and/or extending the labour force by the employment of married women for part-time. Overtime working is generally considered to be very inefficient. Once overtime is on a regular basis, the worker tends to view such earnings as part of his basic pay, and will tend quite naturally not to work too hard during the remainder of the time to ensure that the overtime will continue. In any case, numerous studies have shown that a man's powers of concentration and ability to perform set operations declines progressively after working for a given number of hours. Overtime increases the cost of production since higher rate of pay has to be made for such work. The employment of part-time married women is also considered to be less efficient than the employment of persons to work full time. Not being the main wage earners in the family, they are less reliable. They have a more independent attitude to their work and are subject to absenteeism because of family troubles. Against this, it can be argued that in the employment of part-time married women, a potential labour supply is being tapped which would otherwise remain unutilizedd. This is economically desirable in times of full employment.

As an alternative, firms may substitute capital for labour in the form of automatic and semi-automatic machinery and mechanical handling devices. The non-availability of labour and the increasing cost of labour, which is a function of the shortage, may make it profitable to do this. Again, this may be economically desirable in an era of full employment, for increases in mechanization leads to the labour supply being used more productively. The substitution of capital for labour

may have an effect on the structure of firms within the town. Large firms can generally utilize capital equipment more efficiently than smaller ones, and this may lead to small firms in the town producing the same or similar products amalgamating, or being driven out of business, so that the net result is fewer firms in the town.

16.7 GREEN BELT POLICY

The basic idea behind the green belt policy is to contain the lateral growth of given urban areas with the object of preventing their coalescence with nearby urban areas and to provide countryside within reach of the inhabitants of the urban area. The question, which will be considered, is how do economic forces adapt themselves to such a planning policy? If there are pressures for lateral growth in an urban area and it is prevented, the pressures will tend to manifest themselves in other ways. If workers are attracted to the urban areas by job opportunities, with a green belt policy, they will be forced to live within the urban area thus adding to the numbers living within the confined space or to live beyond the green belt and travel in and out from their employment daily. It would be the lower income groups which would congregate near to their places of employment for their incomes, placed a limit on the distance, which they can travel to and from work.

There are many possible consequences, which may arise from this situation. The influx of workers into the area without an increase in accommodation will tend to force rents up, and assuming incomes do not rise at the same time, the inhabitants would be forced to occupy a smaller amount of accommodation, and overcrowding will occur. The local services such as refuse collection and hospital services may be difficult to adapt to the larger numbers with the result of a loss in efficiency. If an increase in accommodation is forthcoming, then this will mean higher densities, and pressures to change other aspects of planning policy such as day lighting standards. The higher densities themselves may be contrary to original planning policies. If the green belt policy, together with other planning policies, such as density limitations, are effective in preventing the influx of workers within the

area, then there may be any of the responses described in the last section of the employers to a labour shortage.

Commuting across the green belt may reduce the efficiency of the transport systems if they are unable to adapt to take the increased numbers. If private cars are used to cross the green belt, unless the users are provided with an incentive or deterrent, they are unlikely to transfer to other forms of transport within the urban areas. The extra cars add to congestion on the roads and reduce their efficiency in use. If the journey to work is made longer or more uncomfortable with an increase in irritability, then efficiency in employment may be reduced. Resources are being used to transport persons across the green belt which could be used for other purposes. It will cause urban areas beyond the green belt to grow at a faster rate than otherwise. They may then attract industry and employment opportunities, thereby reducing the need for their inhabitants to commute across the green belt. Their growth may also bring pressure to change the green belt policy.

From what has been said, it can be seen that no clear picture emerges as to whether green belt policy is good or bad from the point of view of economic efficiency. On balance, it would appear to reduce efficiency, although empirical research into the subject may prove the opposite. The type of question, which a research worker could ask is: would an alternative policy be more economically-efficient? Does the policy achieve its objectives? How many inhabitants actually visit the countryside in the green belt? If the areas beyond the green belt are dependent on the urban area being contained, is economic coalescence hampered by green belt policy?

There is a need for research, not only into the economic consequences of green belt policy and possible alternative policies, but also into the economic effects of all aspects of town planning. Such knowledge will enable the planner to harness economic forces to achieve the objectives of his plans. Absence of this knowledge can only lead to frustration.

CHAPTER SEVENTEEN

ECONOMIC PLANNING AND TOWN PLANNING

17.1 INFLUENCE OF GOVERNMENT ON ECONOMIC ACTIVITY

The influence of the Government on economic activity is all pervasive. It can be said that in modern Britain, not a single economic action escapes its influence. The past and present policies of the Government set the framework within which institutions and persons have to operate. If, for example, recent policy has been one of deflation and individuals will find it more difficult to sell their goods and services, whereas if it had been a policy of expanding the economy, the goods and services would have been easier to sell. Likewise, if government policy had been one of high interest rates, then not only would present economic activity be affected by credit restrictions, but future economic activity would also be also affected, since interest rates are a major influence in investment decisions. Although institutions and persons try to influence government policy, the policy itself has to be taken as given, as a basis of decision-taking.

The allocation and use of resources are also affected by the Government's financial decisions. It spends large amounts of money directly or indirectly through such bodies as the local authorities, on the provision of goods and services such as housing, education and defense. It provides income or part of the income to some members of the community in the form of family allowances and pensions. To pay for these goods, services and income, it collects taxes and borrows money from institutions and individuals. This redistribution of money between the Government and the remainder of the community, and between different individuals in the community, has a major influence on the use and allocation of resources. If the Government collects taxes and borrows money from a firm, it reduces the firm's command over resources. If it spends that money on the provision of, say housing, then the resources will be used for that purpose. The use of the resources has been

diverted from what the firm would have used the money for, if it had retained it, to housing. Similarly, if one person's disposable income is reduced by the payment of income tax and another person's income increased by the receipt of family allowances, then resources will tend to flow away from the production of goods and services demanded by the first person towards those demanded by the second.

The Government will have a direct influence on those firms whose activities, wholly or partly, are spent in the provision of goods and services demanded by the Government. The giving, renewal or cancellation of a contract by the Government can cause a firm to expand or reduce its activities. Such firms are a sizable proportion of the total number. Over 40 per cent of total fixed investments are made by the Government, local authorities, and the public corporations, besides public authorities' current expenditure being in the region of 15 per cent of total final expenditure. Government policy on specific issues such as increases or decreases in expenditure on roads, railways and schools, will affect different sections of the economy. In fact, it can use such influences to guide the economy, or sections of it, in a desired direction, for example, by giving contracts to firms in areas where unemployment is above the national average, the Government can help to reduce unemployment in those areas.

The Government has a major influence on economic activity through its legal enactments. The many laws on the use of labour and land will partly determine how firms and persons will use them, both for consumption and production purposes. They will also affect the use of resources generally, for example, laws which restrict the use of labour may cause firms to adopt more capital-intensive methods of production. The laws relating to the sale of goods may, for instance, determine the quality of the commodity, which a firm produces. Although, a change in the law will focus attention on the economic effects of the law, after a number of years, it often becomes so much a part of the bias of decision-taking as to pass almost unnoticed. The law regarding child labour passed in the last century still

has economic consequences today; although it would appear to producers that the law was irrelevant to their decisions.

17.2 EFFECTS ON LAND USE

It can be seen that the Government's influence on land use must be one of the decisive factors, which determine the patterns that emerge. In guiding and controlling economic activity, it alters the relative profitability of different land uses, as well as determining the economic framework which forms the background to profit-making decisions. All government activities will affect the pattern of land uses in varying degrees. The laws relating to land use directly, such as the Housing Acts, are likely to have more effect on land use than say, laws referring to the use of labour such as the Shops Acts, although even these are likely to have some effect. The collection of money from the community, and the redistribution and spending of it in ways which the Government decides, will affect the patterns of land use. Again, although all taxation and government expenditure is likely to have an effect on land use, some forms of taxation and expenditure may have more effect than others. If the Government taxes a particular type of property and spends money on acquiring land for public use, these are more likely to affect the patterns than say the purchase tax on goods and the giving of pensions.

Economic planning, like any other government activity, will have an effect on land use. To look at an example, if the Government decides to restrict credit and raise interest rates in order to achieve a favorable balance of payments, then this will affect land use in many ways. It may reduce the inflow of money into building societies, thereby cutting the demand for old and new houses. It may make it more difficult for some builders to borrow to finance their activities and this will cause them to lose opportunities to redevelop property. It may alter the profitability of businesses, causing them to alter their anticipated demand for land for their use. The effects of such economic planning on land use will be haphazard.

It may be found that the effects of this general type of economic planning are in conflict with the *ad hoc* planning regarding land use embodied in the Town and

Country planning Acts, administered by the Ministry of Housing and Local Government. The economic pressures built up by credit restriction and high interest rates may work to bring about a different pattern of land use from the one envisaged by the planning authority. This is more likely to be true of the effects of long-term planning, say to achieve a given rate of economic growth than of short-term planning to meet a balance of payment crisis. As indicated in the last chapter, such economic pressures resulting from economic planning will tend to adapt to the planning situation. If prevented from manifesting themselves in one way by land use planning, they will tend to manifest themselves in another way; although the net result may be that the aims of the land use planning may be frustrated. If planning for economic growth results in pressure to bring more industry into an area than the town planners envisaged, then the industrialists may adopt expedients such as bringing in more component parts, which create a set of different problems such as congestion on the roads. This may eventually force the planners to revise their plans.

17.3 REGIONAL PLANNING

The question is raised as to how can economic planning and town planning be coordinated to achieve the most efficient use of resources? The essential difference between economic planning and town planning is that economic planning, whether it is to achieve specific aims on an *ad hoc* or general basis, is on a national level, whereas town planning is essentially local. Until the beginning of the 1960's, there was no attempt to coordinate the two. In fact, there was little attempt to co-ordinate the various aspects of *ad hoc* planning, for instance, a credit restriction to achieve the general aims of economic policy was applied to areas where the rate of unemployment was above the national average as well as to others. This conflicted with the *ad hoc* plan administered by the Board of Trade to increase job opportunities in those areas.

Although, under the 1947 Town and Country Planning Act, town planning was comprehensive in so far as development plans were prepared for the whole country; as far as can be ascertained, little success attended the attempts to co-

ordinate the individual development plans in order to reconcile any conflict in interests between them. This is a necessary step in order to co-ordinate economic planning and town planning, for if there are conflicts of interest between the individual development plans, the coordination of economic planning and each development plan may be impossible. The main reason for the lack of coordination between the individual development plans was the absence of regional planning, which provides the necessary background knowledge to make this possible. It was not until the first half of the 1960's that the need for regional planning impinged or public consciousness.

Before considering the role of regional planning in the relationship between economic planning and town planning, let us consider the necessity for regional planning. When planning for future land use in an area, it is essential to know what economic functions it is going to perform for other areas, and what economic functions other areas are going to perform for it. These types of relationships are likely to be revealed by regional analysis, which is a necessary prerequisite of regional planning. The more of these economic functions that are known with certainty, the more efficient is the land use planning likely to be. If uncertainty exists as to the economic relationships between areas, then this may lead to inefficiency, for example, if there are three urban areas adjoining each other and each plan their own land use pattern completely independently, then there may be duplication of facilities with resulting under utilization. Each area may plan a shopping centre on the assumption that their particular shopping centre will be the one for the total population of the three urban areas. Coordination of local plans within a regional plan may avoid this.

In the absence of regional planning, there must be the tendency for local planning to take what other planning authorities are doing as given since one area has no control over other areas and to ignore the effects of one's own town planning decisions on other areas. If in one area, the planners decide to encourage and facilitate more industrial buildings, they are unlikely to consider the effects on industry in another area, and the best that planners in the second area can do, is to

take it into consideration in formulating their own plans. Regional planning, at least, gives the local planners knowledge of the relationship between the areas on which to base their plans, and makes cooperation between them more possible.

With regional planning, not only may the wasteful duplication of facilities be avoided, but the possibility of reaping economies of scale increased. As already demonstrated, if a facility serves a larger population, it is likely to be better and more specialized. Without regional planning, there may be the tendency for each local planning area to facilitate the provision of as many facilities as possible. It has been recognized for a long time that local planning areas are too small to plan the provision of certain facilities, for example, in the case of roads; they are too small to plan the provision of trunk and many other roads. Again, regional planning can assist the provision of this type of facility.

The main argument which has been used against regional planning, is that the regional planner is unlikely to have the necessary knowledge of local needs, and that in any case, he would probably ignore them and look only at regional requirements. It has never been advocated that regional planning should replace local planning, but there should be a division of function between them. In the case of the provision of roads, there is a division of function on a national, state county and local level, the Ministry of Transport and Civil Aviation being the highways authorities for trunk roads, the state being the highway authorities for most Class I, II and III roads and the local authorities being responsible for the remainder. In a similar manner, there could be a division of function in land use planning on a national, regional and local level.

17.4 NATIONAL LAND USE PLANNING

It has been advocated by Josephine P. Reynolds that a national land use plan should incorporate motorways, urban regions and recreational areas, and should be comprised of a diagram, which stresses the relationships between these three basic elements. This plan outlines the broad physical structure of land use in the country showing the inter-relationships which could only be seen on a national

level. The question which is raised is what form should national land-use planning take? It would be extremely difficult to have physical planning on a national level. All kinds of regional and local considerations militate against such planning. It would be impossible for a national land use planner to take into consideration all regional and local circumstances if they planned the actual physical land use. If attempted, it might be found that the operations of economic forces were being frustrated, or pressures would build up, which would frustrate the national physical land-use plan.

This difficulty possibly delayed the introduction of national land use planning. It could be overcome by translating a national land use plan into a number of policy statements instead of a national plan of physical land use. If it was considered desirable to make certain areas of the country recreational areas, this aim could be stated in a policy statement to this effect and regional and local planners would be required to draw up their plans conforming to this policy. By this method, regional and local considerations could be reconciled more easily with national requirements. The local planning authority, with knowledge of local condition, is in a better position to reconcile local requirements with the national ones, than a national planning authority.

Flexibility could be introduced into such a system by making it possible for a local planning authority to appeal to the appropriate Ministry to plan land uses against a given policy statement if it believed that local considerations were more important than national ones. If for example local planners wanted to facilitate out-of-season employment in recreational areas by attracting appropriate industries, then exceptions could be made. A policy statement is more likely to cause national land use planners to state reasons for the policy than if the national plan manifests itself as the actual physical planning of land use on a national level. This would enable the planners and others to see whether there were conflicts between the aims of this policy and other policy statements.

Policy statements could be made not only on actual land uses within given areas, but on factors which may have an appreciable effect on land use, for example,

policy statements such as that population and industry would be encouraged to expand in one area and contract in another, and that given urban areas would be encouraged to grow or contract, could be incorporated into the national land-use plan. This would facilitate the reconciliation of any conflicts between the different policy statements over land use. The policy statement would be constraints within which the regional and local planning authorities would have freedom of action. It must be emphasized that there are always constraints on an institution's or person's actions, for instance, the laws of a country. Where the provision of a facility is under control of a national body as in the provision of trunk roads, then that national body could work under the constraints of the policy statements in the way as the regional and local planning authorities.

17.5 REGIONAL AND LOCAL PLANNING

To a large extent, the relationship between regional and local land-use planning would be the same as that between national and regional land use planning. The planning of the regional body would mainly consist of policy statements within which the local body would have freedom of action. This was the type of relationship envisaged between the county and urban planning authorities and the local planning authority by the Planning Advisory Group in 1965. The county and urban planning authorities would deal with the broad physical structure of their areas leaving the detailed allocation of land use to the local planning authorities. It was assumed that regional policies would form the general framework within which the local plans would be drawn up. Regional policies would outline population location and future growth; employment centers and their development; major communications; major landscape and countryside policies such as green belts and national parks; regional services such as water supply; and broad policy objectives for major urbanized areas under the control of more than one local planning authority. Within the limitations given by the regional policies, the urban and county plans would be formulated. The urban plans take into consideration the relationship between the town and the region, the main functions of the town, the problems of physical planning in the town and the main purposes of the urban plan and its relationship to the local plans. They would

consist largely of policy statements on such factors as population and housing needs; employment; transport, the town centre; education and leisure facilities; townscape; action areas; and priorities. The county plans consider the same types of relationships and make policy statements on such factors as green belts, settlement structure and primary communications.

Again, within the limitations set by the county and urban plans, the local plans are formulated. It is on this level that most of the physical planning takes place. In planning the actual pattern of land use, the local planning authority has to work within constraints whether there are regional, urban and county policies or not. In the absence of such policies, the local body has to take such factors as the transport system, distributions of population, etc., in the surrounding area as given and plan land uses accordingly. These are just as much constraints on the local planning authorities' actions as regional, urban and county policies.

17.6 ECONOMIC PLANNING AND LAND-USE PLANNING

The method of land use planning outlined in the last two sections enables land use planning to be co-ordinate with economic planning, and at the same time leaves the local land use planners with considerable freedom of action. Where appropriate, the aims of economic planning could be incorporated into the national and regional land use plans, thereby ensuring that local plans are made, almost automatically, in accordance with such aims. Land use planning at all levels is being viewed as a component part of economic planning helping to achieve the desired aims set by society. If alternatively, town planning is seen to be completely divorced from economic planning, not only may planners be more likely to find that the non-economic aims of planning have been frustrated by the pressures of economic forces which result from the economic planning, but much of economic policy may be directed towards counteracting the economically undesirable consequences of planning. For example, if as a direct result of land use planning, firms had to disperse their plants over a very wide area and this led to a significant falling off in the rate of increase in production, then economic policy would, in all probability, be directed to counteracting this situation.

Although, land use planning may facilitate the achievement of the aims of economic planning, it must be realized that it might not achieve such aims on its own, but might have to be used in conjunction with other measures. It was seen in the last chapter that the possible responses to a situation brought about by planning, such as an imbalance between job opportunities and the labor supply are many. Therefore, to achieve a given aim, it might be necessary to combine land use planning with measures designed to encourage the desired response and perhaps to discourage possible alternative responses. For example, if it is considered desirable in an era of full employment to encourage the employment of part-time married women and increase automation and mechanization, besides pursuing a deliberate planning policy of limiting the supply of residential accommodation, relative to the job-opportunities in as many urban areas as possible, it may be necessary to encourage married women to work part-time by taxing them at a lower rate than other workers, and to encourage automation by giving generous tax allowances on the purchase and depreciation of capital equipment. It may be necessary to take other measures to suppress any undesirable result of the planning policy.

CHAPTER EIGHTEEN

NEW URBAN DEVELOPMENT

18.1 POPULATION INCREASE IN URBAN AREAS

During the twentieth century, the rapid increase in urban population in most countries was due primarily to the influx of persons from the surrounding countryside, seeking work in the factories and workshops. It has been estimated that by 1900, about three-quarters of the population lived in urban administrative districts. In the twentieth century, urban population has continued to increase, but for a different reason. From 1900 onwards, the growth of urban population was due mainly to the natural increase in the population in the urban areas, i.e., excess of births over deaths, with net immigration from rural and overseas areas being of less importance. There was a certain amount of migration between urban areas; the larger ones gaining at the expense of the smaller ones. This is reflected in the fact that some 40 per cent of the population is concentrated in seven conurbations. Other factors combined with the increase in urban population to make the resultant growth somewhat different from hitherto. Whereas previously, industrial plants had to be located near to a source of power such as a coalfield, and the workers had to live within a few miles of their employment; the rapid increase in the use of electricity and road transport made it possible for both places of production and persons to be scattered over a much wider area.

The result was that during this period, urban growth tended to be in urban areas away from the coalfields, and to take place on the countryside around the towns. The population in the outer parts of the conurbations and the new suburbs around the larger towns grew at a fast rate. In fact, the population in these areas grew at a faster rate than those of the original conurbations and towns themselves, and in some cases, a gradual net movement outwards reduced the population in the inner areas of the conurbations. Ribbon development took place along the main roads between urban areas to give residents easy access to town and the advantage of living in the countryside. The new light consumer industries, which were

expanding, with the more mobile forms of transport and power, tended to establish themselves in the outer area of the towns and conurbations.

Not all urban areas grew at the same rate. The Northern and South Wales also tended to grow at a slower rate than the urban areas in the south. The reason for this was partly the developments in power supply and road transport and partly the decline in the overseas demand for ships, coal and textiles, on which these areas were heavily dependent. Some urban areas, mainly the smaller towns, actually declined in size. This can be explained by the fact that the effect of the increase in mobility was to increase the size of the market for many goods and services, and so it became profitable for firms to specialize in complementarity with other firms in the relatively larger urban areas. The effect of the population increase in the first half of the twentieth century, together with the technological developments, which were exploited, was to change urban areas in the ways described.

It is expected that the increase in the population will continue, at least until the end of the century and probably beyond. In 1948, the Registrar General made a population projection on the trends at the time and predicted an increase in the population of England and Wales of about two million persons between 1951 and 1971. As it turned out, there was an increase in the population of just under two million between 1951 and 1961, due mainly to natural increase and only marginally to a net immigration. It had been predicted that the high live birth rate immediately after the Second World War would gradually decline, as indeed it did until 1955. Then from 1956 onwards, there was an unexpected rise in the live birth rate, which largely explains the higher rate of increase in the population between 1951 and 1961. Of secondary importance has been the increase in life expectancy which results from developments in medical science.

Many of the problems which faced the town planners during the 1960's such as high land costs and traffic congestion, have been attributed to the fact that the first generation development plans resulting from the 1947 Town and Country Planning Act were based on the Registrar General's 1948 population projection.

is said that too little land was allocated for the different urban uses and not enough provision made for new urban development in all its forms, considering the actual population increase, which took place. In1963, it was predicted that the natural increase in the population in England and Wales between 1961 and 1981 would be about six million (three times the 1948 prediction for two decades). The lesson for town planners is the uncertainty of population prediction. As advocated earlier, if possible, town planners should base their plans on the minimum prediction and provide for least cost flexibility above the minimum.

18.2 NEW URBAN GROWTH

Since most of the populations live in urban areas, the expected natural increase, as in the first half of the century, must lead to new urban growth and it has to be considered what forms it should take. In the absence of town planning and with the growing use of private cars, it would almost certainly take the form of a spreading out of the larger urban areas into the surrounding countryside and the coalescence of nearby urban areas. Further ribbon development would take place. The natural increase in the population would lead to a gradual increase in the number of persons per unit of accommodation in the urban districts occupied by the lower-income groups and possibly in central districts occupied by the other income groups who wished to live near to the centre of towns such as single persons and childless couples.

Would this type of new urban growth be desirable from an economic point of view? The first point to be made is that the new urban growth would require an extension of the public or non-profit uses of land in the form of new schools, road development, and possibly parks. The planning of these new public uses of land, or even the maintenance of status quo in the public use of land, must have a major influence on the new urban growth. From an economic point of view, that amount of land should be transferred to public uses which would lead to the most efficient use of resources, possibly indicated by maximum aggregate land values.

The next point to consider is whether higher densities are economically desirable or not. A limitation is placed on possible answers by the imposition of housing standards. Such amenities as baths and water closets are required now, whereas earlier in the century they were not considered so necessary. An economist may draw attention to the limitation that this places on the efficient use of resources, but he should then consider how to achieve the most efficient use with this constraint. It is possible he may find that the use with the constraint is more efficient than when it is absent. It has been found that with modern standards, the cost of even maintaining the densities reached in parts of some towns, without considering increases in densities, is prohibitive. The maintenance of densities by the building of multi-storey flats is relatively costly as compared with other forms of housing. This is just as true in the inner parts of urban areas where land costs are high.

It has been found that with high flats, the extra cost of construction outweighs the saving in site costs. As explained in the chapter on Real Property Development what determines building densities in the absence of control would be building costs relative to land costs. If land requirements in the way of open spaces, land for schools, etc., which modern standards require, are subtracted from land in high density areas, it is likely to become economically undesirable to maintain or increase densities. So that without town planning, but with modern standards and present building costs, the new urban growth would be unlikely to take the form of building to higher densities, i.e., more habitable rooms per acre, although in the situation probably the number of persons per unit of accommodation would gradually creep up with the natural increase. Densities meaning number of persons living to an acre are likely to rise in spite of standards laid down.

It would appear that in the absence of town planning, most new urban developments would take the form of new suburban and ribbon developments around existing urban areas. The main economic argument against ribbon development is that it is relatively costly in the use of resources in providing residents with what may be considered the basic services such as water supply

electricity and gas supplies, postal deliveries, and the telephone. If the residents lived in groups instead of along the sides of roads, then fewer resources would be required to provide them with these services. Other possible economic arguments are that the efficient use of main roads may be reduced by cars running into them from the houses at many points alongside, and congestion is caused in the urban areas themselves, because of the increased use of the car, which ribbon development entails. The main argument used appears to be non-economic, that such development spoils the countryside, and if carried to the extreme would make it non-visible, at least to the road user. This argument by itself appears to be sufficient for most people to condemn such development.

The main economic argument used against the building of new suburbs around the conurbations is that they will lead to increased congestion on the roads and reduce the efficiency in use of those areas. Road congestion is one of those subjects on which much is said but little is known. It is true that road congestion involves an economic cost in that resources are used. There is more wear and tear on vehicles; more petrol is used, and not only do persons spend time sitting in traffic jams, which may be spent more productively doing something else, but their efficiency may be reduced by the nervous strain of such journeys. But against the economic cost of road congestion, it should be weighed on the economic gain to be made from making those journeys. It may be found that the persons making the journeys are jointly more productive, i.e., produce more goods and services out of a given amount of resources, than if they produce elsewhere. Under these circumstances, the economic gain might outweigh the economic cost of the road congestion. It is not being said that this is the case, but that it may be true in some urban areas. Research is required on this subject.

Even if it were true that the economic benefits from persons making journeys on congested roads outweighed the costs of the congestion, it does not mean that the traffic congestion must be accepted as a necessary evil, for if the economic benefits can be retained, whilst the cost is reduced, then this is a net gain and economically desirable. It may be possible to achieve this with a combination of town planning

and other measures, say, by planning the new suburbs on the edge of the conurbations, thus facilitating commuting, and taking positive measures to encourage the use of public transport with negative measures to discourage the use of private cars. Conurbation tends to be a term of abuse, but it would appear that the economic benefits far outweigh the costs, from the evidence of the tendency for them to grow at a faster rate than other urban areas in various parts of the world. To return to the economic arguments against new suburbs on the edge of conurbations, another fact is that they entail relatively long journeys to work. This involves the use of resources in transporting the persons which may be used elsewhere. It is said to be partly responsible for ill-health, absenteeism and loss of efficiency. It has been reported that there have been improvements in production when workers live near to their employment in the new towns. But again, it is necessary to measure the economic gains against the economic costs of relatively long journeys to work. It may be possible to retain the economic benefits whilst reducing the economic costs by development of those modes of transport, which speed the journey between residences and places of employment. Public transport may be a means of decreasing economic costs whilst retaining the benefits provided that the costs of improving and supplementing public transport is less than the cost of improving the roads.

Another argument used against new urban development in particular locations, which may be used against the development of new suburbs around the conurbations, is that good agricultural land will be used. If there are two alternative locations for urban development, which would give the same economic gain, then the location, which would involve the least loss or economic cost, should be used. In these circumstances, the poorer agricultural land should be used in preference to the better. But it may be the case that the economic gains from developing in the two locations are different.

It is likely that such new suburban development would lead to industry moving into these areas as well as persons for residential purposes. In so far as this happenes, it would reduce the need for long journeys to work, and the effect of

traffic congestion in the centre would be less. To follow the general lines of new urban development, which would take place in the absence of town planning, does not preclude town planning itself, for even if the new urban development largely took the form of new suburbs around the existing large towns and conurbations, town planning could still help to allocate land between private and public uses and different private uses to make the most efficient use of resources.

18.3 THE OVERSPILL PROBLEM

It may be found on detailed investigation that the economic benefits of the conurbations and large urban areas are largely illusory. There may be mere duplication in the production of many goods and services in these areas, and no greater specialization in production can take place elsewhere. It may be that the goods and services, the production of which are appreciably better in quantity or quality in the very large urban areas, are so few in number that the economic costs far outweigh the economic gains. Alternatively, it may be found that such economic benefits that are obtained from these larger urban areas can be obtained from other urban forms. It is possible that even if the positive economic advantages of the conurbations are demonstrated beyond all possible doubt, society may still reject the new urban development taking the form of a further growth in the existing conurbations on non-economic grounds. In any case, it is necessary to examine the alternative forms, which new urban development can take to assess the economic advantages and disadvantages.

If, for whatever reason, densities in the larger urban areas are kept down to their present levels or even reduced, and the building of new suburbs on the fringe of these areas is rejected, with the natural increase in the population and possibly immigration from smaller urban areas, there is the problem of the overspill. The surplus population above that which can be housed in the urban area at present standard has to be siphoned off and housed elsewhere. During the post-war period, three main solutions of the overspill problem have been exploited. There have been the town expansion schemes, the building of satellites and the new towns.

18.4 TOWN EXPANSION

Town expansion schemes involve the transfer of population from the urban area with the overspill problem to some other urban areas, and mainly take the form of building housing estates and new suburbs on the fringe of the expanding urban area. Such schemes were facilitated by the Town Development Act of 1952. If town expansion is contemplated, it is necessary to consider its economic feasibility. To do this, a survey must be made of the economic basis of the town as it exists at present, and the economic consequences of expanding the population. The economic survey of the present situation should gather as much information as possible to discern trends and the inter-relationships between the different factors. Then on the basis of this information, the effects of a planned immigration of population could be estimated.

The type of basic information, which an economic survey of an urban area being considered for expansion requires, is as follows:

a. The population of the area, its age structure, geographical distribution and the trend in these factors over the past ten years;
b. The structure of employment, which firms and local industries are expanding or contracting;
c. The types of employment offered, the ratio of men employed relative to women, the number of persons commuting into and out of the area daily;
d. The transport facilities both within the area and its relationship with surrounding areas, types of public and private transport with information as to when used and numbers using, car parking facilities, points and times of traffic congestion;
e. The public utilities in the area such as the water, gas, electricity supply, sewerage and drainage, refuse disposal, telephone and postal services;
f. The housing situation, public and private housing, rate of building and types of dwelling constructed;
g. Education and health facilities, schools, colleges, hospitals, clinics;
h. Land use in the area, where different uses are located, open spaces, parks, road system;

i. The retail trade, number, type, and location of shops, turnover, sales per head of population, markets;
j. The central area, office, shopping, entertainment and other uses, transport into and within the central district, parking and congestion.

On examination of such factors, it will invariably be found that the inter-relationships between them will be producing stresses and strains which cause adjustments and changes to the urban structure. For example, a labour shortage in the area may be a causal factor in persons commuting in by car from other areas. This may cause marginal adjustments in the urban structure such as the provision of more land for car parking facilities, the widening of roads, or improvements in the public transport facilities. An enumeration of such stresses and strains and the adjustments and changes, which they are bringing about, are important, for the economic consequences of importing a given number of persons may largely depend on whether they intensify or relieve existing pressures. It may be found that the incoming population reduces the number of persons commuting in by car, and therefore reduces the pressure for the adjustments described, or, if they are housed in a new suburb on the fringe, they may increase the number coming in by car and hasten the adjustments.

It is likely that the import of population itself will bring new stresses and strains, which will build up pressure for changes in the existing urban structure. It is desirable that such changes be anticipated for the economic costs, and benefits of such changes should be included in any calculation to assess the economic desirability of bringing in the population. To calculate possible effects, it is necessary to assess the adjustments, which will be required to the different facilities in the town. It may be found that some facilities may be expanded fairly easily at very little cost, others may be expanded but at great expense, whilst yet others may be almost impossible to expand in their present form and would have to be scrapped and replaced. For instance, it may be found that the cost of refuse collection per head of population may be reduced with the larger population because it would pay to increase mechanical handling. In other words, economies

of scale may be reaped. It may be found that the extra population may increase road usage in the town and make it necessary to improve the road system at great expense. The conclusion may be reached that the centre of the town, as it is at present, will be unable to cope with the additional population and that a complete reconstruction is necessary.

There may be many benefits from the incoming population. To mention a few of the possibilities, extra industry may be attracted to the town by the labour supply, and this industry may make it worthwhile for subsidiary complementary firms to develop in the area, thus increasing efficiency all round. With more shops to serve the larger population, there may be a greater variety, thus consumers' choices may be widened. Educational authorities may be able to offer a wider selection of courses for adults. It is upon the costs and benefits of the necessary adjustments to the town's facilities and the costs and benefits of any other adjustments that the incoming population may bring about, relative to the costs and benefits of transferring that population elsewhere, that the economic desirability of a proposed town expansion should be judged. As already explained, it may be possible to use land values as indicators of these benefits. It may be found that a better use of the country's resources could be made by building a satellite or a new town to house the overspill than by expanding a town, or estimates may show that the town expansion gives the best result.

18.5 BUILDING OF SATELLITES

The building of a satellite or out-county estate can be described as the creation of a new suburb, not on the fringe continuous with the existing urban area, but within a few miles of the outskirts separated from the main urban area by countryside. Although, it was expected that the satellites built in the immediate post-war period would develop into more than dormitories, i.e., districts where the town workers reside, they were not intended to be self-sufficient in employment in the same way as the new towns. Most of the employed residents commute into the main urban area, and only a relatively small proportion, mainly women, work locally. One of the main disadvantages of satellites, which has been pointed out is the necessity of

the long journey to work, but this is often over-stated, for a long journey in distance, does not necessarily mean a long journey in time, and a long journey is not invariably more uncomfortable than a shorter one. This will depend on the efficiency of the different modes of transport.

The journeys to work from the satellite will involve a cost. There are the resources being used to transport the workers. There may be a reduction in the efficiency of such workers and a possible loss since they might have been doing something productive during the time they are travelling. If they travel in by road, this may necessitate road improvements and car parking facilities within the urban area. But again, against costs must be measured benefits. The worker himself will have a much wider choice of employment. If he is skilled or specially trained, the probability that he will find suitable employment must be much greater in the main urban area than in the satellite. As a consumer, he will have the advantage of being near enough to the town to be able to tap services, which are able to offer greater variety and specialisation by virtue of the fact that they serve a much larger population than that of the satellite. There are also the benefits to the main urban area itself. The satellite can be considered to be part of the market for some of the goods and services being produced in the town, and generally speaking, the larger the market, the greater the specialisation in production, which can take place. The workers living in the satellite are part of the labour supply, thus giving employers a wider choice in finding the best man for the job.

The nearness of the satellite to the main urban area has certain disadvantages as well as advantages. The fact that the residents are in a position to tap services and facilities in the town, will inhibit the development of local services. It is said that there may be little entertainment and cultural activity in the existing satellites and this is a factor in preventing the development of a community spirit. Whilst it is true that the development of local services will depend on the nearness of the town and the size of the satellite, the lack of development of community activities may be due mainly to an absence of the necessary facilities such as halls. This was the case in some of the new towns. There should be no greater difficulty in fostering

these activities in satellites than in ordinary suburbs, which are sometimes teeming with such activities.

If it were concluded that a further growth of the conurbations was desirable, then the best form it could take might be a series of satellites. This may give all the advantages of building an equivalent number of new suburbs on the fringe, with the additional advantage that the countryside would be within easier reach of a large proportion of the population than with the green belt policy where the majority of persons have to travel a few miles to the nearest countryside. Many of the disadvantages of the existing satellites might be overcome if they were larger and more self-sufficient in employment, say providing 50-60 per cent of the employment for the residents, as opposed to a much higher percentage in the existing new towns and a very much lower one in the present satellites. The larger population would facilitate the provision of more local services, and at the same time residents could go into town where they felt the need for more specialised facilities. With more employment opportunities locally, persons who find it difficult to travel to work, such as married women wishing to work part-time could be employed in greater numbers. The higher proportion working locally would reduce the demands on the modes of transport in the area, and at the same time those persons requiring a more selective type of employment would be able to travel into the main urban area.

As with town expansion, the economic desirability of building satellites should be judged on the basis of relative costs of the provision of the basic services, such as water supply and other public utility services, and other costs already mentioned, as compared with the benefits. Costs incurred outside the satellite such as a necessary improvement or extension of a railway line should be included in such a calculation. Likewise, benefits received external to the satellite should be added, for instance, any employment generated in the main urban area by the existence of the satellite.

18.6 NEW TOWNS

In 1945, a New Towns' Committee was setup to consider the question of the establishment of new towns, which it suggested should be developed as self-contained and balanced communities for work and living. The committee suggested that bearing in mind acceptable internal densities and the proposed nearness of homes to places of employment, the town centre, schools and the open country, an upper limit of 50,000 should be placed on the population of a new town. It was on this basis that the first generation of new towns was established under the New Towns' Act of 1946. They have been successful in achieving these aims in so far as industry and commerce appear to thrive in the new town setting, many residents are able to live near work and the countryside; they are well equipped with shops, schools and public utility services, and they are financially sound in that they can repay their obligations to the Treasury and have a surplus on the general revenue account. They have failed to create a balanced community; if this means attracting a distribution of income groups and of age groups, which approaches the distributions found in urban areas generally. They have failed to limit the population in that their target populations have been increased.

There appears to be a conflict between the aim of creating a self-contained and balanced community and the aim of limiting the population to about 50,000, since no town of 50,000 or even 100,000 on its own can provide the range and variety of employment opportunities, which larger urban areas can provide. There is a tendency for similar firms and industries to be attracted to the same town, partly because they thrive under similar conditions and partly to reap the advantages of being situated near to similar firms, thus resulting in a narrowing of employment opportunities. Nor can such urban areas provide the variety of services found in a larger urban area. So that if a self-contained and balanced community means one in which the satisfaction of most of its residents' requirements are obtained within its borders and in which there is a cross-section of income groups corresponding to those found in urban areas generally in the town, then limiting the size of a town makes it impossible to achieve this aim.

This does not mean that new urban areas of 50,000, or even less should not be created, but that they cannot be self-contained and balanced communities in the sense described. If this is true, then such newly created urban areas should be sited in positions where both residents and industry are able to tap the employment opportunities and greater variety of specialized services of a larger urban area. There can be a division of function. The smaller urban area providing most of the employments for its inhabitants, the services which are best provided on a local basis, and local social and cultural activities, whilst the larger urban area provides the greater variety in job opportunities for the more specialized facilities, and a greater variety in social and cultural activities. Part of the success of the established new towns has been due to the fact that they have been placed near to large urban areas. They are near enough to a large urban area for the inhabitants to go there if they require the use of special facility not found locally; they are near enough to commute although this has been limited by the new towns' housing policies, and firms located in the new towns still find it profitable to use the services of firms located in the large urban areas and vice versa.

If it is considered desirable to create self-contained and balanced communities, then they must be much larger than 50,000 persons. This is not to say that every urban area should be very large, for an urban area of 50,000 persons or less could be part of a self-contained and balanced community comprised of several separate urban areas. It is more likely that the redistribution of income groups within an urban grouping would be nearer to the distribution in the larger urban areas, and it is probable that most of the inhabitants' requirements could be satisfied within the group. It was stated earlier in this book that there is no one optimum size of town, and that a town size still depended on such factors as its position relative to other urban areas, the relative sizes of these other urban areas, its industrial or commercial base, the services which it performs for the inhabitants of the surrounding countryside and other urban areas, the pattern of transport routes and modes of transport, and the distribution of water supply. In planning new urban areas, such factors and their relationships must be considered when deciding on locations and population sizes. If they are not adequately considered,

then it may be found that pressures may be built up to exceed the target population of the new urban area, or the opposite could happen and difficulty may be experienced in reaching the planned population.

It will be found that these factors will be of varying importance in different locations so that the optimum size, for a new urban area, will vary from place to place. For instance, it may be found that if a new urban area is placed in a given position relative to existing urban areas, transport routes, etc., it will soon develop into a regional centre performing administrative, educational and service functions for surrounding urban areas. The performance of these functions will generate a certain amount of employment in the new urban area. Under these circumstances, it may be desirable to plan for a target population of say, 200,000. On the other hand, it may be considered desirable to site a new urban area within twenty miles of a conurbation. The inhabitants can travel into the conurbation for some services, and a proportion of them may commute to work. In this case, a population of 30,000 may be the optimum for that position.

Regional studies are essential background material for the planning of new urban areas. It is important to know the relative magnitudes and trends of factors such as the distribution of population, employment, transport systems, and water supply. These factors do not necessarily have to be taken as given, for it is often possible to alter them. For example, if it is considered desirable to build a new regional capital, having chosen the best position with regard to geographical and other factors, it may be necessary to re-orientate the railway systen to make the new town a focal point, build motorways, build new water reservoirs, transfer administrative activities to the new town from other urban areas, and take a number of other such measures. This will be much easier if the creation of a new town is seen as part of regional planning.

As with town expansion and the building of satellites, the building of new towns should be judged, from an economic point of view, on the basis of costs and benefits, and a comparison made with the costs and benefits of alternative methods of dealing with the overspill. If such calculations should prove to be

impossible to make, because of the difficulty of making a realistic valuation of benefits, then it may be possible to use the land values criterion.

18.7 URBAN GROUPINGS

It has been suggested that most of the advantages of very large urban areas could be obtained from groups of urban areas situated close enough to each other to make general accessibility between them easy, yet each being separated from the others by countryside. If this were true, or it was considered desirable on non-economic grounds to develop the existing or new large urban areas along these lines, the question would arise as to what form, from an economic point of view, should such urban groupings take? There have been two main suggestions; urban areas in linear relationship and urban areas in clusters. It has to be remembered that the economic advantages of urban areas spring largely from the advantages of accessibility and complementarity.

Two main forms of linear development have been advocated- the circuit linear town, where the urban areas are like beads on a necklace connected together by a fast-moving form of transport such as a monorail or electric diesel rail system; and the vertebrate linear town, where the urban areas are spaced along the main transport route such as a motorway and railway line. With such developments, it would be impossible to make the facilities of the town equally accessible to all its inhabitants. If there was a division of function between the urban areas, with say, one being the shopping centre, another the education centre, another the industrial centre, others residential, and so on, then wherever a person lived on the circuit or vertebrate line, he would be less accessible to some of the facilities than to others and this would be true of every inhabitant with regard to different facilities.

It follows from this that provided both transport systems were equally efficient, and there was no slowing up in the town cluster transport system due to congestion at the centre, that better accessibility in the cluster would lead to more utilization of facilities and therefore more efficiency in the provision of them.

With the linear system, there is the question as to where to place the town centre. Wherever it is placed in the system, some of the urban areas are going to be placed at an unnecessary disadvantage as compared with those in a cluster. Then because it is the town centre, providing those facilities, which are normally found in town centers, that urban area is likely to grow faster and to a different size than the other areas, thus tending to throw the linear relationship and transport system out of balance. If there is no town centre envisaged, then the town will lose all the variety of specialized services which come from the centre of a town being in the position of greatest accessibility and complementarity and the inhabitants are likely to look elsewhere for those services.

The advantage of linear development is that the population can be close to the countryside and could also be obtained from a cluster development. Each urban area in a cluster could be small enough to achieve this purpose; although from an economic point of view, other factors should govern the relative sizes of the urban areas in a cluster. If it is considered to be undesirable for the majority of the inhabitants of the cluster to travel into the centre for work, recreation, to make most of their purchases of goods, to obtain services, then the urban areas should be of a size to develop these facilities themselves. Then only those facilities are likely to locate themselves in the town centre, which require a larger population than the individual urban areas. Even so, it is likely that the town centre needs to be larger in size than the other urban areas, since a large number of such services are likely to locate themselves there to serve the sum of demands coming from all the surrounding urban areas.

It would appear that without planning, the larger urban areas develop to serve the specialized requirements of smaller urban areas, medium size urban areas serve the less specialized requirements of yet smaller urban areas, and so on, down to the villages. Since this division of function appears to provide inhabitants everywhere with a good choice of services, and at the same time makes for the highest degree of specialization possible, unless there is some non-economic disadvantages which outweigh everything else, any planned town clusters should take the same form, i.e. the largest urban area in the centre, surrounded by smaller ones

CHAPTER NINETEEN

TOWN PLANNING AND STATISTICS

19.1 MISUSE OF STATISTICS

It has been often said that statistics can be used to prove anything and to a certain extent, this is true. Anyone with an elementary knowledge of human psychology could draw up a questionnaire and conduct a survey to prove what they wanted to. There are certain tricks which enable this to be done. If a given result of a survey is required, questions should be worded so that when the respondent agrees, the answer will be in accordance with what is desired to prove. The tendency is for persons to agree with a question. Questions can be asked in such a way as to cast aspersions on the respondent if the answer is in conflict with the desired result. For example, "Only a stupid person could fail to understand the contents of this book. Do you understand its contents? Answer yes or no without qualification." Obviously, if this section was not written and we were a little more subtle, our survey would give the desired result. Ninety per cent of persons who read the book understand it.

In order to analyse the answers to a survey, it is necessary to limit the answers to a few choices. This can be used to produce a bias for the tendency if a person is asked to choose out of say three or four alternatives, is for him to choose one in-between the two extremes, for instance, out of 1, 2, 3 and 4, the majority are likely to choose 2 or 3. Answers, which conflict with the desired result, can be placed at the extremes. If all these fail and the survey goes against the desired result, there are still one or two tricks to play. The result of the survey can be given as little publicity as possible, say four lines of the back page of a newspaper instead of in the headlines on the front page, until such time as a repeat of the survey, or a new one, gives the desired result. In presenting the results of the survey, any desired features can be given great emphasis, and any undesirable ones, a bare mention only to show nothing is hidden. It may be asked why persons or organizations

bother to prove in such a way what they desire to prove. Again, it is a question of human psychology. If persons can be convinced that something is a fact, then it is well on the way to becoming a fact. The desire to be in the mainstream of opinion or attitude is a very powerful force for many persons; they are enabled to feel secure by believing that the majority think or feel about something in much the same way as they do themselves.

19.2 USE OF STATISTICS

This type of use of statistics will cause many persons to reject the use of statistics entirely. This is a pity, for in subjects such as town planning and economics, where masses of information are collected, statistics is an invaluable tool. What is statistics? It has been defined as the collection, tabulation and presentation of quantitative data. Whenever information is collected in the mass, it can be analyzed statistically. For example, if information is collected about the characteristics of residential accommodation in an urban area, such as the types of dwelling units, where they are situated, whether they have bathrooms and water closets, and the number of rooms per dwelling unit, then the most natural step is to present such information in the form of quantitative data. It is the statistician's task to supervise the collection of the information, to summarize it to make it more comprehensible, and bring out the essential features of the data.

In planning land-use in an urban area, the town planner requires much information as he can obtain, and it would be true to say that without the statistical processing of the information, much of it would be useless. The fact that the town planner is forced to use so much statistical information is in itself a guard against the type of misuse described above, since it is seldom that he has to rely on one set of statistical data in order to prove a point. He is likely to be able to draw on several sets, often derived from different sources of information. Another safeguard is that statistical data need be only part of his evidence. He can use verbal explanation of the data, maps, and evidence, which for one reason or another has not been subject to statistical treatment. In looking at the possibility of construction of a new major road in an urban area, planners may consider not only

statistics, surveys, etc., but also such factors as the noise problem, which is difficult to quantify. The more varied and comprehensive the evidence, the less the possibility of misuse.

The town planner, like the economist, cannot be expected to be an expert in statistics, but he must know enough about them to be able to see when they will be useful, their scope and limitations, and exactly what a statistician *can* and *cannot* do. His task is made much easier by being able to draw on a statistician's expertise, but in order to do this; he must have an elementary knowledge of statistics. There are many books and teachers in statistics to give him this knowledge. This chapter will be confined to a broad discussion of statistics and its relationship to town planning.

19.3 SCIENTIFIC METHOD

Statistical analysis uses both induction and deduction, which are the essential parts of scientific method. Induction is the formulation of generalizations or theories from factual information, whilst deduction is the formulation of generalizations of theories on the basis of assumptions. On the basis of the information collected from a number of urban areas, a statistician may be able to draw a generalization that there is a correlation between the size of firm in an industry and the size of urban area in which it is situated. This is induction. Then by making the assumption that this is true of all the firms in the industry, and all urban areas, he can draw the conclusion, or put forward the theory that the larger the urban area, the larger in size will be the firms in that industry, which are situated there. This is deduction. He will then proceed to test his theory by seeking more information from other urban areas. This may cause him to change or amend his inductive generalization, his assumptions and his final theory. He may conclude that there is no such correlation in urban areas generally, or that his theory is only true of urban areas, which are cited on rivers, or in a given country.

The establishment of correlation between factors by means of the inductive method does not necessarily show a cause and effect relationship. Two factors which appear to be correlated may be the different effects of the same cases, or it is

possible that there is no relationship between them at all, and that it is mere coincidence that their quantitative interpretations move together. As explained in the chapter on Land Values and Town Planning, there is never a one cause and one effect relationship, although it may be true that a particular cause is a necessary condition to obtain a given effect. Take as an example, the cause of lung cancer. It may be that smoking is a cause of lung cancer, but it cannot be a cause on its own, since not everybody who smokes develops lung cancer. There must be a combination of causes. Smoking together with for instance, air pollution, a nervous disposition, and a lack of adequate nourishment, may be the main causes of lung cancer. Take away any one and the chance of developing lung cancer would be greatly reduced. If this were so, then knowledge of the combination of causes would be much more useful than the knowledge of any single factor. Persons without these other factors could smoke with the knowledge that there was not much danger of developing lung cancer, and lung cancer could be prevented by changing one of these other factors as well as stopping smoking.

This example gives the key to the relationship between correlation and cause and effect. If a combination of correlations between different factors is established, then this is more likely to reveal a cause and effect relationship than any single correlation. Although, it must still be said that it can never be claimed with absolute certainty that there is a cause and effect relationship. Further inductive generalizations may indicate that no such relationship exists. A point to mention about the deductive method is that reference to facts or data will not show that the deduction was wrong. It may show that a basic assumption does not correspond with the facts, but provided the logic is correct on the assumptions made, the conclusion must be valid.

19.4 PREDICTION

One of the main aims of scientific method is prediction, in order to obtain desired results or prevent undesirable ones. Town planning is very much concerned with prediction. In planning the general pattern of future land use in an urban area, the planner will want to know how the many factors, which could affect the pattern,

are likely to operate. This involves looking at what has happened to these factors in the past, what is happening to them at the present, trying to discern their relationships with other factors, and attempting to predict their future behavior and influence. The reason why statistics is one of the town planner's most valuable tools is that in statistical method, techniques have been developed, which facilitate both the search for correlation and prediction.

A simple method of seeking any correlation between factors is by means of a scatter diagram. If it were believed that there was a correlation between size of firms in an industry, and size of urban areas, then the corresponding values of the two could be plotted on a graph, and an attempt made to draw a regression line representing a linear equation, which most closely approximates the points on the graph. A formula is given to estimate possible linear regression lines. If the points on a graph are scattered closely like about a regression line, then there is a strong possibility that the line reflects a correlation between the factors. If, on the other hand, the points are so scattered, that no straight line could be said to be nearer the points than any other straight line, then this would suggest that a correlation between the factors is unlikely. Such techniques used in statistics are useful for discerning possible cause and effect; although as already said, mere correlation alone does not necessarily imply such a relationship, and such evidence on its own is useless and should only be used in conjunction with other information.

Statistical techniques of finding possible correlation can also be used for prediction. If a regression line representing a linear relationship is very close to the points derived from observed data, then it is possible to assume that relationship for the as yet unobserved, i.e. extending the regression line. This must be a very tentative prediction since beyond the observed, unknown factors may enter the situation which destroy the correlation, and as few, if any of the values from the observed data are likely to coincide with the regression line, those which could be derived from unobserved data are also unlikely to coincide. Nevertheless, under certain circumstances, it may be useful to make such tentative predictions to be used in conjunction with other information.

An attempt can be made to predict what is going to happen in the future by looking at the past. There are two main obstacles to this procedure. All the factors, which entered into a situation in the past may not have been discerned, so that when a prediction is made on the basis of those factors which have been discerned, assuming that they remain unchanged and no new factors entered the situation it proves to be incorrect. Then there is the fact that the factors are likely to change and new factors are likely to enter the situation. Again, although this is true, such predictions may be useful if only as a basis on which to attempt a more accurate prediction, for example, such a prediction could be amended to take into consideration any possible changes.

If data on a particular factor have been collected over a period of time, statistical techniques have been developed to bring out the trends in such data. It may be found that there is a long-term general movement in a given direction. There may be regular variations superimposed on the general movement in the given direction, or there may be irregular oscillations. It may be possible, with the aid of statistical method, to separate and isolate these different movements. The most common regular fluctuation, which takes place, is seasonal variations which take place annually. By the use of a moving average, it may be possible to discern the long-term trend by eliminating the seasonal variations. The difficulty may be that not all fluctuations may be seasonal, and circumstances causing seasonal fluctuations may vary from year to year. With limitations, knowledge of trends in given factors together with other information may be useful guides in planning for the future.

There is always a degree of uncertainty attached to future events and it is impossible to be absolutely sure that any prediction is going to be correct. This fact should not be used to dismiss all predictions without consideration, for it is necessary in all walks of life to make predictions. A firm has to predict what its costs, revenue, and other such factors are going to be, and a person has to predict what other persons are going to do, in order to plan his future actions. Predictions

must be made on the fullest possible information, and in the light of the knowledge that events may prove them wrong.

19.5 SAMPLING

Invariably, town planning has to deal with a complex situation where there is a mass of information on some aspects and little or no information on other aspects. Statistical method can assist in dealing with both contingencies. Let us first consider where there is little or no information about a particular factor or group of factors. It may not be practicable to gather information from the whole of a population, i.e., all the individuals, whether items or persons. The expense, length of time, or impossibility of obtaining the necessary total response may rule out such a procedure. Under these circumstances, it may be possible to take a sample of the population from which an estimate can be made of the information obtainable from a total survey.

It is axiomatic with statistics that one cannot infer from the general to the particular, for example, by examining past records, one may draw the inductive generalization that at least, one person in so many will be killed on the road each year, but it is impossible to say which individuals will be killed. All that can be said of individuals is the probability ratio. But it is possible to generalize from a representative sample to the total population. If a sample is truly representative of the whole of the population, in that it has precisely the same distributions of characteristics, then all that has to be done is to examine the sample and find out what proportion of the total population constitutes the sample for us to know all there is to know about the total population. Unfortunately, populations of persons or things are seldom homogeneous enough for a sample to be so representative.

Techniques have been developed to increase the possibility that samples taken are representative such as random selection and stratified sampling. Random selection has been designed to try to ensure that every member of the population has the same chance of being included in the sample. One method is to give every member of the population a number, shuffling these numbers, and drawing at random the

numbers, which will determine the members of the population that are to be included in the sample. Stratified sampling is to divide the population up according to what are considered relevant characteristics such as age groups, sexes or social classes and then draw the sample from a cross-section of the strata. No method can ensure that a sample is wholly representative. There are defects in every method. The shuffling for random selection may be inadequate. Stratified sampling requires a selection of what are considered the relevant characteristics, which may be chosen wrongly.

The larger the sample relative to the total population, the more representative is the sample likely to be. If a bag contains 2,400 blue, red and yellow discs in equal numbers, then the larger the sample drawn off at random, the greater the probability that it will be representative of the total. It follows from this that there is a correlation between the size of sample and the probability that it will accurately reflect the whole population. Although this is true, it is a fact which is ignored in practice unless the sample represents a minimum of between 10 per cent and 20 per cent of the population, for it can be demonstrated mathematically, that if a sample is taken of say 1000 from a population of 50,000, and the same number from a population of 100,000, there would be almost the same degree of accuracy with regard to the standard error value. To increase the possibility of accuracy appreciably, a much larger sample must be taken, for instance, to halve the standard error the size of sample must be increased fourfold.

What invariably determines the size of a sample is the amount of money which can be spent on obtaining the information required. With town planning, populations are inevitably very large and sample surveys of necessity very small. The statistician with his knowledge as to how to try to make a sample as representative as possible, and of techniques to deal with the data, can greatly increase the usefulness of information collected at any given cost.

19.6 USE OF PUBLISHED INFORMATION

A large amount of information is collected as a by-product of activities of one kind or another, for example, in collecting income tax, the Inland Revenue gathers a

great deal of information about wages and salaries, and a trade association will collect information relevant to its activities such as relative prices, differences in product, and costs. Much of this information is published as statistics. Without a doubt, the government department and organizations are the most fruitful sources of published statistics, with private economic organizations a poor second. There is not a clear dividing line between public and private statistical information, since many trade organizations pass statistical information on to government departments to be included in official publications, and many private organizations use public statistics in their published statistical information.

It is often the case that when information is required on a given factor relevant to town planning, published statistics can be drawn on to provide that information; although it is seldom that these statistics are published in a form, which makes them immediately useable. They invariably have to be adapted to the particular purpose in mind. This adaptation is fairly difficult, and should only be undertaken by a person who is fully aware of the many pitfalls associated with the use of statistics. There is much more danger of reaching false conclusions as consequence of error in use of statistics, than in any deliberate misuse. One should never take published statistics at their face value and assume that a definition is the one in most common usage, for example, figures relating to unemployment in an area may only include registered unemployed, and this may make a conclusion drawn from such figures, incorrect.

The easiest error, which a town planner can fall into, is to assume that the statistics from different sources referring to a given urban area cover the same territory. He is likely to find that the territorial coverage of statistics published by the Inland Revenue, Ministry of Labor, Registrars General, etc., although referring to the same named urban areas will be different. If it is assumed without careful examination that differences in territorial coverage are of no significance, then false conclusions are likely to be drawn. Variations in territorial coverage often make published statistics virtually useless for a given purpose, and it is hoped that in time, a standard area classification on the of the lines of the standard industrial

classification, will be introduced so that the territorial coverage of all official statistics would be the same. The standard area should be much smaller than the standard regions for statistical purposes to facilitate intraregional analysis. The usefulness of such a procedure must outweigh the administrative inconvenience to the organizations concerned, especially after its initial establishment.

A common pitfall arises from changes in definition, which necessarily take place in official statistics over time. Many statistics are collected in the course of the administration of systems of control or of the operation of the law, and a change in a system of control or in the law, may change appreciably the basis of the statistics. If there is a change in the conditions under which persons can receive National Assistance, there may be a large change in the number of persons receiving it. Anyone using these statistics without knowledge of the change in conditions would be likely to draw incorrect conclusions. It is necessary when published statistics are being adapted for a given purpose, to have knowledge as to the basic source of information and as to why the information has been collected. If comparison is being made in statistics over time, it is always necessary to look at the conditions under which they were collected to try to detect any influence on the statistics. This may appear to be taking a great deal of trouble, but not as much trouble as may be caused by basing actions on false information.

There are many such pitfalls in the use of published statistics, some of which are indicated in the many textbooks on statistics, but skill in finding such snags and overcoming them can only come by experience and a critical approach to every fresh use of published statistics.

19.7 BRINGING OUT ESSENTIAL FEATURES

Quantitative data in their raw state are useless, and they have to be rearranged and summarized before any attempt is made to bring out the essential features. The first step in this process is to determine the grouping into categories with given characteristics. Suppose information has been collected on shops in a number of urban areas, the division into categories can be under the headings of the towns themselves, the types of shops, sizes of shops, turnover and profit

margin. These categories need not be mutually exclusive, for the shops could be classified according to urban area, then subdivided into type, and further divided according to profit margin. The next step is to count the numbers in each category. This will greatly condense the information. This material can then be rearranged and tabulated as a prelude to analysis. One of the categories such as the towns, can be arranged in order of magnitude and the relevant data placed on a table in that form.

Where published statistics are used as the basic data, it will still be necessary to determine the categories, which are relevant, and rearrange and tabulate the information. A limitation may be placed by the original data on the categories selected, but the same is true when collected data are used. In the latter case, the categories are partly predetermined by the type of questions asked in the survey. Obviously, if no questions were asked on the size of profit margins in the shops, then there can be no corresponding category. There are certain difficulties at this stage such as ensuring that the category contains only items which are homogeneous with regard to a given characteristic, though heterogeneous in other characteristics, and deciding how to divide a category up numerically.One of the most common calculations made by statisticians is that of finding the averages. Knowledge of these essential features often proved useful, for it may be possible to deduce information hitherto unknown. It has been found from experience that a characteristic when given a quantitative interpretation will be found to cluster around a central value, and as one moves away from that central value, there will be the tendency for the number of items possessing an increasing or decreasing quantity to decrease. This appears to be true not only of human characteristics and characteristics of human activity such as heights, weights and intelligence of men, wages and house prices; but also natural phenomena such as the response of mice to cats, the rate of growth of plants and the height of a tide in a given place. If this distribution, which has been named normal, is plotted on a graph, then a line drawn through the points will be bell-shaped.

It is the statistician's job to choose that average, which will most clearly highlight the essential features of the data. There are a number of averages, any of which

may be more useful when calculated from given data than the others. There are three main types of average: the mean, mode and median. The simplest form of mean is the arithmetic mean, which is calculated by dividing the total by the number of items. The total profit of the shops divided by the number of shops will give the arithmetic mean profit. This is the common usage of the word average. It may be useful to have this information, if say a comparison was to be made with the profit from other forms of business. But with other data, calculation of the arithmetic mean may be positively misleading. If a car goes at 20m/hr for one mile, and 60m/hr for another mile, using the arithmetic mean, it might be concluded that it averaged 40m/hr over the two miles, but this would be wrong. With rates of speed or rates of growth, the appropriate average to use is the harmonic mean calculated by dividing the number of values by the sum of the reciprocals of the individual value:

$$\frac{2}{\frac{1}{20} + \frac{1}{60}} = \frac{2}{\frac{2}{30}} = 30 \text{ m.p.h.}$$

The harmonic mean should be used when the rates are not dependent on each other, but where the rates are dependent on each other such as with the rate of growth in house building then the geometric mean may be more appropriate. Clearly, which mean the statistician will choose to use will be governed by the nature of the data. The mode is not calculated like the mean, but is a specific observed value. It is the value, which occurs the most frequently. The mode is not much used, except where a producer needs to know the size of product which is in greatest demand, for instance, it may be useful to a builder to know that three-bedroom houses have a larger demand than other houses with a different number of bedrooms. The mode is not necessarily the majority, for those not in the modal group may add up to more than the mode; although each individual group is smaller.

The median is in the middle of a set of values in terms of value. If there are nine values in order of magnitude, the median is the fifth value, with four values below it and four values above it. The advantage, which the median has over the mean, is

that it not only gives a representative value but it gives the dividing line between the higher and lower values. The median can be looked at in relation to other derived features of the data such as quartiles and quartile deviations. In a perfect normal distribution, the mean, mode and median would coincide, but most distributions deviate from the perfect in various ways. It is often the case that calculation of a mean, mode and median together will give the best overall view of the general features of the data.

19.8 PRESENTATION OF THE DATA

Having brought out the essential features of data, the statistician has to present the information in such a way as to enhance its usefulness, and at the same time make it comprehensible to the intelligent layman. The essence of statistics is comparison. One set of figures on their own may have little meaning but when compared with another set, they may take on great significance, for instance, land values may take on a new significance when compared with house prices. Comparison is facilitated by data being on a common measure; in the case of land values and house prices, they are already on a common measure-money. But sometimes, it is difficult sensibly to reduce them to a common measure, for instance, the number of men employed and the amount of capital used. In these cases, comparison may be facilitated by working out the values in a set as percentages of the total, and comparing these percentages with the percentages derived in a similar manner from other sets. It may be found that when the capital used is increased by a given percentage, the percentage of men employed decreases by say half that percentage.

Percentages may highlight the relationship between data, but they also hide part of the significance of the data, for instance a 10 per cent increase in house building in two urban areas, may mean only ten extra houses in one area, but two hundred in the other. If the two urban areas have equal populations, this is of obvious significance. Another point to remember is that if one starts with a small number as opposed to a large one, then a given increase will be a larger percentage. If one local authority was building one hundred houses per annum and it increased its

building to one hundred and fifty a year, there would be an increase of 50 per cent, whereas if it had been building a thousand a year, the extra fifty would be represented by only 5 per cent increase. For these reasons, it is always necessary to examine the absolute figures alongside the percentages.

Some data may be made more comprehensible and comparable by being reduced to index numbers. This is true of prices of all kinds. At any given time, individual prices in a group such as land values, house prices, import prices and retail prices, may be moving both upwards and downwards at different rates, and it may be useful to know whether it is a general movement up or down, and the extent of the movement. This is done by giving each figure a price of 100 in a giving year and estimating in another year the percentage increase or decrease and giving the price the figure of 100 plus or minus the percentage change. They can then be weighed according to their relative importance in the total. Multiplication, addition and division will give a figure, which will show the proportionate increase or decrease in the group of prices. If the group is large, there is a strong possibility that some prices may have been missed, even with sampling; therefore the index number is misleading. There is a tendency to use them as evidence of correlation without looking at the basic information. Like all statistics, they are only significant as supporting evidence together with other information.

There are many ways of presenting the data to make it more comprehensible to the layman. There are graphs, pie diagrams, pictograms, etc. They may be useful for this purpose, if it is assumed that the layman is not going to act on the information, for such representation can, at the most, highlight only one or two significant features. It could be said that for every feature highlighted, such presentation will hide at least six.

19.9 TOWN PLANNING AND STATISTICS

Not all the limitations, pitfalls in use, techniques involved, or possible uses of statistics have been outlined in this chapter, but it is hoped that enough has been said to give an indication of the usefulness of statistics to the town planner. It is in

assessing the consequences of the inter-play between economic forces and town planning, that statistics may prove most useful to him, for much of the published statistical information is on factors which have economic significance. To name just a few, figures are published on various aspects of the population such as the geographical distribution, age structure and movements; there are statistics on employment by industry, by location, by income groups, and by age groups; figures on production covering manufacturing, mining, agriculture, building and contracting and the public utilities; figures on the retail trade outlining such factors as types of trade, location, sales, and employment, and figures on prices and incomes.

Statistics have been a great aid since the end of the Second World War in regulating and controlling the British economy. It would be true to say that without the knowledge, which only statistical information can give, the maintenance of full employment would have been impossible. Likewise, it is the contention in this section of this book, that town planning cannot be adequate without statistical information. As has been demonstrated, economic forces must be of great influence in shaping urban areas. With the aid of statistics, the town planner can use these forces to increase the usefulness of his plans and prevent them from frustrating his non-economic objectives.

CHAPTER TWENTY

ECONOMIC BASIS OF URBANISATION

20.1 URBANIZATION

The development of urban areas and the increasing proportion of man's activities now carried out in such areas, illustrate dramatically, man's ability to fashion the physical, economic and social world in which he lives. Urban areas are thus very much a human invention, which man has evolved as a means of organizing his existence. There are many problems involved in defining the term urban area. Depending upon the point of view from which a study is being made, the "urban area" may refer to the physical and geographical factors of human life and to social characteristics. When one thinks of an urban area, one has in mind a large number of people who are permanently resident in a limited area and are separated from other such centers by a much greater area of thinly-settled land. Also, the residents of such places are normally, although not wholly, engaged in non-agricultural occupations. Thus, urban areas have important functions connected with those manufacturing and service activities which are performed from centralized locations. This would cover the case of an urban area whose functions were primarily the provision of services for the surrounding agricultural area. Furthermore, throughout this and the following part of the book, the terms urban area, city and town are used to mean the same thing.

Cities came into existence as products of and as focal points in the social and economic life of a community but only when that community had reached a certain stage of development. It is the modern organization of society which is especially dependent upon urbanization and this reflects the shift of the centers of power within a country from the land to the factory. The dominance of urban areas goes hand-in-hand with the decline in the relative importance of agriculture in the economy and hence the increase in the relative importance of secondary and tertiary activities.

This is not to say that the city is solely a product of industrialization, for cities had existed many centuries before the industrial revolution, but their number and relative importance was less. The pre-industrial city had limited opportunities for producing goods and rendering services. This was a reflection of the dependence upon agricultural production and the low level of technological knowledge. Where it did produce goods, it had to depend on animate power and non-standard methods of production. Consequently, there was little specialization; the latter also being retarded by the system of determining prices by haggling. The degree of urbanization increases sharply as industrialization increases, as witnessed by the Industrial Revolution and the concurrent rise of urbanism in late eighteenth and nineteenth century Europe. As industrialization spreads to other parts of the world, so does urbanization, and the most spectacular urban growth is now taking place in Tropical Africa, Asia, and South America. Urban growth is now common to the world over, suggesting that the attractions of an urban way of life are as compelling as ever, and standing as a testament to its power despite certain imperfections which develop in the urban mechanism. If urbanization already embraces such large fields and is of increasing importance, shows the same basic tendency in all cases, irrespective of the size of the urban area or its geographical location, there must be important characteristics and advantages pertaining to this way of life.

The reasons why people want to live close together in large groupings such as urban areas are manifold. Man is by nature gregarious and much of the satisfaction he obtains from life is obtained in the company of his fellows. This, in itself, is insufficient to explain the urban character. The size of the urban aggregate is such that it exhibits considerable heterogeneity. As a result, urban man has developed contacts and made friendships with only a limited number of his fellow urbanites. On the one hand, city-living provides opportunities for being sociable and increases the likelihood of persons with common interests meeting each other; on the other, the individual urban dweller can retain a very high degree of privacy and remain anonymous in the multitude. The choice is left to the individual. Often, ma

has found it necessary to cluster his dwellings in compact groups in order to facilitate defense against attack from hostile outsiders. Once established for this reason, then other functions may be added a later date and the time may come where the defensive element is relegated to the background. Similarly, other urban areas may have come into being because they provided a reliable water supply, or a place of assembly for religious, political, or administrative purposes; or being at a meeting place for traders, they facilitated exchange, or they became a centre for industry as handicraft was replaced by factory production. Whatever the original reason for the formation of a particular urban area is, it is certain that additional functions would have been added, for urbanization is a cumulative process, stimulated today by man's need for employment and opportunities regarding education, marriage, medical treatment, recreation, professional, business and social advancement. Thus, the diversity of persons and activities and the scale on which these are carried out are prominent urban characteristics. Furthermore, today, the centers of decision-taking, and the triggers of change, are located in urban areas.

An urban area comprises all those socio-economic activities which require the concentration of people, buildings and machines in a relatively small area. Moreover, the city, which itself is a unit of social life and economic organization is an aggregate of smaller units, each having a distinct character and playing a specific role in the life of the city as a whole. This concentration of people and activities is largely explained by the friction of space since goods and services can be most efficiently produced and performed at specific locations in an urban area and the need to reduce the costs incurred and the energy expended in making contacts results in the population clustering. At the crux of urbanism is the opportunity for specialization of occupation and interest in the production of these goods and the performance of these services. The city is thus a rational environment, but it is something more than an economic entity, even more than a political entity, and more than a social unity.

Surrounding countryside's set up cities to perform those tasks which can best be carried out in a place located in the centre of the area served, so giving

specialization of labor between town and countryside. These pre-industrial cities did not transform the societies that contained them for the majority of the population remained rural, in agricultural employment, and the source of wealth and political power remained with the land. Although, such towns had existed for centuries, it was the impact of the Industrial Revolution, which gave rise to the modern phenomenon of urbanization, which shifted the centers of economic and political power to the cities, and brought with it a situation where the specialization of the action between towns is commonplace. Industrial technology increased the spread and density of urban population; the needs of industry determined the location of raw urban areas, whilst established cities had to adapt to meet the needs of industry if they were not to stagnate.

In the long run, population tends to move from areas of relatively lower living standards and less economic opportunity to areas of relatively higher living standards and greater economic Opportunity. Thus, the stimulus to urban growth given by industrialization represented a power drawing persons to cities to take advantage of the opportunity to earn higher incomes but as long as incomes and economic opportunities were lower in non-urban areas, then there was also a force pushing persons off the land and into urban areas. In so far as a very large part of the population is now economically foot-free in the sense that it is under no economic compulsion to live on the land, then the relative drawing powers of urban areas is a factor in determining their rate of growth

The twentieth century has witnessed the rapid growth of the larger cities. Their growth appears to be correlated with a number of factors. Firstly, a high level of industrialization and increased mobility of industry within a nation. Secondly, the growth of inter-regional commerce leading to the indicated importance of tertiary activity. Thirdly, the more equal spread of national income, which has allowed more and more persons to take advantage of any new possibilities, such as long distance commuting.

The dominance of the modern large town arises from that centralization and specialization of function which is rooted in cheap and rapid transport. It is shown

by the location of these vast population magnets at strategic points in the web of transport facilities. With the sheer size of the proportion of economic activity, which now takes place in the urban sector, more and more, the rate of economic growth of a nation is coming to approximate the average rate of growth amongst its urban areas.

20.2 THE INTERACTION OF ECONOMIC AND NON-ECONOMIC FORCES IN URBANIZATION

Whatever the reasons for persons and activities concentrating in urban areas in the first instance, it has been found that urbanization has certain economic advantages which reinforce its impetus. This is true even where a city's original purpose was to provide a good defensive position, or the seat of a royal court, or a political centre, or a religious centre. In other cases, it has been the economic advantages, which have provided the underlying reason for the establishment of an urban area. However, before examining the economic advantages of urbanization, and in order to avoid misunderstanding, it is advisable to consider the inter-relationships between the economic and other factors involved in urbanization.

Various disciplines are concerned with the phenomenon of urbanization. Throughout this part of the book, an economic approach is obviously, but it is fully realized that other factors enter into every decision made by man. These aspects, whether sociological, psychological or some other, are equally important to the understanding of urbanization, for these factors will have economic consequences and vice versa. For example, if it is assumed that the urban death rate exceeds the urban birth rate, then the urban population would not be replacing itself. This would have economic consequences, for in the long run, the supply of labor would decrease unless net immigration more than offset the excess of deaths over births. There are also occasions where persons have moved from one country or area where they were persecuted for their religious beliefs to countries and areas with a more tolerant outlook. Again this could have economic repercussions, which are more far-reaching than the effect on labor supply. Thus Coventry was chosen as a

haven of rest by refugee Huguenot silk spinners and weavers and the silk industry they established was followed by one making fine machinery for textile industries, and so on to the present-day concern with other specialized machinery, sewing machines, bicycles, motor cars and aircraft.

The decision to locate the national political capital at a certain site, even if for no other reason than geographical centrality, will immediately create a new urban area offering employment opportunities in administrative work. To this city will be drawn other activities which need to be in close and frequent contact with government circles, and which would influence future development of the transport network. Moreover, cities which are centers of government activity often find that the employment opportunities so created are relatively immune from economic depression. The history of many American state capitals shows the extent to which the location of the government function in a particular city is an artificial stimulus to growth, which gives that city a relative advantage over other cities in that state. In fact, decisions by public authorities generally can aid or retard the promotion of further urban growth by economic factors. Thus, the construction of the London—Birmingham motorway reinforced the economic factors leading to the growth of London and Birmingham. Similarly, government controls over industrial and office development retard such development in the controlled areas and promote growth elsewhere when the national economy is prosperous and the industries and offices involved are relatively foot-loose.

On a smaller scale, topographical features may condition the direction in which a city is able to expand, as in the case of ports or cities at the junction of mountain range and plain. Within a particular city, the choice of an ideal physical site for or a building, is rarely practicable; certain sites will be avoided because of some developmental handicap relative to the state of building technology, e.g., excessive slope or liability to floods, and on other sites because of subsoil conditions, heavy buildings will require pile foundations or raft construction.

From what has been said, it can be seen that the economic aspect of urbanization is no more important than any other. In the remainder of the analysis of

urbanization, the economic factors will be emphasized but the importance of the other factors will not be overlooked. It is especially important to realize that economic forces do not operate in a vacuum and that the existence of other forces and factors provide limits within which these economic forces have to work. Thus, the pattern of land- use in an urban area, which is determined by economic forces acting within legal, political, religious and other constraints, is likely to be different from the pattern which would develop in the absence of such constraints. Although on many occasions, the economic factors are analyzed in isolation to emphasize the point in question. In the final analysis, an attempt is made to take into account the limits within which the economic forces work and the economic consequences of the other factors involved in urbanization.

20.3 THE ECONOMIC ADVANTAGES OF URBANIZATION

An economic study of urbanization seeks to explain the existence and character of urban areas and the functions they perform. Cities grow up in particular locations in order to discharge functions for the surrounding countryside, or for regional, national, or even world markets. The city can, therefore, largely be regarded as an economic mechanism evolved in response to the ever-changing economic needs of society in the production, consumption and distribution of goods and services. It takes the form of an agglomeration of producers and consumers who are mutually dependent for goods and services. Within the city, wants are satisfied by means of exchange as producers obtain the use of factors of production, especially labor, and provide an elaborate assortment of goods and services, and consumers get the goods and services they demand. The advantages of the city as a means for solving the basic economic problem of scarce resources, with alternative uses, versus unlimited wants, can be examined in detail under the headings of specialization and exchange, complementarity of activities, the supply of factors of production, and economies of scale.

20.4 SPECIALIZATION AND EXCHANGE

The economic organization of cities is based on specialization and exchange. This is true in two senses. Firstly, there is specialization of function within a given city, as

where one person runs a shop. Another is a transport worker, yet another a factory worker and so on for all other workers and factors of production. Secondly, there is specialization of function between cities; for one can associate industry with certain cities, education with others, some towns are financial centers, or resorts or military garrisons.

Taking a completely isolated city, it would be found that specialization and exchange increases the quantity and quality of the goods and services produced from a fixed amount of factor resources. Using labor as an example, where a person specializes in a particular task, he would acquire more knowledge, more skill, have better machines to work with and develop new techniques in the performance of that task, and get the job done more quickly than would otherwise be possible. This would be true if all labor was identical but where labor is heterogeneous, specialization also allows individual workers to concentrate on those tasks where their relative advantage is greatest. These advantages of specialization result in a person, either on his own or in co-operation with other specialists, producing more of a better product.

The corollary of a high degree of specialization is the need for exchange. A person will only specialize on the production of a given good or service when he can exchange that good or service for the other goods and services he requires. In a money economy, it is the effective demand for the good or service which determines how much or how little of other goods and services a person can buy, or indirectly receive in exchange. The effective demand for a good or service is thus the extent of the market and it is this which governs the degree of specialization. Take an example, where a good is effectively demanded by only two persons in a hundred, and it requires the demand of one hundred persons to keep a person fully occupied in supplying that good, providing that person with what he considers to be an adequate income, then it will require a city of 5,000 persons before that person specializes wholly on the production of this good. If only one person in one hundred demanded the good, and conditions of supply remain unchanged, then the city size would have to be 10,000 to attract the person into

specializing on the production of the good. Therefore, the smaller the demand for a given good or service relative to a given number of persons, the larger will the size of a city have to be before a person or persons specialize(s) on supplying a good or service. This shows itself in that some activities can only be supported by cities of a certain minimal size. Where there is a large effective demand for a particular good or service relative to a given number of persons, the size of the demand or extent of the market will govern the degree of specialization of function in the production of that good or service. Usually, the production process of any good or service can be broken down into a number of stages, and a person or persons can specialize at each stage. The larger the demand for a good or service, the greater the subdivision of the productive process, which can take place, and the more of this type of specialization of function that will be possible. Again, the output of goods and services will be increased and it is more likely that the opportunities for such specialization are more commonplace, the larger the city.

From the above reasoning, it was seen that the degree of specialization depends upon the extent of the market and that exchange involves the close integration of the persons concerned. The larger the number of persons who are accessible to each other, the larger the number of possible contacts, and thus the larger the market for any particular commodity. Therefore, in the completely isolated city with given transport facilities, the degree of specialization is dependent on the density of population. Herein lies the inherent economic advantages of urban areas. The larger and denser the population, the greater the likelihood that persons will specialize on producing given goods and services and the more will specialization within the productive process take place with the resultant enrichment of the inhabitants. If economic efficiency, in terms of the highest total real value of output from resources available, is a desirable goal, it would appear, *a priori*, that the larger the urban area, the greater is likely to be the real income of its inhabitants.

If the city was not isolated from other population groupings, an additional factor, besides density of population, will determine the degree of specialization. It will

depend also on the ease with which persons and goods can be transported between population groupings. Within the city, the mere fact of close settlement provided the possibility of numerous contacts but with persons living outside of the city boundaries, more sophisticated methods of transport are necessary to bring further consumers into the market for goods and services produced within a given city. These additional consumers need not live only in the rural hinterland of that city but in other urban areas as well. Where population is scattered over a wide area and transport facilities between cities are poor, the degree of specialization and exchange will be small. On the other hand, when the density of population is high and the intercity transport routes are well developed, there will be a high degree of specialization and exchange.

Urban areas most naturally develop at nodal points in the transport network, for transport is not timeless and those locations, which have good transport access to other areas have a relative advantage over locations with poorer transport facilities. Urban locations with such a relative advantage are likely to be where different transport routes converge, as in the case of a bridging or fording point on a river, a pass through a mountain range, or a trans-shipment point where it is necessary to change the form of transport. A general improvement of transport facilities will increase the size of the population whose effective demand can be tapped and therefore increase the amount of specialization and exchange, which can take place. Population tends to follow economic opportunity and persons will be attracted to places where the potential market is largest. This increases the number of persons in the city, which provides further opportunity for specialization and exchange. The increase in city population and therefore population density in the area is likely to lead to an improvement in transport facilities. In this way, the one factor reinforces the other in urban growth.

Where a person specializes in supplying a particular good or service, he cannot be self-sufficient but is dependent upon other persons buying his specialized product in order to be able to purchase his other needs. The same is true of the city; it cannot be self-sufficient, having to import food from agricultural areas, probably

raw materials and certain manufactured good as well. Moreover, where specialization of function between towns is common, a portion of a city's economic activity is supported by non-local demands, and the more specialized a city becomes, the more it must import to provide for the great variety of goods and services demanded by its inhabitants. To pay for these extra imports, the more goods and services the city must produce for export outside the city.

The concept of specialization applies not only to the production of economic goods and services but also to non-economic activities. Social organizations find that the principle applies equally to their activity. The variety of clubs and organizations catering for individual interests is likely to be much larger, covering a wider range of special interests, catering not only for popular interests but also for the unusual, the larger is the city. In the field of religion, only the more important denominations are likely to provide places of worship in the smaller cities, for the number of adherents to deviant denominations is an insignificant proportion of the city's population. In the largest cities, the number of members of deviant denominations may well be adequate to warrant their own place of worship and thus the variety of religions practiced by congregations in large cities is much greater than in small cities.

20.5 COMPLEMENTARITY BETWEEN ACTIVITIES

Many economic activities are located in urban areas in order to tap a large population and so obtain an adequate demand for their good or service. Apart from this, many activities need to be there for another reason-they are complementary to each other. Many specialized activities are complementary to other specialized activities in the sense that either they need to use these other specialized services in order to function efficiently or together with these other specialized services they provide a more complete range of goods and services. In such cases, there is usually the necessity for these specialized activities to locate in close proximity to one another in order to carry out their economic function with the maximum efficiency.

The financial community of the City of London comprises the headquarters offices of commercial banks (including merchant banks), insurance companies, building societies, discount houses, investment organizations and other specialists. These institutions have a compelling need to be close together and near the Bank of England because face-to-face contact is demanded in order to keep abreast of current developments in the market for loanable funds. Immediate knowledge is essential for these financial specialists because the prices paid for the use of loanable funds and other paper assets, such as shares and glit-edge securities can change often and quickly and as they deal in large amounts of money, the risks are high. The risks are thus minimized by this clustering, which allows information to circulate quickly and decisions can be made rapidly. Moreover, the business linkages between the various financial institutions involve the physical movement of vast amounts of paper between offices, and this is accomplished by rapid hand delivery. Further, external economies are available to the financial community either in the form of jointly-provided facilities, e.g., clearing houses, or in the form of services provided by other industries, e.g., legal services, printers, accountants.

Either the product has to move from one workshop to another or the specialist worker must be able to move between workshops and in both cases, the close grouping of workshops facilitates this.

Shipping firms in the City of London also require the services of many other specialist firms. For example, they require the services of insurance companies, road haulage and rail transport, warehouse storage facilities, ships' chandlers and other specialists.

Not only do firms reap a definite economic advantage by locating within easy reach of complementary activities but they may also find it advantageous to locate near firms producing similar goods and services. To take the case of shipping firms, a given firm can find that it can tap the largest market by situating itself near to other shipping firms in an urban area, for potential customers requiring shipping services will gravitate towards the area containing the shipping firms and will seek the service they need within that area. On a shopping street, two shoe shops will

find that turnover is great if they are located next door or near to each other because of the ease of comparison rather than if they were located at opposite ends of the street.

Producers of specialized products or services, which appear to be similar and therefore competitive, may in fact be complementary. One shipping firm will specialize in shipping goods and persons to a certain country, whilst another will ship to a different country. Even where two firms ship to the same country, they often cater for different types of trade.

Complenentarity between activities is, to a certain extent, a function of the size of the market. As the market for a good or service increase, firms are likely to develop producing more specialized goods or services than previously. An obvious example of this is with shops. In a village, there will be one or two general shops selling a wide variety of goods, but if the population of the village increased steadily, then specialist shops would begin to appear. In general, the larger the urban area, the more likely there is to be found the clustering of complementary activities.

20.6 SUPPLY OF FACTORS OF PRODUCTION

Competition for factors of production is a natural process because the factors are limited in supply relative to the demand for them. Urban areas are able to attract economic activities as cities have an advantage when it comes to the supply of factors of production. This advantage of adequate factor supply is most marked in the case of labor.

Labor is not a homogeneous factor of production but whether a firm requires a general supply of all types of labor or a particular variety of skill, it is likely to find the necessary supply most readily forthcoming in urban areas. Urban areas have a higher proportion of population in the working age groups than non-urban areas because a significant number of persons come from elsewhere in search of a job, and married women are more available for work. For some firms, unskilled and/or semi-skilled labor is by far the most important input in the production of goods and services. This type of labor receives a relatively low income and as a result,

many of the workers will be tied to public transport facilities and limited in both the time and distance they are willing and able to travel to and from work. For these reasons, firms requiring unskilled or semi-skilled labor tend to locate themselves in cities where the public transport system is well developed and an adequate supply of this type of labor is near at hand. The larger the firm and the higher the proportion of unskilled and semi-skilled employed, the more attractive and essential an urban location will be.

Firms, which require an unseal type of labor or one which is in limited supply also find that urban locations have an advantage. Assume only one person in a hundred can perform a given service because of the special training or aptitude necessary, and that a firm requires twenty such persons, then, in the absence of competition for labor, the firm must locate itself where it is easily accessible to 2,000 persons. However, such special skills are not evenly distributed through the geographical population, being relatively more concentrated in the large urban areas. Therefore, the greater the competition there is for a particular type of skilled labor and the more of that labor a firm requires, then the greater is its need to locate in positions easily accessible to such labor, i.e., this usually means in urban areas.

Labor is being continuously attracted to urban areas because, from a worker's point of view of the higher income opportunities, the greater variety of jobs from which to choose and the better facilities. These superior conditions are, of course, functions of the increased specialization and exchange which takes place in urban areas. The increase in the quantity and quality of goods and services which comes with specialization enables producers to pay labor higher incomes at the same time as increasing their profit margins. Employment opportunities are more numerous and varied and facilities are better because the size of an urban population makes specialist activities possible. If one person in two hundred is mental defective and a specially-trained social worker can look after the welfare of a hundred such persons, then the population within travelling distance of that social worker must be 20,000 before it is fully economic for the local authority to employ such a specialist. Urban areas will have better facilities than non-urban

areas and larger cities are likely to have facilities superior to those existing in smaller cities.

The benefits arising from specialization attract more people to urban areas and this increase in urban population enables more specialization to take place as well as providing an increased supply of labor to meet the increased demand for labor stemming from increased production activity and specialization. This illustrates the complex inter-relationships between the different factors and suggests that the supply of labor adjusts itself to the increased demand, unless factors operate to prevent the adjustment of supply, such as the non-availability of housing, which deters prospective migrants from coming into a given urban area.

In the case of capital funds and Lands, the supply of these factors is probably more responsive to changes in demand than with labor. The availability of finance is rarely a retarding factor for economic activity in an advanced society because capital funds are mobile and the money supply reflects the demand for resources so funds would be created to this extent. Although the availability of capital funds may be affected in the short run by government policy, in the long run, the amount of capital funds demanded by economic activity is likely to be forthcoming. Land as a factor of production includes not only the space used but also raw materials. Again, these are responsive to changes in demand. Materials are transportable (at greater or lesser cost) so the supply in any given urban area can be altered in the short run and in the long run, the supply will be increased in response to increased demand. The supply of land as urban space also responds to demand and although the amount of land in the centre of the city is fixed in amount, land further away from the centre is available. Such land may not be a perfect substitute for central land but as there are limits to the intensity to which central land can be developed and less central land is in greater supply relative to demand, there will be a point where less central land is developed for urban uses. The supply of potential urban space is related to the radius of development, for example, if the radius of city development was doubled, this would quadruple the actual developed area. Thus, as distance from the city centre increases, there is a more than proportional

increase in the supply of potential urban space. Again, there may be limitations which affect the adjustment of supply to demand for physical features, and zoning regulations could reduce the forthcoming supply of land.

20.7 ECONOMIES OF URBAN CONCENTRATION

As well as the opportunities for specialization and important linkages of complementary activities, there are similar but more general advantages from urban concentration, which provide an incentive towards agglomeration of diverse types of activities. These increase in their importance as city size increases. Up to a point, the city as a whole gains in efficiency as it grows in size; transport facilities become more extensive, the market becomes broader and more flexible, the amount of rentable space increases, and there are more auxiliary services catering to business in general (such as banks, utilities, fire and police services). As has already been shown, the larger the urban concentration, the greater the subdivision of function that takes place. In small towns, certain operations and services must be carried out by firms for themselves but in large cities, these can be contracted out to firms specializing in those functions and operating on a large enough scale to do them cheaper. This arises from the imperfect divisibility of factors of production and as a scale of operation increases, there is often the chance to introduce large, divisible units, which result in cheaper output per unit. This principle applies not only to the subdivision of the productive process into specialized parts but also to the provision of general urban services, such as sewage, refuse collection, and retail facilities. The principle of massing of reserves means that in urban areas, especially the larger ones, individual firms need not keep large reserves of materials and equipment but can operate on a hand-to-mouth basis, for supplies of materials and equipment are available at short notice when necessary. Thus, the economies of urban concentration are especially important in the case of industries facing an unstable demand of comparatively small, single plant firms, which lack heavy capital equipment.

Once established, an urban area acquires advantages, which serve to attract further economic activity. However, economic activity is rarely static and in an

urban area, some industry may be declining as other is expanding. Overall existing urban areas have shown an ability to substitute new or expanding activities for declining ones, although ghost towns indicate that such substitution does not always occur. The success of substitution depends upon the acquired advantages an urban area possesses-a labour force of varied skills, numerous business services, the markets available, etc.-and the more developed these factors the more favourable the conditions for substitution.

From what has been said, it would appear from an economic point of view that the larger the urban area, the better. This is true to a certain extent, although there may be offsetting factors, which reduce the economic advantages of large urban areas, such as traffic congestion on the roads, and the reduction in the efficiency of persons due to the anxieties and frustration of urban living.

20.8 URBANIZATION AND AGRICULTURE

It has often been argued that land must produce a surplus in order to support cities and only when the agricultural surplus is sufficiently high to release a substantial part of the agricultural labor force will cities be formed. In times and areas of limited transport facilities, a city would be dependent upon the agricultural surplus of its hinterland but with world transport techniques, the agricultural surplus, which supports a city need not be related even to the country in which the city is located.

Obviously, an urban area cannot be self-sufficient and agricultural goods must be one of the most important imports into an urban area. Imports are not costless for the city but require exports from the city to pay for them. Also, in discussing the labor supply advantages or urban areas, it was shown that urban areas could draw persons to them: there was a "pull' to the city and urban growth was not solely dependent on the "push" from the land. Thus, agriculture could be in a position where it was losing labor and this encouraged agriculture to substitute capital for labor, i.e., greater mechanization. The city has contributed to the modernization of agriculture itself in that many inventions born in the city have been adapted to agricultural use. Moreover, the city would never go short of foodstuffs for the

specialization of activity which characterizes the city means that more and better goods and services can be produced and therefore more goods and services are available to export in payment for the agricultural imports. The larger and more specialized the city, the greater the volume of possible exports, and thus the higher the incentive to farmers to produce the agricultural goods demanded by the city.

20.9 PUBLIC HEALTH

Similar reasoning can be applied to the question of sanitation, refuse disposal and medical services. It cannot be said that city growth during the Industrial Revolution in the nineteenth century, Britain had to await improvements in medicine and so on. Certainly, the operation of such improvements may have been secondary factors, which gave an impetus to the rate of urban growth. The stimulus to improved sanitation and medical services came from the growth of urban areas themselves: it was the requirements of dense urban living, which forced innovation. In other words, as the number and size of cities increased, so did the demand for such services and it became economical to undertake their provision, e.g., to install a system of drains and sewers, to build reservoirs and transport water considerable distances to meet the needs of a city, refuse collection, and improved hospitals.

20.10 URBANIZATION AND TRANSPORT

The degree of urbanization in any community is closely connected with the level of transport technology. Transport is vital to urbanization at two distinct levels. First of all, inter-nation, inter-region, and inter-city transport facilities are very much urban builders. Before the development of cheap and rapid transport over long distances, each city was almost entirely dependent upon its surrounding area for food and materials and out-of-town customers for its exports. Urban areas will not grow from this small start to great size unless transport facilities make it possible to amass raw materials from and distribute products far afield. improvements in long-distance transport makes possible larger individual cities and increase the proportion of the population, which lives in urban areas. Secondly, transportation plays a strategic role within the urban area and the amount of intra-city transport

needed increases as the size and complexity of the city grows because of the even wider separation of urban functions which accompanies growth. The construction, running and maintenance of transport facilities make a substantial contribution to the employment base in urban area. The movement of goods and persons cannot be costless so transport acts as a substitute for physical nearness. Each successive improvement in transport has had significant effects in concentrating persons and economic activities at nodal points, so accelerating the growth of urban areas. The fastest means of transport available at the start of the Industrial Revolution was horse-drawn and since maximum speeds were of the order of five miles per hour, this dictated small towns, a fact which was emphasized because persons unable to afford horse-drawn transport had to walk. The advent of the steam railway era made it possible to move persons and goods between various parts of the country and where adapted to provide the first commuter services, the out-of-city railway stations formed the first nodes of suburban development. Around any station, the possibilities of horse-drawn transport provided the limits to the built-up area. At first, only the higher income groups could afford such suburban living but as real wages increased and the demand for rail transport rose, so the introduction of concessions such as early morning workmen's tickets widened the number of workers who could live at some distance from their place of work. The electrification of suburban rail services provided faster transport, so spreading the suburban net over larger areas. However, as long as the outward physical growth of urban areas was governed by rail movement, it was tied to a limited number of routes. This was changed by the motor vehicle. Bus services could give a much closer network than rail; the private car was even more flexible. The result is that the motor-car has given persons and activities the opportunities to spread themselves over wider areas; although there will always be advantages such as complementarity, which work to keep them bound closely together, and the potential radius of the continuous built-up area of any city has been extended to twenty miles or upward (giving an area of some 700 square miles should this be a realized development).

20.11 SEQUENCE OF URBAN GROWTH

Urban areas today provide a distinctive economic environment in which secondary (manufacturing) and tertiary (service), are created. The evolutionary sequence usually evident in a nation or region is to start with an economy based on primary activity, that is agriculture and other extractive industries, and to proceed to the secondary industries, which are well developed before tertiary activity assumes significant proportions. However, the more urbanized a society becomes, the stronger the possibilities that the sequence of development in any of its regions can take other lines. For example, the sequence of development could be reversed starting with tertiary activities if good beach facilities were developed into a holiday resort. On becoming successful, the resort would grow to a size where it could support certain manufacturing industries catering to the resort, trade or industries taking advantage of labor available in the off-peak season. One industry can attract another; the larger the city becomes, the more services and industries find it an attractive location and eventually the city/resort area may grow to such a size that eventually it encourages commercial agricultural use of land in the surrounding region. Equally, urban growth could begin at the secondary stage and proceed both ways, drawing service activity to it and promoting agriculture around it.

From the advantages outlined earlier in this chapter, it would appear that the phenomenon of urbanization will further increase in importance, even in those nations already dominated by urban-based activities, and other less developed nations will also find that increasing urbanization will be synonymous with rising standards of living. Future urban growth depends on a number of factors, foremost amongst which is a strong economic base, opportunities for increased specialization of function, the rate of increase of the country's population, and the percentage of that population that can be maintained in cities by home agriculture and imported foodstuffs. In most cases, so rapid has the growth in urban population been that there has been a considerable reorganization of population within the urban area.

20.12 PROBLEMS ASSOCIATED WITH GROWTH

The economic advantages of the urban way of life are enormous but this does not mean that the path of urban growth is a smooth one, and maladjustments can accompany the process of urbanization which prevents the city from making the maximum contribution to the national economy. The rapidity of urban and the degree of concentration were sure to bring in its wake problems and conflicts. Some of these are of an economic nature and must, therefore, be set against the economic benefits derived from cities. Examples are the great inequalities of incomes between urban inhabitants, the congestion of facilities, especially public transport and roads, which go hand-in-hand with suburban dispersal, difficulties in obtaining housing. The existence of slums and blighted areas and the lag in public improvements, also have their economic facets. From the point of view of other disciplines, urbanization, especially the rapidity of its advance, may have its disadvantages. The administrative and boundary difficulties are problems of city government and the working of the latter may help explain the delays in public improvements. The sociologist is concerned with the effect of slums and blighted areas or the inadequate recreational facilities on the lives of city inhabitants, the existence of delinquency and crime, etc., and the psychologist with the effects of noise and strain leading to greater insanity and more suicides. The medical officer notes the effects of dirt, smoke, etc. on the health of urbanites. The complexity of inter- linkages between the various specialists must once again be emphasized and the fact that urbanisation need not be totally advantageous from all points of view. However, the fact that urbanisation is of increasing importance the world over suggests that overall, the advantages outweigh the disadvantages. As long as there are disadvantages in urbanization, society is not gaining the greatest possible benefit from cities and much attention is paid to overcoming these disadvantages.

CHAPTER TWENTY ONE

LAND USE WITHIN AN URBAN AREA

21.1 URBAN AREA LAND USE

Urbanization is essentially an economic phenomenon and, therefore, it is only logical to expect that the internal organization of urban areas has evolved as a mechanism to facilitate the functioning of economic activities. Within an urban area a rational pattern of land uses will evolve and this same basic tendency is exhibited in all cities irrespective of their size, origin, or geographical location. The apparent haphazard arrangement of land uses in a city belies the underlying essential order.

An urban area consists of a great variety of interdependent activities and the choice of location of any activity is normally a rational decision made after an assessment of the relative advantages of various locations for the performance of the activity in question, given the general framework and knowledge prevailing. In the case of a competitive economy there is a close limit to the disadvantages that can be incurred by any firm or person or, alternatively, the possible advantages that can be foregone. Therefore, in the long run an activity will tend to the location which gives it the greatest relative advantage. This will be the profit-maximization location for business units and the utility-maximization one for consumers. Thus, by a process of competition, in any city, large or small, activities seek out and segregate themselves in that area in which their optimum conditions (greatest relative advantage) are to be found and by virtue of which they are normally able to exclude all other users. The spatial differentiation of land use patterns becomes more marked and complex as the degree of specialization increases in significance and complementary linkages more commonplace.

21.2 FACTORS DETERMINING THE PATTERN OF LAND USE

Basically the pattern of land use in any urban area is a reflection of competition for sites between various uses pirating through the forces of demand and supply. It is, therefore the factors which underlie these demand and supply forces which must be examined. In the first instance, the price a user is prepared to pay for an urban site i.e. demand price, must be explained assuming that the underlying conditions of demand remain the same. For example, an increase in the income of a prospective user of a site could lead that user to pay a higher price for the site. Similar considerations apply in the case of the supply of urban sites.

In order to simplify the initial analysis a number of assumptions must be made. First, it is assumed that the underlying conditions of demand remain the same so that the number of sites of given size demanded at each price remains fixed. Thus the population and number of economic activities in the urban area are given, as are the tastes or preferences of that population and their income. Second, the assumptions which ensure that the number of sites of a given size supplied at each price is fixed. These are the underlying conditions of supply which will determine the relative advantages of the sites. The state of building technology is taken as fixed, also are the sources of raw materials and other factors of production, the number and type of public utilities, and the transport system. Finally, if the market is to be competitive it is necessary to rule out government interference with land use, such as town planning legislation and rent control, and other institutional restrictions, such as legal covenants. This gives each prospective user the freedom of choice and the opportunity to obtain the site of his choice if able and willing to pay the market price. It is within this analytical framework that the evolution of the urban land use pattern resulting from the interaction of supply and demand will be examined. At a later stage these assumptions will be removed in order to illustrate the dynamic nature of urban change.

Similar patterns of land use emerge in different urban areas because of competition between different potential users for given sites. Such competition for a given site may be between similar potential users, as when two department

stores compete for a city centre location, or between users with very different plans for developing that site, as in the case of a riverside location which could provide an attractive residential setting or a valuable industrial site. Potential users of a given site will estimate the net gain they will make from occupying and using that site compared with the net gains from alterative sites. As already explained in the chapter on the real property market, if a potential user wishes to occupy a particular site, and estimates that he can earn #x more from the use of that site than from occupying what he considers to be the next best position, then he will be prepared to pay up to #x in addition to the rent he would be prepared to pay for the next best position. Where the gain to the potential user is non-pecuniary but, instead, represents the satisfaction he receives from using that site, he will have to place a monetary value on that satisfaction. This will determine the sum of money he is willing to give up for a particular site compared with other sites. With many sites in urban areas, it will be the sums of money which potential users are willing to pay for their use, that ultimately determine their use.

The sum of money can be a periodic payment in the form of rent or a capital sum to purchase the site. If a person rents a site, and where it is developed the building on it, then someone else owns that property as an investment. The net rent he receives will be the return on his investment. If a person purchases a site, then he is, in all respects, making an investment. His return for the purchase price is the rent he would have to pay to occupy and use the site. Rent and value of land and buildings are merely two ways of looking at the same thing. Of course, one or the other has to be used consistently when comparisons are being made, and in this and subsequent chapters the value of land and buildings is preferred.

The person who is willing to pay the largest capital sum for a site is likely to be the person who will eventually occupy and use it. He will be able to compete it away from other potential users. By this mechanism, sites in an urban area will tend to be used for that purpose from which the user makes the greatest net gain, pecuniary or otherwise, compared with the net gains from alternative uses of that site. In other words there is a strong tendency for each parcel of land in an urban

area to be used for its highest and best use. The chief factor which determines the net gain to be had from the use of a particular site is its spatial relationships with other sites, and the use made of these other sites. This is a question of accessibility which, in all its varied facets, provides a key to an explanation of the pattern of urban land uses.

21.3 ACCESSIBILITY

Accessibility evaluates the net economic costs of moving persons and goods between one place and another place. It is, therefore, not only concerned with the distance to be travelled between two places but, more important, with the time taken to travel that distance, i.e., with all the factor cost involved in any journey. However, accessibility does not affect solely the real costs incurred by movement but also the real benefits derived, for example, the total revenue received by a business firm is influenced by the number of customers purchasing that firm's good or service (as well as the amount each customer buys).

With the underlying conditions of supply remaining fixed the supply of possible sites in an urban area is a function of the existing transport network. Therefore, knowing the preferences and tolerances of persons and firms, the total supply of sites is defined within relatively narrow limits. With a given transport system movement will be concentrated along particular lines so differentiating between sites in terms of accessibility advantages. Sites adjacent to a main transport route will have a relative advantage over sites located some way from such a route. Other sites located at route intersections will possess an even greater relative advantage, whilst the greatest relative advantage belongs to those sites located at the focus of the urban transport system, i.e., the city centre. The accessibility advantage possessed by the city centre is thus a key factor in urban land use patterns.

On the demand side accessibility is of similar importance, for prospective purchasers may demand different accessibility characteristics from their chosen sites. To examine the demand for urban space it is necessary to distinguish between the business demand and the residential demand for premises. The

business demand reflects the productivity of land since business users are seeking that location which will maximize their money profits:- The maximum profit location depends upon a comparison of the total costs of production at various sites, which will reflect the relative accessibility advantages of those sites, with the total revenue possibilities of the respective sites, which will reflect any relative accessibility advantages of those sites, with the total revenue possibilities of the respective sites, which will again reflect any relative accessibility advantages. Thus, the profitability of any site is dependent, for urban business uses, on accessibility.

It has been shown in the previous chapter that specialization reaches its peak in urban activity and that specialization depends upon exchange. Exchange necessarily involves contactbetween factors of production and producers, producers and wholesalers, wholesalers and retailers, retailers and consumers, etc. Accessibility sums up the ease with which these contacts are made. The type of contact may differ. For example the department store demands face-to-face contact between the Sales-assistant and the customer whereas the mail-order store relies upon the postal service for its contacts with individual customers or local field agents. Thus accessibility to prospective customers is more critical for the department store than for the mail-order concern. Contacts may be made in other ways. e.g., telephone telex, and be more complex than in the above example, for instance, where one has a chain of middlemen between the producer and final consumer. Then again, contacts differ as to responsibility for moving the good in question. Often the consumer incurs the cost of getting a good from the place of purchase to his home. In other cases it may be shared where the consumer telephones or takes his order and the producer/retailer runs a delivery service to take the goods to the consumer's home. Alternatively an intermediary may be used such as a specialist transport firm or the postal service in the case of mail order stores and correspondence education. The consumer may have to travel to the producer's location in order to make known his demand as against the producer's agent calling at the consumer's home (e.g., insurance field agent calling on prospective clients) or alternatively the use of some intermediary such as postal or

telephone service or a special order firm (e.g., travel agents, theatre ticket agencies). The more necessary is face-to-face contact and the greater the reliance on the customer coming to the producer/seller's location the more vital is accessibility to the activity in question.

Further aspects are the number and frequency of contacts and the time which can elapse before a demand is satisfied. The contacts of a business user with a given customer may be (i) numerous and at regular intervals, e.g., daily delivery of bread, milk and newspapers, (ii) few and at regular intervals, e.g., quarterly telephone accounts, electricity and gas meter-reader's calls, (iii) numerous and at irregular intervals, e.g. purchase of cigarettes or petrol, and (iv) few and at irregular intervals, e.g., purchase of curtains and furniture. Combining these facts with those of the previous paragraph, the accessibility conditions demanded of a site can vary between different potential users. A firm catering for large numbers of customers coming to buy goods at frequent, regular intervals will find accessibility more critical than a firm dealing with fewer customers at long and irregular intervals where the firm's representatives went to the consumer's home. Likewise here speed of contact is essential accessibility and assumes greater importance than in those cases where time can be taken over a purchase or contact. Because of the varied facets involved in a study of accessibility on the demand side it can be seen that accessibility can be of varying degrees of importance to business users and, thus, the demand for sites is, like supply, highly differentiated. The more important is accessibility to a given business user the more restricted the possibility of substituting one urban site for another, whilst for those activities for which accessibility is less critical there is a much wider range of substitution possibilities.

So far the importance of accessibility to a business has been illustrated only in terms of contacts with customers but a business has to weigh the advantages of easy access to factor inputs. Contacts with factors of production involve similar considerations of type, number and frequency, etc. Whether the market attraction or the factor pull is the stronger for any particular business user will depend upon the relative importance of distribution and assembly costs compared with revenue

possibilities. When one realizes the variety of site relations with factors and customers demanded by business users it can be seen that accessibility could well be more critical for one business user than another. This does not mean that two such uses would not compete a given site, say one which is accessible to the whole urban area. Such a site would suit the use placing less emphasis on accessibility admirably but the capital sum it would be prepared to pay for the site will not be as high as the capital sum the user who finds accessibility critical will pay. The reason being that for the latter the sites in the urban area offering general access to the city are limited in number and if accessibility is vital, that user cannot substitute a less accessible site (even though it would be cheaper) because its profits would be reduced either because total revenue is less or total costs are higher or some element of both. Similarly competition for the accessible site would take place between business use desiring access to customers and one seeking access to factors and it is likely that the firm requiring access to its market will be willing to pay the highest price for that site.

The residential demand for urban land also depends upon accessibility but the capital sum a residential user pays to obtain a site represents a money evaluation of the satisfaction to be derived from that site. Residential demand depends upon utility or satisfaction and the residential user seek that site which allows him to maximize his utility. Thus, for the residential user traveling, whether to work, to shops or for pleasure, represents a disutility and each person wishes to minimize these disutilities, i.e., the time and money costs of travelling. Disutilities would be minimized if a residential user located himself on a site with a high degree of accessibility, so resident use would compete with business uses for accessible sites. However for the residential user there are certain amenity considerations involved in the choice of site which confer satisfaction/utility upon the user. The amenity value of a site depends upon factors not readily accessible in financial terms such as space, quiet, fresh air etc.,. The choice of a residential site is, in many cases, a compromise because the desire to minimize travelling disutilities demands a relatively accessible, therefore central, site whereas the quest for amenity leads towards less accessible sites some which from the city centre. Greater amenity can

usually be achieved by accepting additional travelling disutility. The degree to which persons are prepared to put up with travelling disutility in order to gain more amenity will depend upon the individual's preferences and these are influenced by such factors as marital status and age composition of family. The extent to which any person can realize his residential wants depends upon his disposable income.

Thus on the demand side the degree to which any business or residential user is dependent on and can benefit from accessibility determines the capital sum they will pay for a site with a given accessibility conditions.

21.4 COMPLEMENTARITY

Complementarity of persons and activities was seen to be one of the advantages of locating in urban areas and thus once a number of sites in given area have been developed this has a strong bearing on the use to which the remaining sites are put. If a particular site is surrounded by offices or houses or any other particular use, this will determine what will be the highest and best use of that site. In any residential area, especially the middle and upper income areas, houses are usually of a similar standard and cater for certain income groups because this maintains the value of the property should one house be taken over for office use, this is likely to affect the value of the remaining residential units. Department stores located next door to each other stimulate sales because of the opportunity for comparison. In such cases there is interdependence of like uses and the advantages of complementarity result in the clustering of these like activities which can benefit from grouping.

The advantages of complementarity may bring also the clustering of unlike uses. One firm may use the by-product of another as a factor input, or firms may perform individual stages in the production of a commodity, or require the specialist services of other activities.

Individuals find advantages from living near to others with similar interests, to schools for their children, to their place of worship or the homes of relatives. Even

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residential use is complementary to business use in that it provides living space for the workers.

Complementarity not only leads like and unlike uses to cluster on adjacent sites but where the site (or more usually the building on the site) cannot be subdivided to provide a particular user with a sufficiently small site/building then that user may combine his demand with other users and so be able to locate on a more accessible site than would otherwise be the case. Thus where a shop occupies the basement and ground floors of a building with offices on the upper floors one finds complementary use of the same site.

The importance of complementarity in determining the use of any urban site is, in its turn, related to the degree of accessibility. The easier access between persons and firms in an urban area the more important is complementarity. Assume a general improvement is made in the urban transport system so that more contacts can now be made between persons and firms, then this is equivalent to an increase in the extent of the market, leading to increased specialization of function. Therefore in the subsequent subdivision of production certain firms may concentrate on one component or one stage of production and new firms will come into being offering special services and all these firms will benefit from close grouping because they are complementary.

Just as some unlike activities are attracted to locate themselves near to each other because of the advantages of complementarity, in other cases, once a particular use has been located in an area then this influences other locational decisions and may cause these other uses to locate elsewhere. Thus obnoxious industry, such as tanneries, glue factories, repel residential use of adjacent sites. Similarly proximity to offensive non-residential uses discourages residential use from sites with highest accessibility.

Combining the influences of accessibility and complementarity it is possible to illustrate the way in which the pattern of urban land use is determined. The earning capacity of some firms is highly dependent upon their being able to occupy

particular positions or be in a particular area. These are the firms which are most highly reliant upon accessibility and/or complementarity. Therefore the more a firm is dependent upon a particular position for its earning capacity, i.e., there are few substitute positions, the more it will be prepared to pay for that position relative to other positions. Where a site is already developed the firm has to consider the suitability of the building to its earning capacity. Where site and the of building is less important to the earning capacity of a firm then it will have the choice of many different sites and the price it will have to pay for any one of these sites is less than where accessibility and complementary factors are vital because the range of substitution possibilities is wider.

It is to be expected that the same or similar activities in different urban areas will make comparable gains from occupying and using sites in similar positions within each urban area. If a user of a given site in one urban area can make a large enough gain in that position to enable him to compete it away from other potential users, then it is likely that another person carrying out the same activity in another urban area will be able to make similar gains and compete a comparable position away from potential users in that area. Thus similar patterns of land use emerge in different urban areas.

Firms for whom accessibility is critical are willing to pay high prices for sites with the necessary characteristics. Within an urban area the demand for land is greatest for the position offering the greatest accessibility. Firms congregating in such a position give one another the advantages of complementarity so giving firms an additional reason for wanting to be in that position and thereby increasing the demand for land. The extent of the demand for land in this position will cause its value to rise to the point where it becomes the position of highest land values in an urban area.

As an urban area grows, the position of greatest accessibility and complementarity tends to grow both laterally and vertically and usually divided into clusters of complementary activities. For instance the main shopping and entertainment

centre in an urban area may divide from the main office area, whereas previously they were intermingled. Where this happens peaks of higher land values will appear, reflecting the clusters of complementary activities, within the general position of greatest accessibility. As one moves away from the position of greatest accessibility and complementarity it is to be expected that land values would fall increasingly, reflecting the disadvantages of these positions with regard to accessibility and complementarity. Although this is generally true some positions away from the one of greatest accessibility may be in a less disadvantageous position than others. Thus sites next to main roads out of the city or to suburban railway stations or where two main roads meet are likely to be more accessible than sites some distance from main roads or railway stations. Some firms, such as shops selling foodstuffs, will find that their earning capacities can be increased by being in such positions and they will tend to gather there and perhaps attract complementary activities. The demand for these positions will cause their values to be higher than in the surrounding area.

Thus the pattern of land values is another way of looking at the pattern of land uses. Since a similar pattern emerges in all urban areas it is possible to indicate in detail how the uses would arrange themselves, but first the intensity of utilization should be discussed.

21.5 THE INTENSITY OF LAND USE

There is also a correlation between the pattern of land use, land values and the intensity utilization. As a result of the differential advantages of various sites, there will be a large demand for those sites with the greatest relative advantage and it may be profitable to provide additional accommodation on that site by building more intensively. In fact the provision of more accommodation on a given site will, up to a point, increase the amount available to purchase the site. Therefore, those persons and activities who are able to use a site most intensively, are the ones who will be able to compete it away from other potential users.

The differential advantages possessed by various sites mean that the application of capital and labor on some sites yields a greater return than on others. There are, however, limits to the production possibilities of the better sites. The greatest demand for sites will be within the position of greatest accessibility and complementarity and will lead to the greatest intensity of use in that position. As an urban area grows the position of greatest accessibility will be more intensively used but, in accordance with the law of diminishing returns, the increased intensity of use raises costs and forces a resort to less accessible land. This land will be less intensively developed, with the exception of certain sites which have advantages regarding local accessibility. Even so, these sites will not be as intensively developed as those in the position of greatest accessibility.

The correlation between land values and intensity of use is not always a positive one, since, in some instances, it is difficult to increase the accommodation suitable for a given use on a particular site. In the retail business many of the advantages of position are lost when one moves away from the ground floor and it may not pay to develop the site intensively for that purpose alone. For other uses, such as offices and residences, it may be profitable to develop above the ground floor. The high land values of shop property comes from the demand for ground floor space rather than the total floor space of a site as is the case with many other activities. Nevertheless, as shopping use and office or residential use can be combined in a building one would expect, in any urban area, to find a close correlation between the pattern of land values and the pattern of intensity of land.

21.6 DIFFERENCES IN LAND USE PATTERNS BETWEEN URBAN AREAS

Although the similarities in land use patterns between urban areas are striking there will be differences. These differences in geographical patterns of land use between urban areas are due to many factors, physical, legal and so on. Differences in patterns do not undermine the contention that the principles allocating land amongst competing uses are the same for all urban areas but, in fact, illustrate the working of the price mechanism within a given framework. It is the framework within which prices work which is different for different towns. This framework

will comprise the physical conditions of relief, climate, subsoil, water bodies, legal considerations invoked by individuals and government, the provision of land uses not subject to the price system, and consumer preferences.

In the first place differences in land use patterns reflect physical features such as the presence or absence of rivers or other water bodies, varying slopes and elevations, and orientation to prevailing winds. The pattern of transport routes is the major determinant of the positions of greater or lesser accessibility in an urban area but these routes are very much influenced by relief and water bodies which have to be crossed. Since accessibility and complementarity are closely connected these physical features will also influence the positions of complementarity.

Geographical features may also influence the directions in which an urban area develops and expands. Where an urban area is located on a plain at the foot of a range of mountains growth is likely to be asymmetrical is greater expansion on the plain side than on the mountain side. Transport on the plain will be easier therefore accessibility easier. The cost of building on steep slopes is greater than that of building on level sites but the elevation and perhaps the views may be an important factor which would attract a particular type of residential use, catering for higher income groups, which can stand the increased building costs. Similarly proximity to natural water bodies may be a sought-after amenity by residential users although such features could equally well be important for industry, for moving goods and materials, for cooling purposes or effluent disposal. Climate conditions can also play their part, this orientation to prevailing winds may be an important factor in industrial cities. Industrial smoke will be carried in a certain direction by prevailing wind and create a "black belt" which is to be avoided by all who can afford to live elsewhere, leaving only lowest income housing in the "black belt". There are sometimes important micro- climatic differences within relatively small distances, for example, susceptibility to fog which may condition the location of a municipal airport.

Geological conditions have a bearing on the pattern of land use and the intensity of use. Subsoil conditions will determine the type and amount of foundations

necessary for any particular building and, although new methods such as pile foundations or raft construction are now possible, unstable subsoil conditions can mean that some sites remain undeveloped or are not developed as intensively as one might expect. It should be emphasized, however, that given the geographical, climatic, and geological conditions prevailing in any urban area, the economic factors will operate within these limitations and tend to lead each site to its highest and best use.

Another important factor affecting the geographical pattern of land use in an urban area will be the wishes and desires of former residents and landowners in the area. If, for example, a man with the means and legal backing to carry out an action, decides that a given area of land will, in perpetuity, be used as a park, then that are of land will be limited in the future to that use. The existence of the park will affect the highest and best use of other land, especially of the land on the edge of the park. It is possible that the highest and best use of this land would be entirely different if the park was not there. Such past decisions determine part of the framework of limiting factors within which economic forces operate.

A further part of the framework will be past legal decisions and laws made with reference to land use. Laws may have been passed in the earlier stages of the development of an urban area which limit the intensity of use of land in the position as greatest accessibility. Should the demand for accommodation in that position increase there can only be lateral expansion of the area, and this may prevent firms from reaping the advantages of complementarity which might have developed with more intensive use. This particular type of law would alter the highest and best use of both the land which could have been used more intensively and that affected by the lateral expansion. In other cases the laws or regulations may go so far as to prohibit what would appear to be the highest and best use from an economic point of view, or retard the time when a site becomes available for development or redevelopment, or alter the cost of building by imposing certain conditions.

There are many examples of the way in which laws and past legal decisions have helped determine present land use in urban areas but in all cases the economic forces have worked to bring particular sites to their highest and best use within these limitations. From a purely economic point, whether a particular legal framework is desirable depends on whether or not it leads to land being used for higher and better uses than would otherwise be the case.

Inevitably during the development of an urban area some land will pass into public ownership. Roads, railways and utility services such as water, gas, electricity and telephone become the responsibility of a public or semi-public authority. Schools and hospitals are usually controlled by public bodies and frequently museums, art galleries and open spaces pass into the realm of public jurisdiction. Often the public administrative and works department concerned, own the land and buildings which they use and occupy. Seldom, if ever, is this publicly controlled land offered for sale on the open market and the movement of other land to its highest and best use takes place within this constraint. Moreover, access to publicly provided and/or operated transport facilities and to public utility services will largely determine what the highest and best use of a particular site will be.

Other factors which may be responsible for differing land use patterns between urban areas are consumer preferences, individual judgments, and inertia. It may be the case that in one country persons prefer to live in flats near the city centre whereas in another country the preference is for single-family residences, each on their individual plot of land. Urban areas in the former make more intense use of land and cover a smaller total area than urban areas of similar size in the latter country. Although competition tends to establish on each site the highest and best use as seen by the market in some cases where there is a lack of knowledge poor judgment could result in a different use from the highest and best use. This situation may well only last in the short run for there will be a limit to the additional income forgone as a result of using that site for a lower order use. Somewhat similar in effect may be the case of inertia where a particular use was located in an urban area and over a period of time has acquired advantages such as

complementarity. Now that use persists because of the capitalization of structures and facilities.

Although the pattern of land use in urban areas can be explained in terms of the highest and best use and will, therefore, show certain similarities, from what has been said no two urban areas would have exactly the same geographical pattern of land use. Even within the limiting framework it will never be found that all possible sites are used for their highest and best use because conditions are always changing. Modes and routes of transport change, population growth or migration, the demand for goods and services changes: these and other factors alter the highest and best use of any site. In spite of the many limitations on land use in an urban area, as long as and/or buildings are bought and sold and potential users compete against each other, a pattern of land use will emerge that can be explained in terms of the highest and best use for businesses seek to maximize their profits and residents their utility within the given framework.

21.7 A GENERALIZED PATTERN OF LAND USE WITHIN AN URBAN AREA

The land use pattern of any urban area is not an exact reflection of the immediate and current space requirements but rather of the cumulative needs over a period of years which has arisen from the differing requirements of the various uses with regard to the accessibility and complementarity advantages of certain sites.

As a framework for the explanation of urban land use patterns the area covered can be subdivided into four: the central business district, then moving out from the centre one passes through a zone of transition, followed by the suburbs and the rural-urban fringe, after which land assumes wholly agricultural use. Such a well-differentiated structure appears by the time population, reaches 10,000.

(i) Central Business District

The central business district is an optimum location for many economic activities because it is the focus of intra-city transport and so has the advantage of greatest accessibility to the whole of the urban area. The competition for space gives rise to peak land values and because of the value of the sites and their scarcity, all sites

are fully built-on so giving the greatest intensity of land use. The intensity of use is equally noticeable in that the central business district contains the highest multi-storied buildings for skyscraper is the economic way of producing accessibility in the centre for a large number of firms. The activities for which net profit through accessibility and complementarity is greater cluster and reside in the central area. Therefore the daytime population of the central business district is far in excess of the resident population. The central business district is irregularly shaped and need not be in the geographical centre of an urban area because conditions favored faster expansion of the city in one direction than another. The areal size of the central district increases in physical terms as an urban area grows but in proportionate terms it declines markedly suggesting that the area of greatest accessibility and complementarity is of limited horizontal extent, even in the largest cities. As one might expect the central business district of the largest urban areas can itself be subdivided into functional sub scores.

Firms requiring accessibility to the city population as a whole and who must attract the final customer to their premises are willing to pay the prices to command the sites offering the greatest accessibility. These firms are department stores, variety chain stores, and other specialist shops. Such shops, providing shopping and specialty goods, are located close to the transport termini as this gives them the necessary accessibility. In the large urban area these shops are concentrated into right retail core, the 100 per cent district, and virtually no other use occupies ground-floor space. The sites of highest value are occupied by department stores, alongside which are stores retailing women's shopping goods, whilst nearby are variety chain stores and some convenience outlets, for although they may not be the object of a shopping trip, they supply items incidental to the main purpose of such a trip. Other shops can occupy smaller sites, e.g.. furriers and jewelers, cannot command the best sites because of the display space needed for their particular specialty, e.g., furniture shops. Interspersed amongst the shops are other establishments offering consumer services such as banks, restaurants and ticket agencies. Where smaller shops occupy only the ground and perhaps first floors of a building the upper floors are occupied by offices which require access to

the whole city population, for example, employment agencies, estate agents, solicitors, accountants and insurance offices. Similar reasoning applies to certain professional services like dentistry and chiropody.

In the larger urban areas the main office concentration is to one side of the retail concentration. This is because the type of offices involved, the headquarters offices where the executive and policy decisions of commerce, industry and government are made, are less dependent upon general accessibility to the whole urban area than the shops, although they must be centrally placed in order to be accessible to an adequate supply of labor. These offices rely more on complementarity and frequently need face-to-face contact between workers from different offices. The daily contacts between banks, insurance companies hire-purchase finance companies and so on falls into this category, as do contacts between a firm's head office and relevant government offices, trade union offices, lawyers or market research agencies, or those between newspaper offices and advertising agencies. Whether land values in the office sub core or the retail core are the highest will depend on the nature and size of the city.

Also in the central business district are certain public buildings, like the town hall, public library, and general post office; hotels, which cater for wholesale buyers, out-of-town shoppers, etc.; entertainment facilities, ranging from cinemas and bowling alleys to opera houses and art galleries. The size of the city is the determining factor as to whether or not entertainment facilities are drawn into a "bright lights district" or are scattered amongst the shops. Other buildings, such as churches, are not associated with modern economic life and their central location depended on earlier circumstance.

The boundary of the central business district is not a distinct one but is characterized by land uses which include transport termini, warehousing and wholesaling plus light manufacturing and multifamily residential units. However these may best be considered in the next outer tone from the central business district.

(ii). Zone Of Transition

The transitional zone is, in most British towns, an area originally built up in the nineteenth century by private enterprise when there were few restrictions on the density and type of buildings but which now has relatively high land values due to the expansion of the central business district drawing certain activities towards the city centre. The zone is now undergoing the gradual replacement of old by new uses, and new building may be quite common. A striking feature is that few of the older buildings were purpose-built for their occupiers but more often have been converted from their original residential use.

The business activities of this area and the edge of the central business district have essential linkages with either the retail/office core or with the rest of the urban area Warehousing of retail stocks demands, access to the central shops and needs adequate transport facilities for assembling the goods or, in other cases, to suburban shops scattered throughout the urban area. The industry of the area is partly attracted by the cheap premises available in converted premises and partly by the fact that it needs to be accessible to skilled labor. Relatively few raw materials are used and the goods produced are valuable in relation to their bulk and raw material cost, i.e., there is considerable "value added" during processing. Here is the oldest residential area which is still available for residential use since residence can compete for sites where accommodation is provided at a relatively high density. This takes two contrasting forms. Luxury apartments in a select residential quarter, which has succeeded in preventing infiltration of incompatible uses, are for those who can pay the price for such accessibility to urban facilities complete with very amenable living conditions. Elsewhere are multi-family dwellings for the lowest income groups which have either been provided as such, in the past by private enterprise or more recently by local authorities, or they are the former homes of the more well-to-do which have slipped down the social scale and in the process have been adapted to house more families. The occupants of the latter have insufficient income to be able to afford more amenities and must have access to public transport to get them to and from work.

(iii). Suburban Area

Land values and the intensity of land use are generally very much lower than in the two previous areas. This is to be expected because the suburban area is occupied by lower order uses which were, for some reason, unable to secure more accessible, and thus, more central, sites. The predominant land use is residential, being developed at moderate densities to give suburban dwellers a spacious and amenable environment not too far removed from urban attractions. The individual suburbanite seeks a pleasant home environment but needs access, at varying degrees of frequency, to urban facilities, so, if without private means of transport, he must be near a bus route or railway station. The chosen site has to be accessible to the workplace of the head of the household, and provide general access to convenience shops, schools, doctor's surgery, etc., as well as giving opportunities to visit the city centre for shopping trips, entertainment, expert legal and financial advice, etc. The variety of suburban housing types is considerable although the houses in any street or on a particular estate may be highly standardized for the neighbors of the suburbanite have similar incomes, interests and preferences. The suburban residential areas therefore show segregation according to social class. Scattered throughout the residential areas are those activities which serve relatively restricted neighborhoods, e.g., churches, chapels, public houses, primary schools doctor's surgeries.

Suburban shops are primarily located for ease of access of the everyday buyer and only along main inter-city roads or at the intersection of a radial road and one linking two suburban areas, will find shops retailing shopping and specialty goods, together with certain services such as branch banking. Two main patterns of retail activity appear in the sub urban area. First, the retail use of property abutting a radial road out of a city. Here, the nature of shops and services depends on (a) the importance of the road as a main route, which would attract accessory shops, car showrooms, second-hand car lots, on garages, cafés and the like, and (b) the degree to which it is also the core of a residential area, which would encourage convenience-type outlets such as supermarkets, butchers and launderettes. Secondly at those route intersections which have a relative accessibility advantage