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**REPORT ON
THE LOCATION OF INDUSTRY
IN GREAT BRITAIN**

PEP (Political and Economic Planning) is an independent non-party group, consisting of more than a hundred working members who are by vocation industrialists, distributors, officers of central and local government, town planners, architects, economists, doctors and so forth, and who give part of their spare time to the use of their special training in fact-finding and in suggesting principles and possible advances over a wide range of social and economic problems. By means of the fortnightly broadsheet 'Planning' (the subscription to which is £1 a year) P.E.P. keeps in continuous touch with a large number of men and women interested in social and economic reconstruction from many different standpoints. The group has issued over a hundred and forty broadsheets on a wide range of subjects, and has also published full-scale reports on the coal-mining, cotton and iron and steel industries, housing, and building, electricity supply, international trade, the Press, the health services, the social services, retirement-pensions, continued education from the age of fourteen, and agricultural research. Details of these are given inside the back cover, and notification of future reports will be sent on request to those interested, who are asked to complete the enclosed postcard.

This Report is the result of some four years' work by the Regional Development and Location of Industry Groups of P.E.P. It seeks to provide a comprehensive, balanced and up-to-date summary of the main factors affecting the choice of location of industry, and to supply a basis for a judgment upon the practicability and advisability of attempting conscious stimulation and guidance of industrial development in the national interest. The Report finds in favour of such a policy, but points out its difficulties and limitations, and shows where further examination is needed.

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P E P (POLITICAL AND ECONOMIC PLANNING)

REPORT
ON
THE LOCATION OF INDUSTRY

A survey of present trends in Great Britain affecting
industrial location and regional economic development,
with proposals for future policy

MARCH 1939

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Introductory

Since problems confined to a single industry or a single region are often neglected until they become very difficult to solve, it is hardly surprising that a problem such as industrial location, which cuts across all industries and all regions, should until very recently have been ignored. Even now, although the subject has been much discussed and its literature is rapidly growing, there is a serious lack of data on many of its important aspects, and a tendency to distort its significance in social and economic affairs. In a sense there is no such subject as the location of industry, for the problem has only taken shape owing to failure to think out fully the effects, upon different areas, of industrial change and of fiscal and taxation policy, of central and local administration, and of transport and utility policy. (To study thoroughly the location of industry would, therefore, mean investigating in detail many of the main branches of national social and economic policy, with a view to finding where they have gone wrong, making adjustments, and so eliminating their more unfortunate repercussions upon individual parts of the country. Such an encyclopædic study would be unwieldy and probably impracticable.) Moreover, it would be hard to justify rushing from the extreme of ignoring how various national policies, through the agency of location of industry, affect the prosperity of different areas, to the opposite extreme of judging all these policies simply from the limited angle of industrial location, which is only one out of many important factors to be taken into account.

It is worth while, therefore, to remember as an approach that location of industry is not a clearly defined subject, but a series of miscellaneous repercussions of all sorts of policies having nothing in common except that they affect the prosperity of different areas in different ways. The real trouble, it must be borne in mind, is that an environment has been allowed to grow up in which individual industrialists are led to take decisions which are apt to be contrary to their own long-term interests and to those of the community. Clearly the only adequate remedy is so to transform the social and economic environment that the decisions regarding location which managers of new or expanding industries take are in line with, and no longer opposed to, the public interest. Such a readjustment of the social and economic background must in any case take many years, and involve the weighing of countless different

factors.) Some of these have been dealt with in previous P E P Reports; for example, on the coal and electricity supply industries and on the social services. In any event, however, the need will remain for examining more specifically the repercussions of what is done in industry and in other national activities upon the fortunes of different areas,

Origin of this Report

These repercussions have long been of interest to P E P, and as far back as December 15, 1981, an article in *The Times* by a member of the group analysed the problem under the title 'Trades on the Move,' pointing out the evils of the southward trend of industry and putting the question, "Must it then be left to the Government to intervene and compel consideration of the claims of the depressed areas to new industries?" Three years later, with the Special Areas (Development and Improvement) Act, Parliament made a start towards a policy of social reconstruction in some of the worst-hit districts, but it was obvious that this measure only touched the fringe of the problem, and in April 1985 P E P decided to launch a comprehensive study of regional development, in order to provide a sound basis for the evolution of policy. A good deal of preliminary work had already been done and was outlined in *Planning* No. 52 (June 4, 1985) and No. 53 (June 18, 1985). The first of these gave the agenda for a meeting of authorities on the subject from various parts of the country called by P E P to "prepare the way for a more imaginative and successful long-range policy of regional development in the United Kingdom," while the second criticised the narrowness of the "depressed area" approach and emphasised that "the very success of the State, of industry, of labour or of other organised groups in controlling their own destinies tends to aggravate the difficulties of the region,* which cannot at present, as a region, either protect itself against decay, or achieve the necessary adaptation which would help it to defy decay." Among the short-term measures proposed for consideration in 'Planning,' No. 53, were surveys of potential new industries for unprosperous regions, national information and advisory services backed by publicity for industrial development where needed, Government-supported trading estates, rate or rent rebates and cheap Government-aided finance for new industries, publicly initiated processing industries in agricultural and forest regions, special inducements or advantages to be given by Government agencies and business men to assist for a limited period industries in depressed areas, development of amenities in depressed or backward areas, campaigns for stimulation of regional culture, and development of regional schemes of town and country planning.

It is interesting to note the extent to which these short-term proposals have already been carried out. In September 1985 a Survey of the Industrial Region of South Wales was begun with the aid of a grant from the Commissioner of Special Areas, and the results were published in three volumes in 1987. Less detailed surveys of Scottish industries and of the Highlands and Islands were also set in hand and results have been published during the latter part of 1988 and 1989, by the

*The definition of a region used by P E P is "some area, continuous and fairly homogeneous in character, which is more extensive than an administrative county but much smaller than the State."

Scottish Economic Committee. Another recent publication in this field has been the Survey of Industrial Facilities of West Cumberland with Alston, published by the Cumberland Development Council. It may therefore be said that securing the survey of industrial opportunity by areas is now generally recognised as a function of government. A good deal of propaganda has also been done, notably by the Commissioners for the Special Areas.

A P E P memorandum on trading estates had already been circulated and an article in *The Times* of July 8, 1935, by a member of the group, called attention to the possibilities and asked "whether the promotion of several such industrial estates in order to provide cheap sites or buildings with all services at strategic points where fuller industrial development and increased employment are desirable, should not be undertaken on a public utility basis, with or without subsidies or other attractions." On December 3, the Prime Minister announced in the House of Commons the Government's intention to proceed with trading estates, and the subsequent establishment and success of these estates is described in Chapter IV of this Report. As regards financial aid, the Special Areas Reconstruction (Agreement) Act was passed in 1936 to enable the State to assist in financing new industries, and this was followed up by the establishment of the Nuffield Trust for a similar purpose in December 1936, and by the passage in May 1937 of the Special Areas (Amendment) Act enabling the Commissioners "for the purpose of inducing persons to establish an industrial undertaking in any of the special areas . . ." to give financial assistance "by means of contributions towards any sums payable in respect of the undertaking by way of rent, income tax or rates." Several of the other points listed have also been given considerable attention and have proved fruitful lines.

The P E P Regionalism Group

While this Report has been taking shape, therefore, the background has been rapidly changing, and the arguments of a number of the interim broadsheets issued on the subject by P E P, such as No. 59 ('Balanced Industrial Development,' October 1935), No. 68 ('How New Industries Grow,' February 1936) and to a less extent No. 87 ('The Location of Industry,' December 1936) can now be taken as fairly familiar to all concerned with the problem. The long period occupied in the preparation of this Report has been due partly to interruptions caused by the giving of priority for urgent work on international trade and other problems, and partly to the complexity of the issues raised, which made it necessary in 1937 to divide the field between two groups: one dealing with location of industry and the immediately related issues; while the other dealt with regionalism, including under that head the overhaul of central and local government and public services, and the revival of cultural and civic life and amenities in different parts of the country. The P E P Regionalism Group has got together a huge mass of material and has explored most aspects of its subject, but will not be ready to report before the latter part of 1939, or very likely 1940. The Location of Industry Group, having to report earlier, has not had the advantage of seeing the Regionalism Group's findings, but co-ordination between the two has been carried as far as possible and there is reason to anticipate that the conclusions will be complementary.

Appointment of the Royal Commission

The appointment of the Royal Commission on the Geographical Distribution of the Industrial Population, under the chairmanship of the Rt. Hon. Sir. Montague Barlow, in July 1937 placed the group in some difficulty, as its work had already reached an advanced stage. The question arose whether to abandon the P E P Report and to lay the results so far obtained as evidence before the Royal Commission, or to complete and publish it as originally intended. On consideration the second of these courses was chosen. It was felt that the work, being closely bound up with that of other P E P groups, would lose much if it had to be forced into other terms of reference, and that the importance of and growing public interest in the subject made it undesirable to give up the task. At the same time contact was established with the Royal Commission, and although it was not possible in the circumstances to submit formal evidence, steps were taken to keep the Commission informed of such work of the P E P group as might be of interest to them.

Balance of the Report

The Report should be considered against this background. It is not a hasty or isolated publication, but is one of a long series of contributions to this subject which P E P has been making at frequent intervals over the past four years, and will continue making, at any rate until the large report on Regionalism is issued. An effort has been made to cover the subject broadly and to outline the main factors, giving what appears to be due weight to each, without overloading the work with excessive detail.

While proposals for action have been approached in a constructive spirit the group, which included four economists, has been alive to the difficulty of combining bold action in this field with sound economic policy. The industrialists on the group have helped it to assess many factors of business operation which are too intangible for quantitative study, and it has also had the benefit of considerable experience in town planning, utility development, and public administration, including the working of licensing schemes.

Scope and Order of Treatment

Starting with a sketch of the problem as it has recently emerged, the Report proceeds to examine the present location of industry in Great Britain and the various methods of measuring it. The many factors which affect the choice of site by individual industrialists are next considered, and an account of trading estates as a particular method of meeting industrial needs completes the review of the more strictly economic and business aspects. The effects of location of industry are then considered from the standpoint of the community, which is interested in the best use of land, in preventing dereliction of sites and creation of waste patches or dumps, in avoiding air and river pollution, in the quantity, quality and regularity of local employment, in population and migration trends and in the conservation of social capital generally. The effects of location on different types of town and on the evolution of civilisation in town and country are next examined, and a chapter on defence aspects of industrial location completes the analysis of the more specific

factors in the present distribution of British industry. The problem is now more broadly treated from a regional standpoint, with a view to finding whether a coherent policy of regional development is possible, and if so on what general lines. It then becomes possible to discuss what should be the aims of national industrial policy with regard to location, and after outlining an approach we examine the desirability and practicability of a considerable range of possible measures for implementing it. Finally, we discuss the question of suitable agencies for guiding industrial development, and their co-ordination with other parts of national life.

The Emergence of the Problem

The question of a policy for location of industry did not arise when populations were tied to the soil, nor to any serious extent so long as industrial civilisation depended largely upon power from coal and on transport by rail and water. It has only been made acute by the development of electric power, road transport and mass consumption demands, which have conferred great mobility on industry just at a time when increasing costs of public administration and services have made it far more important for the State to anticipate and perhaps guide where industry, and therefore population, are going to grow. The standpoints of the industrialist and the State are both rapidly becoming defined, and to some extent they conflict. The industrialist, however, never knows whether a choice which may be right when made will afterwards be upset by changes in conditions, some of which are technical and economic, while others depend on actions of the State. British governments, on the other hand, have hitherto refused consciously to influence an industrialist's choice of site, but have unconsciously exerted an enormous influence through national policies (e.g. tariffs, trade pacts, and Exchequer grants) which, by their differential effects on localities, have made it attractive for industrialists to choose certain areas rather than others. In extreme cases most or all of the effects of specific subsidies have gone into a few counties or a few towns. The decisions of transport and utility undertakings to provide facilities at certain points have also largely dictated the direction and pace of local industrial and housing expansion, although the full implications have not been recognised by the authorities concerned, which in many cases fail to co-ordinate development programmes with one another. At the same time the State has had to take on much of the burden of unemployment and depression resulting from industrial failure, and public opinion is becoming increasingly aware that the forces which create such social liabilities are still operating unchecked. The question has therefore arisen of watching trends in industrial location with a view to avoiding a repetition of mistakes.

Definitions

It is important to avoid being misled by the ambiguities of words used to describe industry and the limitations of the methods of measurement available. To speak of "an industry" is to use a convenient fiction, because there is no clearly definable series of industries between which boundaries can be fixed. Industry without prefix is also used in many different senses; it may be applied to all gainful occupations and be measured in terms of persons employed, or it may be restricted

to more limited groups, such as manufacture, in which case it can also be assessed in terms of value of output.) It is particularly unfortunate for clear thinking that the definitions and categories of industries used in the Board of Trade Census of Production, the Ministry of Labour Employment Statistics, the Registrar-General's Census Tables and other official sources have never been unified by a common standard, despite repeated criticisms from those who have to work on them. (In this Report, the term "industry" is normally used to cover the activities measured by the Census of Production, and it therefore excludes agriculture, commerce and distribution. When an individual industry is referred to the basis of measurement is indicated wherever it is a relevant factor.)

The Present Location of Industry

By means of a series of diagrams the Report shows the recent changes in British industry and its present distribution by regions. The employment chart for all insured persons, including distributive and other workers, shows how between 1928 and 1987 the S.E., Greater London, the S.W. and the Midlands increased their proportion of total national employment at the expense of other regions, particularly Wales and the North. The net output figures show similar changes, with Greater London rising by nearly 50 per cent between 1924 and 1985, and S. Wales declining nearly as sharply. A diagram of net output by regions for 1985 again shows the outstanding position of Greater London, which has now more workers actually employed than any other region and at the same time a higher value of net output per head. Quite apart from their heavier burden of unemployment the older industrial regions of the N.E., the West Riding and Lancashire have markedly lower net outputs per head than S.E. and E. England or the Midlands. A chart of changes in employment in different types of industry between 1927-87 shows that the extractive group has reduced its use of labour by over 80 per cent, and textiles and clothing by some 20 per cent, and heavy industry has also registered some decline, while light and intermediate industries, building, transport, distribution and services have expanded their employed personnel.

It is, however, not enough to know what proportion of an industry is found in each region, without knowing how far that proportion is higher or lower than would be expected on the basis of the region's share of the whole population. We therefore require a method of indicating "extra" concentrations and deficiencies of industrial population above or below the expected proportion, and this provided by the "location factor." To say, for example, that an industry has a location factor of 2 in a given area means that the area's share of the workers in that industry is twice as large as its share of workers in all industries.) The most conspicuously localised industries are slate quarrying and tinsplate manufacturing; while at the opposite extreme come distributive trades, with an almost negligible variation in different areas. Some of the more significant examples are diagrammatically shown in Fig. 6 (pages 42-48). Statistics are available for 167 industry groups and a region with diversified industries will show location factors between 0.45 and 2.05 for at least half of them. The region with fewest types of industry is S. Scotland in which 89 per cent of British industries are virtually unrepresented and a further 86 per cent

show location factors of below 0.45. Lancashire and Cheshire show most types of industry, while the W. Midlands have the largest share of industrial concentration, nearly 20 per cent of their industries yielding location factors of over 2.

Between 1924 and 1935 Greater London maintained or increased its relative share of output in all industrial groups except two, and even in these its actual net output increased. Nevertheless, London's share of the United Kingdom employed population, which rose from 18.9 per cent in 1923 to 22.3 per cent in 1932, has remained more or less stationary ever since. In other words, London is now getting no more than its proportionate share of new employment. During the past six years the S.E. and Midland divisions have made most advance, but the Northern division has recovered nearly a third of the ground previously lost and Scotland, Wales and the N.E. have held their own, the N.W. continuing to lose rather heavily. The four southern divisions now claim together nearly 54 per cent of British employed workers in the United Kingdom against under 47 per cent in 1923, and London's employed population is now nearly half as high again as sixteen years ago. There has also been a movement of industry out from the centres of large cities.

While employment in industry as a whole has increased, many individual industries have contracted, the largest groups to show a reduction of 10 per cent or more since 1923 being cotton spinning and weaving, coal mining, iron and steel smelting and rolling, and the manufacture of boots, shoes, slippers and clogs. Tinplate and the manufacture of carriages and carts employ less than half of their 1923 personnel. At the other extreme, electric wiring and contracting has four times as many employees as in 1923, the large electric cable group has risen by 150 per cent, and the motor vehicles, cycles and aircraft and electrical engineering groups have doubled. Some interesting further calculations, which must, however, be used with caution, show the great increase in volume of production between 1930 and 1935.

Factors Affecting Location

Having shown by statistics how British industries are distributed among the various regions the Report next seeks to answer the question how they have come to be there. Evidently this can only be done in general terms, but all the main forces involved are analysed so far as they are identifiable. Many of these forces have only recently been consciously recognised, partly through the elaborate studies made by certain large enterprises in choosing their sites, and partly on account of economic and social criticisms of the results of mislocation. In order to avoid, on the one hand, saddling the community with unnecessary burdens and wastes, and, on the other hand, saddling industry with higher costs in the supposed interests of the community, it is necessary to know what determines economic location.

The main primary factors appear to be (1) raw materials, (2) suitable labour, (3) site and services, (4) access to market, and (5) finance. Raw materials range from those hardly processed at all to those very highly processed, and many be home-produced or imported. One industry may use several, and what matters is the total cost of all its raw materials delivered at the works. Some factories depend on raw materials which are only handled at a few ports; others are financially

linked with certain raw material suppliers and get a favourable price; while other raw materials are too bulky and low in value to justify transport beyond very short distances. Reliability of supplies is a factor, as well as their price.

Labour

Nationally, the proportion of female to male workers is about 4 : 10, there being relatively few women employed above the age of 30. It is difficult to find exactly what types of suitable labour are available in a given district, and every fluctuation or transfer of industry alters the position. A few industries are still localised by a pool of skilled labour in a traditional centre or centres, but changes in the nature of "skill" and of the training required for manufacture are making for less and less localising influence of the labour factor. Trade unionism has had an effect on location. Certain areas have, often unjustly, come to be regarded as under "unreasonable" labour leadership, and some employers have preferred newly industrialised districts where they can start with a clean slate. In many of the newer districts very mixed industries, long journeys to work, more leisure interests and, in some cases, higher pay, have much increased the difficulty and reduced the incentive for trade union recruiting, but employer-trade union antagonisms have declined, and in some industries the employers actively encourage their workers to join the appropriate unions. Wage agreements providing different rates for different zones have had a powerful influence in localising some industries, notably printing, much of which has become centralised in smallish towns such as Cheltenham, Frome, Beccles, Aylesbury and Rochester. In some areas certain types of new industry have to face considerable local prejudice—e.g. the making of consumer goods in a centre of heavy industry—while there is a marked tendency for any office work to prove more attractive than almost any comparable factory work. Differences in security of employment may be a decisive consideration.

Site and Services

Steep slopes, liability to floods or subsidence, and, to some extent, climate, limit the choice of sites for industry, and further limits are imposed for certain manufactures such as brewing, by an inadequate quality or quantity of available water supply, and sometimes by the need for dumping of solid waste or disposal of liquid effluents. Apart from natural conditions there is much variation in the policies of local authorities in this respect.

Certain industries are incompatible as neighbours: for instance, a biscuit factory could hardly be operated next to a works emitting black smoke. A few "offensive trades" are subjected to special control, and the same applies to explosives works and petroleum refineries.

Accessibility of site by road and rail is usually an important consideration, but is sometimes offset by, for example, a need for avoiding vibrations or dust. The cost, terms of contract, and efficiency of utility services locally available are also an important consideration, although there is a tendency to even out some of the local variations as a result of competition and of national co-ordination.

The incidence of local rates is often mentioned as a factor, but since de-rating, its importance as a cost burden has been very slight: for instance, all Birmingham industries combined contribute only some £240,000 a year towards local rates. Local authorities, however, also influence location in other ways, for example, by the degree of strictness or laxity with which they interpret the many regulations regarding building plans.

Industrialists have sometimes been persuaded to go to a place where a bargain site was available—for example, a factory already built and vacant through liquidation. Locations so determined are not always justified by operating experience, while the cheaply-acquired buildings may soon need expensive adaptation.

Markets

Access to markets, always important, has become more important than ever, partly because technical needs of production are satisfiable in more locations, and partly because of the more dominant position of the consumer, who has grown to demand rapid and regular delivery of small consignments from stock, and considerable after-sales service. The decline in relative importance of heavy industries and the growth of suppliers of consumer goods has had a similar effect. In some cases organisations serving a national market, such as the Co-operative Wholesale Society, have set up two or more duplicate factories to supply different parts of the country. This has the additional advantage in some industries of making each factory less unwieldy to run than a single, very large plant. The important consideration is no longer merely the cost ex works, but the cost delivered to the consumer.

Finance

The mechanism for finance of new industries has a powerful effect on industrial location. Until recently it was almost impossible for finance to be found for a new industry in a depressed area. A region is depressed because it needs industries to employ its workpeople, but because it is depressed it is a poor market for consumer goods, and therefore an unattractive location for a light industry.

As well-to-do and enterprising people can most readily leave depressed regions, and have in many cases done so, a further obstacle to revival has been created. Men who have the resources and temperament to be financial backers of a new enterprise tend to live in the South, and to favour mainly, if not exclusively, projects in that part of the country, so that they can keep in touch without the inconvenience of long journeys.

Three funds have recently been created to assist the finance of industry in the depressed areas. These are the privately run £2 million Nuffield Trust, and the officially sponsored Special Areas Reconstruction Association, Ltd., both founded in 1936, and the Treasury Fund, which is not restricted to newly established concerns and may operate in certain conditions outside the Special Areas. Up to September 30, 1938, the three together had found £5.7 millions of capital for 151 undertakings in the Special Areas of England and Wales.

There are three main types of new enterprise involving the establishment of a new works—those making an established product, those making a product not previously manufactured in Great Britain, and those making some new product.

As far as the first type is concerned, there are many secondary and often unnecessary obstacles to finding finance, but they are rarely insuperable. In the second case, again, finance can usually be found somehow, although the waste of time involved is often enormous, and may well run into years. For the entirely new product or process, however, the difficulties are immensely greater, owing to the temperamental peculiarities of inventors, the lack of sufficient persons or institutions primarily interested in or qualified for undertaking the finance of new industry, the lack of facilities for economical and sound “vetting” of the technical and market possibilities of new inventions, and the fact that the £5,000-£50,000 capital most often needed for this type of development is much harder to raise through the existing financial mechanism than considerably larger sums would be. While something has recently been done to help the industrialist to set up his works, little progress has been made in helping inventors to exploit their inventions. Further facilities of this type would greatly assist industrial development.

Linkages and Evolution

Many industries are so linked to others that their location cannot be considered independently—for instance, the manufacture of textile machinery has to be near the cotton and woollen centres of Lancashire and the West Riding. There is also a continuous process of industrial evolution—for instance, at Coventry watch-making developed into the manufacture of bicycles, which in turn gave rise to motor car manufacture, and later to an aircraft industry. This process is often almost unrecognised at the time, but in some cases offshoots are purposely developed in order to offset slackness in another branch of the business, or to keep a labour force employed at off-peak periods. The chance location of the initiator often decides location, and sometimes the proprietor of a new works may deliberately place it to suit his leisure occupation, like the keen yachtsman who chose to manufacture iron piano frames at Burnham-on-Crouch.

Choice of location is therefore a complex blend of factors, some conscious and others unrecognised, some directly and others only very indirectly economic. Generally a site which is advantageous in some respects is disadvantageous in others, and whether or not all the considerations are weighed there remains great scope for the individuals in control to make the ultimate decision according to personal preferences.

Trading Estates

In the past each factory had to make separate arrangements for its site and buildings, transport, electricity, gas, water heating and other services, including workers' welfare. Recently the trading estate has been developed as a means of providing some or all of these services on a commercial basis, and often also of renting the premises instead of compelling the industrialist to own them. In what circumstances, if any, is the trading estate economically inferior to the old system? That it

has some advantage is indicated by the fact that the two oldest British trading estates have kept many industrial tenants and made fair profits over long periods. Trafford Park has paid an average return of nearly 4 per cent since its foundation in 1896. Among advantages of trading estates are that they enable new works to be started quickly without locking up much capital in land and buildings and without risk of finding that some necessary services cannot be economically provided on the site, that they give a lower cost both of erection and of supplying the factory with services, owing to bulk facilities on one spot, and that they can raise capital for development at low rates of interest. Such services can, however, only be economically provided if the estate is above a certain minimum scale—including, say, at least 75 factories of average size. Factories of all sizes occur on trading estates, but it is not clear whether certain works needing very extensive sites may not be more economically located elsewhere. Perhaps the most serious defect of existing trading estates is the inconvenience of many of their sites in relation to workers' housing.

Three government trading estates have lately been established, one covering 700 acres in the Team Valley near Gateshead on the Tyne, which has so far cost about £1½ millions and has at present rather more than a hundred tenant firms, employing over 2,000 workers; another with about 160 acres being developed at Treforest near Pontypridd in South Wales, which has cost so far £768,000 and is planned for an eventual 150 factories, of which 32, with a total of 1,040 workers, were in production by February 1939; and a third of 320 acres at North Hillington near Glasgow, which has cost so far £528,000, and had in January 1939 61 factories in operation, employing 1,257 workers, and nearly a hundred more factories completed or under construction. (All these estates were started in 1936-37 and are developing so rapidly that any figures relating to them very quickly become out of date.) A number of smaller sites are being developed in connection with the three main trading estates and also in West Cumberland.

Capital is provided by the Treasury, and the estate companies, which are not run for profit, have eventually to pay interest on it at 4 per cent. Outside the Special Areas provision is so far made only for the establishment in depressed places of site companies performing some of the functions of trading estates, but depending on private initiative for much of their capital.

The economic effects of the trading estates can hardly yet be assessed, and have been the subject of much uninformed criticism, based particularly on the "lump of employment" fallacy, which assumes that there is only a given quantity of jobs and markets to go round and that if A gets one he is probably depriving B of one. It is also often assumed that the value of the estates can be measured in terms of the direct employment they afford, but this leaves out of account the more important indirect benefits to local purchasing power and thence to local employment.

Trading estates proper build standard and other factories for letting and provide communal services. They fall into three groups, the government estates already described, the older commercial estates, such as Trafford Park and Slough, and the estates developed in connection with town planning schemes, such as Letchworth and Welwyn. Trafford Park, Manchester (1,200 acres), is the largest and oldest British

trading estate, and is peculiar in many respects—notably in its lack of dependence on consumer goods industries and its provision of warehouse and cold storage services: The original development cost was heavy, but the estate has paid steady dividends rising from 5 to 8 per cent during the past twenty years, and now accommodates over 200 works employing about 50,000 people. Slough Trading Estate (700 acres) has nearly doubled its number of factories since 1932, and now has over 270, employing about 25,000 workers. The industries concerned work mainly for the consumer market, and a number of them originated overseas. A 10 per cent dividend has been maintained for many years.

Of the garden cities the oldest is Letchworth, founded in 1903. It has now some 11,000 factory workers, employed predominantly in the printing, bookbinding, stationery, engineering, scientific instrument and clothing industries. The Company owns the local gas, electricity and water undertakings and has paid a 5 per cent dividend since 1923. Any excess earnings over this level are applied for the benefit of the town and its inhabitants.

Welwyn Garden City started in 1920 and now has a population of about 14,000. The parent company owns almost the entire Urban District, covering about 3,000 acres. There is a wide range of industries, particularly light industries such as food-stuffs, clothing and radio.

Apart from these and other trading estates proper, there are many industrial sites for grouped factory development with few or no communal facilities.

Effects of Industrial Location

From the standpoint of the nation as a whole the great economic benefits resulting from modern industry have been to some extent offset by less fortunate consequences—land subsidence, slag heaps and colliery tips, deposits of slime, river pollution, derelict works, and in some cases derelict housing attached to works which have ceased operation. In addition, there have been many less tangible disadvantages, such as local unemployment, ill-health, depopulation, and air-raid hazards. Some of these consequences follow naturally from the everyday operation of industry along existing lines, while others are due to shifting of industry and still others to mistakes or misjudgments by industrialists, who have sometimes placed works in areas where they have sooner or later had to close down.

Industries vary greatly in the proportions of males and females and of adults and juveniles that they employ. Analysis of the populations of different towns shows that even if all unemployment were eliminated there would still exist depressed areas, where the earnings in the dominant occupations and the average numbers of wage-earners per family are so low as to make chronic poverty inevitable. Whereas in 1931 in the Rhondda only 1.67 persons per family were in the labour market, nearly three-quarters being coalminers with low average earnings even when they are employed; in East Ham 1.7 persons per family were actually at work, and over two-thirds of these were in the relatively well-paid “sheltered” occupations such as commerce, finance, utilities and government service. In Greater London in 1931 nearly 46 per cent of the population were working, 4 per cent unemployed and 50 per cent unoccupied, whereas in South Wales only 33½ per cent were working, nearly 8 per cent

unemployed, and 59 per cent were out of the labour market altogether. It is necessary, therefore, not only to consider local levels of unemployment but also local levels of employment, and the earnings and security which go with them.

The depressed towns appear to be less healthy than the country as a whole, but valid comparisons are difficult to make in statistical terms, and increases in unemployment do not necessarily mean increases in the death-rate. Migration from depressed to prosperous areas has recently occurred on a large scale, and while the immediate effect may be to reduce the numbers of unemployed the long-term effect is often to make depression worse in the town from which the emigrants come, by removing the younger and more enterprising members of the community and by reducing the local purchasing power on which many trades and services depend. The migrants also take with them a considerable local investment which has been made by the ratepayers in their upbringing in the place of origin. Between mid-1921 and December 1937 the London Transport Area received about 677,000 immigrants from the rest of the country. Some of the frictions of migration are illustrated by the fact that out of 90,000 men transferred in 1930-37 by the Ministry of Labour over 49,000 were known to have returned home.

Towns and Industry

Four out of five of the British population live in towns and one-third live in the six largest towns in the country, yet despite this popularity of town life the town has been remarkably little studied as an environment for industry. Partly owing to this neglect the modern town is marred by conspicuous defects. Land is owned in such small parcels and is so expensive as to hold up essential rehousing and traffic improvements, and hundreds of thousands of people have to spend many hours a week and substantial fractions of their earnings travelling to and from work in overcrowded, unhealthy and noisy vehicles along heavily obstructed routes. Urban smoke annually causes damage measurable in money costing the equivalent of about 9d. on income tax. The town is not only less healthy than the country but is proving an environment only suited to the able-bodied and unencumbered adult, and does not produce enough children to maintain its population.

The town has made possible immense improvements in standards of living, but the same technical advances which enable the town to grow larger and larger also enable it to be more easily dispensed with. There has thus been widespread "rurban" development outside the towns and the more closely built-up suburbs. Many of the services which used to be confined to or much cheaper in towns can now be readily obtained over wide areas. The average town, moreover, represents, with considerable accretions and with only minor alterations, an organism created to serve a range of technical needs which has long since been outgrown.

Most towns have grown up unplanned, either by ribboning, by continuous spread, or by more or less open scattering. There is a tendency as a town grows for the main functions to become segregated in distinct areas, such as residential, shopping and amusement quarters, but often factories are mixed indiscriminately

with dwellings and other buildings in the middle of a town, or are placed at points on the fringe where they may injure amenities and cause uneconomic development.

Many distinct but overlapping types of town can be recognised, such as the country town, the port, the "mining camp" town, the military town, the cathedral city, the resort, the dormitory town, the planned town, the metropolitan centre, the urban cluster or conurbation, and the urban region composed of a group of closely linked towns which are not physically merged in a continuous built-up area. Each of these types has its characteristic advantages and drawbacks, but the least successful towns seem to be at one extreme those dominated by a very narrow range of interests, and at the other those which attempt a little of everything without giving scope for any one aspect to achieve anything like full development. These two extremes are both being created in Great Britain at the present time.

The building of a new town, Letchworth, with a population of over 15,000, recently cost more than £5 million, at which rate a town of 100,000 inhabitants would represent a capital of over £30 millions. While existing towns have probably been less expensively built it is evident that the capital investment in towns is enormous, and there is scope for much waste where there is a lack of planning. Medium-sized towns appear to cost less per head to run than very large or very small ones, but much depends on the character of the town, the functions which it seeks to combine, and whether the population is growing, declining or stationary. The forecasting of urban population trends and the framing of plans accordingly has been much neglected, and there is a widespread tendency to exaggerate the likelihood and extent of rapid future increases. Careful examination of realised figures in the light of current national population trends shows that a growth of 30 per cent or more in the course of a decade is highly improbable except in small areas on the developing fringe of a flourishing large town, areas of small initial population chosen as sites for large public works or plants, and seaside and health resorts attractive to retired persons. For towns outside these categories population increases are likely to be very moderate—the average town of 50,000 persons in 1931 may expect to have only about 52,000 or 53,000 throughout the next three decades. Some towns are beginning to work out development policies based on information, and to implement them through town planning schemes, publicity and administrative measures.

The town, with all its shortcomings, is a remarkably vital and successful organism. No nation has taken to town life to the same extent as the British, and few have given so little systematic thought to the many problems of towns or taken so little trouble to make their towns pleasantly habitable. Thought and study are required on the economic and social functions of each town and how to guide them, on the most appropriate layout and development schemes, on the most convenient sizes and rates of change, on the co-ordination of urban policy and administration, and on the relations of the town with the countryside and with its surrounding region.

Defence and Location of Industry

The strategic position and vulnerability of essential industries are in modern war factors as important as the strength of the fighting services. In essential industries there is often a conflict between a location which is desirable on grounds of

defence and one which gives lower costs of production. The international situation makes planning necessary to meet such difficulties. The whole of the United Kingdom is within range of air attack from the Continent, but the western areas are still appreciably safer than the eastern. Substantial anti-aircraft defences are being gradually built up, and the total effectiveness of various methods in combination would probably be formidable where it is feasible to provide them in full strength.

In order to make important industrial plants less attractive to the bomber it is necessary to consider the possibilities not only of local defence but of spacing out buildings on the site, particularly where the risks of fire or explosion are high, and of moving production out of the most vulnerable areas. The cost of moving existing large works wholesale is prohibitive. Defence must, however, influence future choice of location, and this applies even to consumer goods industries whose labour supply, raw materials and markets would be very much affected by the large-scale evacuation of target areas planned in the event of war. Vulnerability of transport and utility services would be as serious a consideration as the vulnerability of the factories themselves.

It is concluded that dispersal of works away from target areas is needed, as well as dispersal of sections of works on the site; that new locations should, as far as possible, be chosen away from the East Coast and from obvious landmarks such as bends of rivers; that the more fragile type of factory construction should be avoided; that duplicate means of transport and raw material supplies should be found and brought into regular use; and that larger stocks should be maintained at the points of consumption or processing. The State has already had to take increased responsibility for industrial defence in connection with the location of "shadow factories" and those engaged on military contracts, the organisation of air raid precautions, the assumption of liability in connection with insurance of war risks, and the creation of reserves of essential commodities. The urgency of the defence problem is a strong reinforcement of the other arguments for influencing the location of industry in the national interest, and to a considerable extent defence considerations point the same way as those discussed elsewhere in the Report.

The Need for Balanced Regional Development

It has been shown that there are both advantages and drawbacks in the type of specialisation which leads a whole town or even a whole region to depend largely on one or two industries. Under *laissez faire* it looked as if world-wide division of labour would prevail, but the economic, social and political strains set up were too great, and in the reaction towards economic nationalism those areas which had concentrated upon selling a small range of products on the world market often found themselves depressed areas. The States containing such areas, and notably Great Britain, have had to consider whether to force their unemployed populations, by the weapon of starvation, to migrate to other districts, or whether, by subsidies and special privileges, to try to put the distressed towns in a position to compete with more prosperous areas. This question has not yet been decided, because no Government has been ready to face the immediate difficulties of a decision either way. The hope has been held that palliatives and temporary assistance would enable some

readjustment to be effected, but this has not happened to any adequate extent, and the Special Areas in particular remain very depressed. In some ways Government policy has made the situation worse by encouraging immobility of labour through working-class house-ownership, and making unemployment assistance a national charge, by selective transfer of many of the younger and most enterprising individuals, and by tariffs and trade pacts which have had adverse effects on some already depressed areas. Technical changes and the backward marketing policy of certain staple industries, such as coal and cotton, have also aggravated the trouble. On the other hand, the Midlands and South, to which large numbers of young adults have migrated, have benefited from an almost continuous boom in building and house equipment, and have been able to attract a very large share of new consumer-goods industries. In the absence of further intervention, it seems that the North and West will continue to lose population, and that the decline will occur in an increasing number of areas at an increasingly rapid rate. The process is unlikely to assist much in eliminating long-term unemployment, and may actually increase it. The questions, therefore, arise:

Should population be continuously redistributed according to the apparent needs of industry, or should industries, at least to some extent, be brought to places where employment is needed by existing populations, or should existing populations, which do not "naturally" attract new employment on an adequate scale, be subsidised to remain unemployed where they are?

In order fully to answer these questions for each area it would be necessary to carry out economic and industrial surveys (which have to some extent already been made) and probably to estimate the amount and composition of regional and local incomes with a view to ascertaining the approximate balances of payments. For instance, in the extreme case of a colliery town, all food, clothing, vehicles and other requirements from outside may have to be bought out of the proceeds of locally-raised coal, plus State grants, unemployment pay, pensions and private remittances.

Broadly, it should be possible to separate areas in which:

- (a) virtually no new industry or service is likely to be economically competitive on an appreciable scale;
- (b) openings exist for some new industries or services on an economic basis, but not enough to support the whole existing and future population;
- (c) openings exist for some new industries or services on an economic basis in the region, but not on or conveniently near the actual sites where the existing population lives;
- (d) openings exist on an adequate scale for new industries and services on an economic basis to support the existing and expected local population; and
- (e) new industries and services are likely to be attracted on a scale involving the immigration of population from other areas.

So far as the first category is concerned the only reasonable course appears to be a planned evacuation over a period of years, accompanied by resettlement on generous terms, except in the case of such areas as the Scottish Highlands, where it

would be defensible to recognise the contribution made to the man power of other regions and the cultural value of preserving the Highland way of life by an appropriate payment from more prosperous areas. At the opposite extreme areas exceptionally attractive to new industry should be critically examined, with a view to establishing the long-term economic effects of their rapid development, particularly where they are denuding other areas of picked adults by migration.

While it is impracticable to ensure that every town should have a great diversity of employment it should be feasible to secure considerable diversification in every region. A large region composed almost exclusively of cotton towns or coal towns has been shown to be highly precarious. The objective of policy should be the attainment of maximum earning capacity with minimum risks and liabilities in the long run over a wide area, instead of the pursuit of maximum earning capacity in peak years in terms of narrow areas with high risks and with liabilities left uncovered.

It is misleading to speak of a conflict between economic and "social" considerations. The real issue is not between "natural" economic locations for industry and arbitrarily enforced uneconomic locations, nor is it even between economic and social considerations: it is between locations which may be economic for the individual or small group in the short run and those which are economic for the community as a whole in the long run.

Where towns or areas cannot economically attract new industries the political nettle should be grasped and resettlement arranged on the nearest suitable site, which should normally be within twenty or thirty miles. Few people appreciate the enormous cost to the nation of maintaining chronically depressed urban communities even at a very low standard of life. The amount of public money paid out in Merthyr Tydfil in 1937-38 was over £830,000, or approximately £1 per family per week, not counting the proceeds of the locally levied rate of 27s. 6d. in the £1. The same is true of other areas; for example, in Durham. Coventry, which is well over three times as large as Merthyr, needs some £200,000 a year less in assistance from public funds and can provide far more comprehensive and up-to-date services.

The tendency for British population is to concentrate in a compact quadrilateral between Gravesend and Haslemere in the South, and Colwyn Bay and Knaresborough in the North, with a number of less important centres, the chief being within the Clyde-Forth-Tay corridor, on the N.E. coast and round the Bristol Channel. It seems unlikely to be possible to reverse this trend, but much can be done to guide it so as to reduce wastes and fluctuations resulting from disequilibrium between local employment capacity and local population, and to prevent communities from being left stranded. (Contraction where necessary of established industries, introduction of new industries, development on a regional scale involving considerable local shifting of population, and in the last resort transference to other regions, must all play their part in adjustment)

Aims of National Industrial Policy

While it is impossible to say definitely whether unguided individual choice has on the whole led industrialists to the most advantageous locations even from

their own standpoint, it is certain that the industrialist often makes a decision in ignorance of material facts which might lead him to other conclusions. Further, a correct decision may shortly afterwards be upset by sudden changes in external environment, while a plant on a relatively disadvantageous site may continue to flourish indefinitely owing to factors such as price agreements, which inhibit perfect competition. The case for hoping that automatic forces will lead to the most economic distribution of industry is therefore weak.

The State cannot avert the impact on industry of technical and economic changes, but it can very largely limit their impact upon society. The State is already, often unconsciously but decisively, influencing choice of location, and once this process becomes conscious it is necessary to weigh immediate maximisation of profits against a longer view of responsibilities to posterity. Every citizen engaged in the economic process has in effect two incomes: a personal money income, and a share in kind in the common inheritance. The State must seek to reconcile the conflicting claims of these two incomes, and to secure and expand them.

In order to fulfil this responsibility the State needs to assume extended powers, to provide more comprehensive services to the industrialist, and above all to co-ordinate what is done by its different agencies. Steps have been taken, through town and country planning, fuel legislation and otherwise, towards a more intelligent use of national resources, but the gaps and confusion are still very serious. It is necessary to consider a wide range of expedients in the fields of information and publicity, financial and social measures, development of local resources and service facilities, and measures connected with public and industrial administration which might be applied at suitable points in cases where they can satisfy the tests of practical effectiveness, ease of administration, reasonable cost to the State, and possible repercussions. Among the major points discussed are the provision of a centralised information service on industrial siting; the improved provision of finance for new enterprise; the overhaul of the rating system, particularly with a view to removing its deadening effect on the expansion of consumer markets which industry badly needs; the transfer of specific burdens from local to central government; direct subsidies and preferences in government contracts in certain cases, a levy for re-development, the revision of labour agreements, the improvement of local amenities and the reversal of the trend towards centralising public and industrial headquarters administration in London. In some of these cases the difficulties are great, and in others advantages are by no means unmixed, but there remains a substantial field for useful action.

Proposals for an Industrial Development Commission

Having considered the basis of a policy for guiding industrial location, it appears that the main needs not covered by existing machinery are the provision of a centralised research and information service and the effective co-ordination of action. It is believed that these needs could best be met by a permanent Industrial Development Commission, created for the specific purpose of guiding the location of industry and advising the Government on the subject. The Commission would have to take into account the undesirable social and economic consequences of the

present uncontrolled growth of industry, and of excessive industrialisation and urbanisation of large areas, the lack of industrial balance in towns and regions, the existence of not only depressed but derelict areas, the vulnerability of industrial concentrations in war, and the lack of adequate information and co-ordination.

In order to give it sufficient authority it is proposed that no new factory, or extension of an existing factory, should be begun without a licence from the Commission. In the great majority of cases licensing would amount to no more than registration, but the Commission would have power, subject to appeal to a judicial tribunal, to refuse a licence, and would be required to state publicly in broad outline the areas and the categories of industry in respect of which applications would not in principle be favoured. There would be certain difficulties of definition and preventing evasion which are discussed and can be met.

Great importance attaches to the proposal that the Commission should keep under review all the factors affecting the efficient operation of industry and should publish information, and that its officers should be available for informal consultation by industrialists. Equally important is the duty of watching and reporting on the effects of policies and actions of government and other agencies, in so far as they affect the economic development of different areas and the location of industry. It should also, like the Commissioners for Special Areas, have resources available for giving limited financial help to overcome obstacles to industrial development in specific instances. The Commission should explore the problem of financing new enterprise, and should be empowered, if necessary, to co-operate with private enterprise in establishing suitable mechanisms, and if necessary to lend money for this purpose itself. It should take over responsibility for supervising existing publicly owned trading estates, and for initiating new ones as and where they are needed. The preservation of amenities, and the restoration of amenities which have been spoilt by industry, should also be a function of the Commission.

Evacuation and Resettlement

It should, further, be required to examine areas burdened with serious and chronic unemployment, and to report to Parliament on their prospects. Where these could not be expected within, say, five years to provide employment for the major part of the local unemployed, the Commission should be authorised to draw up and submit to both Houses of Parliament a scheme for the total or partial evacuation of the area over a period, a plan for developing on a new site within twenty or thirty miles a new town with housing, services, and trading estate for as many of the inhabitants as were willing to transfer as a group, and a plan for re-housing and servicing any part of the population still having local employment or wishing to live, out of private resources, at the original site. On approval of a scheme a Compensation Tribunal would be set up to deal with all claims, together with a Resettlement Company on the lines of the existing Government trading estate companies. Compensation would be given to all who could prove loss, and extra inducements to those participating in group transfer. It is roughly estimated that even a town the size of Merthyr (63,000) could be transferred as a community

for a total cost of some £15 millions, and that the total cost to the State in interest and sinking fund would, even at the outset of the scheme, be less than the total of £882,000 actually paid out in 1937-38 to keep much of Merthyr in idleness. If the site were well chosen and rapidly developed the initial boom created by the operation would give a great impetus to local industry and services, and would afford ample time for new industries to be built up which would provide employment for a large proportion of the population, although it is envisaged that for obvious reasons unemployment in the community would be liable to remain for some years at a level above the national average.

Status of the Commission

It is proposed that the Commission should be responsible to Parliament through a senior Cabinet Minister without departmental duties, and its probable cost need not be greater than that of the existing Special Areas Commissioners, whom the new industrial body would in time supersede, as was envisaged by the Government spokesman when the original Special Areas Act was introduced as a Bill before the House of Commons. It is contemplated that the Commission would work alongside a parallel central body for town and country planning, established on the lines proposed by the Town Planning Institute, the Industrial Development Commission dealing with location of industry and the economic development of regions, while the proposed National Planning Commission would be concerned with control of the types of use of land.

It is not anticipated that rapid results will be attainable in eliminating the effects of so much neglect and confusion, but it is believed that action on these lines will have cumulatively beneficial results, without upsetting the workings either of industry or of the machinery of government, and without replacing the short-sighted test of immediate individual profits by an equally short-sighted test of "social needs" unrelated to economic limitations.

The above summary is only intended to give a general view of the findings of the Report, and for any specific subject reference should be made to the relevant section, where the necessary explanations and qualifications will be found.

I. THE EMERGENCE OF THE PROBLEM

The Industrialist's Standpoint—Unstable Conditions—Technical and Economic Changes—The State's Standpoint—Imperfect Competition—How the State has Intervened—Tariff Policy—Government Contracts and Subsidies—Financial Influence—Local Authority Powers—Public Utility Development Policy—Marketing Boards and Redundancy Schemes—Increasing Discrimination—The State's Liability—Importance of Preventive Measures.

All human settlements have been decisively influenced in their size and character by the need of their inhabitants to make a living. Until modern times transport and technique were rarely well enough organised to permit large populations to live very far from where their food and most of the raw materials for their clothing and other needs were produced. The industrial revolution, which led increasing numbers of workers over from agricultural labour and handicrafts to machine production, made possible for the first time the gathering together of large communities dependent for a large part of their basic supplies on fields, forests or mines sometimes thousands of miles away. Until recently, however, the location of these communities was dictated by their dependence on low-cost supplies of raw coal and on railway and canal transport, and by other limiting factors. Until recently also the State provided a minimum of services for families attracted to any given spot by employment demands, and took a minimum of responsibility for the supervision of industry. Lately the balance has evidently begun to shift. (Owing to electrification, road transport and many other factors, a large proportion of industries are now able to choose, within rather sharp limits, not one but many sites which appear sufficiently suitable to offer more or less equal chances of profitable production. Simultaneously the extent and quality of social and other services demanded of the State has raised the cost of providing them from a few pence or shillings to many pounds per head, and is impelling government to take a much closer interest in industrial enterprises which, without consulting it, may commit it to the expenditure of vast sums of public money through central and local authorities.

This is fundamentally the reason why the location of industry, or the geographical distribution of the industrial population, has emerged as a major problem of public affairs in all advanced countries.

There are, it must be recognised, two standpoints from which the siting of a new factory must be regarded—the industrialist's and the nation's.

The Industrialist's Standpoint

The industrialist about to set up new plant is primarily concerned with the facilities offered by various competing sites. The subsoil and the drainage, the availability of raw material supplies and the distance from markets, the cost of transport of goods, of fuel and of labour, the availability of satisfactory supplies of gas, electricity and water, the proximity of works engaged in allied processes—all

these factors have to be looked into before one particular site can be chosen as the most suitable of those considered. In some cases few, if any, of these factors will be made the subject of careful research, in which costs and possible economies are balanced against each other, although in recent years the attention devoted by many companies to finding the best location for their new works has increased. It must be remembered that the methods by which some companies now examine the relative advantages of different sites are, in effect, only an extension, to meet more complicated problems, of the old-fashioned process by which most of the balancing of various factors was carried out in one man's head. The old rule of thumb methods implied, at any rate, some recognition of the problems raised by the location of industry. The present trouble is not so much that attention is not paid to factors affecting location but that the factors themselves are becoming increasingly unstable and elusive.

Unstable Conditions

A firm requiring female labour may locate its works in a town where there is a big surplus of such labour used to going out to work. The arrival a year later of, say, a large ordnance factory also requiring female labour may entirely upset the labour supply position. The attitude of a single man to his job may have the same effect. Some managers of gas undertakings are, for one reason or another, opposed to developing the sale of purchased coke-oven gas and to introducing promotional tariffs getting down to really low costs per therm to big industrial users. One such potential user may find a certain town entirely suited to his diverse requirements in all respects save one—the absence of cheap gas—with the result that he goes elsewhere to his (otherwise less economic) second choice. A year or so later a new gas manager may arrive and arrange for a supply of cheap gas in the town first selected. Railway rates form another example. A change in rate or classification or the granting of a special rate may radically alter the relative economy of two sites—for instance for brickworks. Any implementation of the "Square Deal" proposals of the railways must have a fundamental effect on the relative economy of different sites by changing relative freight charges. There is nothing new in any of these factors. (The background of the industrial picture has always been a changing one. It is the rate of change and the number of different factors having to be taken into account in arriving at a decision on industrial siting which have increased.)

Technical and Economic Changes

The individual industrialist is faced with increasing difficulties, therefore, not only in making a satisfactory initial choice but also in ensuring that his choice will continue to be advantageous. It is worth examining the reasons for this in greater detail. In the past the site of Great Britain's manufacturing industries was largely decided by proximity to the coal or iron resources of the Midlands and North of England, Wales and Scotland. When technical factors allowed so little latitude in choice, the individual who made it could hardly go far wrong, even if, on occasion, the best use was not made of opportunities. At the worst, the waste was not overwhelming because each plant was smaller and less public capital was involved.

However, such simplicity as once existed in the factors influencing the choice of location has quite disappeared. The introduction of other forms of heat and power has ousted coal from its former pre-eminence with the result that proximity to the coalfields is no longer of the first importance, even for heavy industries. For instance, the Ford Motor Company now operates blast furnaces at Dagenham on the Thames. Again, since the depletion or exhaustion of the older iron ore deposits (such as the Staffordshire coal measures and Cleveland), nearness to the port of entry of foreign ores has become just as important as nearness to the remaining iron ore beds. In other directions changes of similar importance have taken place: the development of air-conditioning has given the industrialist freedom from climatic factors, while the progress of road transport has broken down the overriding need for a factory to have access to a railway. The Marston Valley Brick Co., for instance, has shown that rail transport is no longer essential for disposal of Fletton bricks, and this has resulted in the development of brickworks further away from the L.N.E.R. main line than previous works. Rail connection continues to be of great importance, but it has lost the urgency it had before the introduction of the internal combustion engine, and there are increasing numbers of important works without rail sidings.

The increasing rate of obsolescence of machinery further lessens the chances that a location will remain fully satisfactory for a long period. The new strip mill erected by Richard Thomas & Co. at Ebbw Vale will have, for instance, a considerable effect on the tinplate industry of the Swansea area. This example illustrates another process as well. Formerly most individual businesses were too small for the bankruptcy of one of them to have much effect on others or on the district in which it was situated. Recently, however, when Richard Thomas & Co. found themselves in difficulties owing to the incidence of unforeseen expenses in their expansion programme, the Bank of England considered it advisable to assist them, since the slightest possibility of failure, after the public had subscribed £9 million, was too serious to be contemplated. Financial assistance from the same source to John Summers & Co., also for the erection of a continuous strip mill, has followed, and it seems inevitable, despite the Sheet Makers' Conference arrangements, that steel sheet production will tend to become concentrated at Ebbw Vale and Shotton to the detriment, for instance, of Stockton and Glasgow.

Changes in markets have also greatly affected choice of location. Not only have overseas markets contracted, but important shifts of emphasis have taken place in the home market as well. This is partly due to the demand for new articles of consumption owing to the steady, if uneven, increase in the standard of living, and partly to the movement of population to the Midlands and South-East of England, which has created new mass markets much larger than those of the past.

The State's Standpoint

While the industrialist has to cope with all these and other problems, the State, as the representative of society at large, has been forced also to take an interest in the establishment of new factories. Whether through the central government or the local authorities it must ensure adequate provision of housing, schools, communica-

tions and public utility services for the people brought together by the offer of work at a new factory, to say nothing of its obligations in respect of ill-health and unemployment. The State must therefore consider the effects of new industrial enterprises on its own responsibilities. Formerly, when its duties were less comprehensive and the growth of new areas not so rapid, these responsibilities appeared of relatively slight importance.

At the present time the attitudes of the industrialist and of the State are almost entirely unco-ordinated, although it is clear that they have a considerable effect upon each other. The industrialist is not primarily concerned with the provision of social facilities of various kinds, which fall within the province of the State. The State, on its part, has hitherto refused intentionally to influence the entrepreneur in any particular direction as regards the location of a new factory, although it has lately made some efforts on behalf of certain depressed areas. The Board of Trade has gone so far as to lay down categorically that "there is no evidence that the industrialist has in the main incorrectly assessed the value of the various and often mutually opposing factors which have had to be weighed before he could decide in which part of the country he could risk his capital."* It is worth noting, however, that remarks of this kind are qualified by the statement that they relate only to the individual economic aspects of the matter† and not to other aspects outside the sphere of the Board of Trade.

The Board of Trade has assumed that the profit incentive will lead the industrialist to the most suitable site for his factory. But there is no direct evidence for this assumption, and indirectly it is known that essential data on important factors in choice have often not been available. The rule-of-thumb methods of site-selection still used by many industrialists may yield a profit, but a choice has to be very bad indeed if it is to cause a loss when a different site would have yielded a profit. It would be unsafe to give here specific examples of factories which have been badly located but which are still in operation. Those responsible for the choice are not always over-anxious to admit their mistake, or to allow others to suggest they have made one, although if there is a change in management, criticisms are not so hard to come by. But if a magic carpet were available on which any works could be transported, lock, stock and barrel, to a new location, it is safe to say that the carpet would be in widespread demand, and that it would raise the profitability of many plants suffering to varying degrees from what is now recognised by the managements to be a mistaken choice of site. The simple fact of earning or not earning profits is not, therefore, sufficient evidence of the success of the individual industrialist in selecting factory locations.

Imperfect Competition

The argument that the present location of industry is the satisfactory result of economic forces, with which it would be fatal to interfere, tacitly assumes the existence of a state of "perfect competition." Theoretically, perfect competition rests on four main conditions. First, a market must consist of a large number of buyers and

*Board of Trade Statement of Evidence to the Royal Commission on the Geographical Distribution of the Industrial Population. Para. 115.

†Loc. cit. para. 120.

sellers so that no one man can dominate a large proportion of supply or demand. Second, the buyers or sellers must be quite indifferent to all except the market attractions of their opposite numbers. Third and fourth, it is assumed that the factors of production are all perfectly mobile and that the entrepreneur has a complete knowledge of the alternatives open to him.

How far these conditions existed in the nineteenth century is a debatable point, into which it is not necessary to enter here. But there is little doubt that all are ceasing to apply owing to radical changes in the industrial structure. The growth of trade associations and advertisements has severely limited the "freedom" and "indifference" of buyers and sellers, while the progress of Trade Unionism and the increasing size of the average industrial plant has greatly reduced the mobility of the various factors of production. In an ever-increasing number of industries, concentration, cartellisation and technical integration are destroying, or have already destroyed, any semblance of perfect competition. It follows that the economic argument advanced by the Board of Trade is invalid, and that the so-called automatic forces which were supposed to guide location have lost much of their significance. Moreover, many of the background factors in the light of which the individual industrialist made his choice were in no way "natural" or "automatic" developments; on the contrary, they were the outcome of State actions which were deliberately taken for various purposes, although often without appreciating their repercussions on the location of industry.

How the State has Intervened

While refusing until recently to consider consciously influencing the industrialist's choice of site, the State has unconsciously influenced it in many ways. Taxation and tariff policies, grants to local authorities, subsidy policies, transport and utility policies, centralisation of administration and many other Parliamentary decisions have largely determined that industries should go to certain parts of the country rather than to others, and that certain industries concentrated in some areas should flourish, while others operating in other areas should decay.

Some State activities in the direction of assistance to industry, such as protective tariffs, have been on an enormous scale; in other cases, such as the Government grant to the Travel and Industrial Development Association (part of which goes to persuading foreigners to establish factories in Great Britain and assisting them to do so), quite small sums are involved. Some activities have taken the form of direct money payments, as in the case of several of the agricultural subsidies; some have taken the form of loans or guarantees, such as that given to the Cunard-White Star Co.; some have consisted more in the provision of services on certain of which (for instance the Export Credits Guarantee Department) the State has made a profit. In some cases, assistance (for instance to tramp shipping) has been of a temporary nature; in others it has in fact become more or less permanent, for example in the beet sugar subsidy. These by no means exhaust the possible instances, and to them all must be added the

assistance given in recent years, through the Office of the Commissioner for Special Areas and through the Special Areas Reconstruction Association, for the special purpose of attracting industries to the localities considered to be in greatest need of them.

Actions of the State taken on other grounds have thus had effects on regional and local industrial growth so far-reaching, and in many cases unforeseen, that some of the more important individual examples require further attention.

Tariff Policy

In the first place, the imposition of a general tariff on imports from abroad has favoured the development of some industrial areas at the expense of others as well as guaranteeing some districts against complete industrial collapse. The extension of tariff protection to particular classes of manufactured goods inevitably stimulates their manufacture at home, and therefore acts as a stimulus to industrial development in the areas where they are produced.) In so far as foreign firms have been induced by the tariff to set up plants in this country, there has been some tendency to concentrate around metropolitan centres, such as London and Manchester, in order that foreign and administrative staff and key workers imported with the process may be able to enjoy the society of their own nationals, who naturally tend to collect in "colonies" in the larger centres only. (Any increase in tariff protection, which has the effect of reducing imports, is bound to discriminate indirectly against areas depending heavily on export trade by reducing the ability of foreign countries to make purchases of British goods and also frequently by raising the cost of their materials.) For instance, when cheap continental tinplate bars were no longer available to the South Wales tinplate industry after the introduction of the steel tariff, the cost of tinplate was increased, and the prosperity of the industry was injured. Bilateral trade agreements under which tariff or quota concessions are exchanged may also have a differential effect as between industrial regions. This, of course, is often intended, but there are examples where unexpected results have occurred, as, for instance, in the case of the coal agreements with the Scandinavian countries in 1933 and 1934 which, while obtaining valuable concessions for Scotland and the North-East Coast, drove German and Polish competition into the markets of the South Wales exporters.

In view of the rapidity with which new industry tends to flock towards prosperous areas, the differential effects of tariff policy on the prosperity of different areas need to be considered rather more carefully, and more in relation to other factors, than has been done in recent years. In one case at least—that of hydrocarbon oils—tariff policy has involved giving a guarantee of maintenance of a certain level of protection for a certain period of years. Although this affects other home-produced fuels such as benzol, the output of which is fairly widely spread throughout the country, its main effect, as was intended, is to assist the shale oil industry, which is highly localised in Scotland and the I.C.I. coal hydrogenation plant at Billingham. The benefit is shared by the low temperature carbonisation plants (e.g. the "Coalite" plants at Askern, Barugh and in South Wales), though the tariff assistance involved, based on the output of hydrocarbon oils, is much smaller.

Government Contracts and Subsidies

Further, the Government itself has practised direct discrimination on a very large scale by preferential treatment of the Special Areas in the allocation of Government contracts—especially in armaments contracts—and in the building of Royal Ordnance Factories at such places as Bridgend, Bishopton and Chorley. Subsidies have been responsible for discrimination on an even larger scale. Thus the Greene Committee's Report on the Sugar Industry in the United Kingdom, which was issued in March 1935, showed that 70 to 75 per cent of the sugar beet acreage was then to be found in six counties of Norfolk, Suffolk, Isle of Ely, Lincoln, Cambridge and Essex. The sugar beet subsidy is largely, therefore, a subsidy to these counties. Similarly the wheat deficiency payments discriminate in favour of the counties in which the bulk of the U.K. wheat acreage lies. In 1936-37, for example, 17 counties had 61.5 per cent of the wheat acreage between them. Again, the cattle subsidy favours in a similar way the stock-breeding districts of the Midlands.

The effects of the subsidy which it is now proposed to extend to the zinc-smelting industry, though falling on the consumer rather than the Exchequer, will be confined exclusively to the towns of Avonmouth, Swansea, Seaton Carew and possibly Bloxwich.

An interesting form of concealed subsidy very intimately affecting industrial location lies in cutting losses on Government expenditure in developing a site for some special purpose for which it is not afterwards required. Examples are the Slough Trading Estate site planned as an aerodrome and used as a post-war surplus dump, and the Wembley British Empire Exhibition site.

Financial Influence

The extent of the directional influence exerted by the Special Areas Reconstruction Association, and its unofficial counterpart the Nuffield Trust, in providing finance for enterprises setting up in the Special Areas needs no detailed discussion. In spite of the limitation imposed on the S.A.R.A. to provide only a maximum of 80 per cent of the total capital required by a project, the influence of even these relatively small attempts at discrimination in the finance of industry is considerable owing to the dearth in many areas of provincial sources of industrial finance and the shortcomings of the present machinery of the City of London. The problem will be examined in more detail in Chapter III.

From the date of their appointment in 1934 up to October 31, 1938, the Commissioners for Special Areas paid out £10.23 million for various objects, including the aids to industry mentioned above. In addition they had commitments on October 31, 1938, to spend another £6.82 million. Of the sum of £17.05 million which the Commissioners either have spent or are committed to spend, grants for industrial purposes accounted for £5.85 million. Further, according to a statement made by the Chancellor of the Exchequer on February 9, 1938, the Treasury has lent £1.27 million and S.A.R.A. another £0.63 million to 109 businesses having a total loan and share capital of £5.67 million.

These, however, by no means end the various financial influences affecting

industrial location. (Some, such as tariffs, have already been mentioned. Further influences have been the use of discriminatory valuations by local authorities; the greater readiness of the Ministry of Health to sanction the raising of loans by prosperous as against distressed local authorities; and the block grant system, especially since the placing of new duties on local authorities began to put out of gear the formula on which it was based in 1929. The extent of this process is difficult to assess, especially since it has been balanced to some extent by ameliorative measures in the Special Areas or by the payment of subsidies which benefit particular districts. Measures designed to ameliorate conditions in Special Areas, however, have aims other than that of rectifying faults which have developed in the methods of paying block grants. In fact, the faults in the present block grant system are symptoms of serious shortcomings in the system of taxation, which requires a radical overhaul.

Local Authority Powers

Local Government Acts, in the way in which they are often interpreted, are capable of having a profound but unforeseen influence upon the location of new industry. Many authorities have used the large measure of independent action conferred upon them in order to attempt to attract new industries to their own areas. In some cases, expedients of doubtful legality are adopted such as the effective reduction of rates through a "sympathetic" assessment or even by "forgetting" to collect rates when they are due. Some authorities have applied for statutory powers to grant discretionary reductions of rates for new factories. Measures of this sort, of course, merely amount to subsidisation of industry by local ratepayers and it is obvious that relatively prosperous areas rather than those most in need of new industries are likely to have the longer purses.

The same consideration applies to other aspects of local government policy. The power to purchase, lay out, and develop land, or to advance money to a purchaser or lessee for the erection of buildings, gives to local authorities means of attracting industry by offering special facilities and even by charging uneconomic rents. It is clear that, as between areas which are competing for new industries, the richer and not necessarily the more necessitous areas are able to make most effective use of these powers.

Local authorities have, in addition, considerable powers to interfere directly with the location of industry. Wide powers of control over noxious industries and over types and uses of buildings in relation to location, are contained in the Public Health Acts and in the Town and Country Planning Act of 1932. Since August 1985 also, local authorities have enjoyed powers to re-develop working-class housing areas as a whole in certain circumstances which include powers to relocate industrial establishments affected, either by the offer of alternative sites or in the last resort by compulsory purchase. Several schemes under this order have been formulated—for instance in Liverpool, Manchester and London (Bethnal Green). It is doubtful if these powers in their present form are materially influencing industrial location, but any extension of them would obviously do so. Under the present powers only "minor" relocation at the most is likely to take place—such as the shift of a works within a fairly small area in order to conform to a town planning scheme.

Public Utility Development Policy

The development policy of public utility and transport services may exercise a very important influence on the rate of growth of areas, particularly those situated on the fringe of large concentrations of population. In framing their development policies, utilities are, of course, trying to prepare for developments which they think will take place, whereas in practice the decisions which they take will form one of the strongest factors influencing the course of those developments. The possibility of locating an industry on a particular site is often determined by the availability of a relatively small number of services. The importance of utility development policy in this respect would be infinitely greater if it were not for the fact that each utility authority is, in most cases, engaged in making its own expansion plans. Unless each of these happens to be based on an identical forecast (which is somewhat unlikely in practice), the various plans inevitably do not coincide to the loss of the utilities themselves and the confusion of the prospective manufacturer.

Examples of local development as a result of the initial enterprise of public utility undertakings are not difficult to find. The Western extension of the Metropolitan District Railway from Ealing Common to South Harrow and Rayners Lane was constructed long before the prospective traffic of that area could justify it. The project was supposed to anticipate housing and other development in that district. In practice it probably decided that development should take place in that district rather than in others, and certainly accelerated such development as had already begun. If the extension of the Central London line along the G.W.R. route to Ruislip had preceded the South Harrow extension of the Metropolitan District, it is more than probable that the Greenford-Northolt-Ruislip area would have been developed before Alperton-Sudbury.

The extension of the former Charing Cross, Euston, Highgate and Hampstead line to Edgware also preceded the housing and other development in the new area served, which could hardly have taken place as rapidly and extensively if the new line had not been built. In other words, the development was not merely foreseen, but largely determined by the railway. Elsewhere, local development in advance of transport and other services has led to difficulties, as, for instance, at Dagenham.

Very similar considerations apply also to new by-pass roads, owing partly to the fact that the advertising value of factories on them is an important attraction. By-pass road schemes depend, of course, partly on local authorities and partly on the Ministry of Transport, and this is another example of a way in which public authorities may have a large and often unintentional influence on location. The Restriction of Ribbon Development Act 1935 has to some extent modified the position.

Electricity, gas and water service development has similar effects, although here a further complication arises from the statutory right of an individual to demand a supply if he is within a certain distance of an existing main. For example, an electricity authority laid a main along a quiet lane with a few houses on the edge of a growing suburban area, and determined the size of its cable according to the existing requirements plus an allowance for increase in the demand per consumer. The growth of the population and the existence of electricity mains soon afterwards

attracted a "super cinema," which, instead of taking a site in the centre of the suburb, was placed in the residential lane, and being within the specified distance of an existing main, exercised its statutory right to demand a supply. As a result, the electricity undertaking had to scrap and replace a large part of the recently installed supply cable, which was too small to carry the load of a cinema.

The influence of public utility policy upon industrial growth is great, and would be still greater if the expansion of different utilities were submitted to some degree of co-ordination. This is seldom the case to-day, even where they are run by local authorities. It would obviously be to the general advantage if each authority knew not only what expansion was being provided for by others, but also the actual expansion which might justifiably be expected. (Co-ordination of the plans of the various authorities would in itself greatly facilitate accurate estimation of future expansion in the public demand for services, in view of the extent to which the development of demand is influenced by the availability of supplies.

Marketing Boards and Redundancy Schemes

Conscious discrimination between different areas is also provided for in the constitutions of several public bodies such as the Milk Marketing Board. Apart from its own manufacturing units, the Milk Board exercises no direct jurisdiction over the location of processing plants in England and Wales, but indirectly its control over the supply of milk for manufacturing purposes makes its influence very effective. Redundancy and licensing schemes, whether privately operated, as in the examples of flour-milling and shipbuilding, or under public or semi-public control, as in the example of bacon-curing, are also resulting in conscious discrimination between areas.

Increasing Discrimination

This list of examples of the growth of regional or local discrimination by the action of the Government or of statutory bodies under its control could be extended. Even measures intended to be applied uniformly everywhere tend in practice to have different effects in different areas to such an extent that discrimination in the treatment of different areas, whether conscious or unconscious, may be said to be inherent in the machinery of government. The more a government does, the more discrimination it must cause. Since no one would deny that the scope of government intervention generally is widening every year, it stands to reason that the possibilities of intentional or unintentional discrimination are also multiplying. The chief failing of the process hitherto has been the absence of co-ordination between the interventions and discriminations outlined above. As long as the scope and nature of State interference was not considerable, the confusion following on the lack of co-ordination was not a serious impediment to social and economic progress. With every extension of State interference in its present form, however, the need for co-ordination between its different manifestations becomes more pressing.

The State's Liability

In the Victorian age an expanding population at home and expanding markets overseas provided almost automatic correctives to depressions, however they were brought about, and whether local or national in scope. Combined with the oppor-

tunities open to emigrants, this expansion of population gave a firm basis to the overseas market development work on which so much of the Victorian prosperity was based. With the slowing down of emigration since the war, and its virtual cessation since the depression of 1929, the safety valve has been almost completely closed and the pressure has been increased to dangerous levels, notably in the Special Areas.

Without any formal announcement, without any actual plan, the State has come to assume the responsibility for remedying the misfortunes which overtake a community when the industry on which it depends decays or even disappears. To start with, the workers formerly employed by such an industry receive benefit, part of which constitutes an indirect charge on other industries owing to their contributions to the Unemployment Insurance Fund. If unemployment continues, the whole responsibility falls on the State-run Unemployment Assistance Board. Apart, moreover, from the relief of unemployment, the responsibilities of the State through the various social services are heavier in the case of a community which has been deprived of its means of livelihood than in the case of normal communities. Lowering of the general standards of living adversely affects the shopkeepers, traders and wealthier classes, and results in more "empties" among the higher-rated properties, with a consequent loss of revenue to be made good from other sources. The quality of local government is also liable to decline owing to departure of potential leaders and the spread of fatalism.

Importance of Preventive Measures

Hitherto the activity of the State in relation to declining industries has been largely confined to stemming the tide as far as possible and clearing away some of the wreckage from the worst places. If the State is to advance beyond its present responsibility for clearing up industrial wreckage in the Special Areas to a responsibility for preventing as far as possible inevitable industrial changes from ruining community life and prosperity in other areas, it will have to examine the causes which created Special Areas. It will be necessary to start this study early, for it must not be forgotten that many districts of South Wales and Durham, now decayed, were each hailed as bright spots of prosperity and enterprise in their day. Although the Reports of the Commissioner for Special Areas contain many valuable pointers, more detailed factual information would be necessary as the basis for action.

Some general factors, such as changes in technique and shifts in demand, have already been mentioned. Some of these are quite recent. For instance, the rise into favour of oil-firing for ships in place of steam coal has been one of the chief factors responsible for the permanent depression in South Wales. There may well be a gradual displacement of wool by the various types of artificial wool and staple fibre now making rapid progress both in Great Britain and abroad. Though this may not affect manufacturers it may quite probably adversely affect woolcombers and spinners who are highly concentrated in certain parts of Yorkshire. Another important danger is the exhaustion of deposits on which an extractive industry depends; in this way both West Cumberland and perhaps Cleveland are losing part at least of their economic basis. There has been a great decline in reserves of tin ore which can be profitably worked in Cornwall, and although recent developments have given fresh

hope, there was a time quite recently when it looked inevitable that the chief lead mine in North Wales would have to close down. Industries which have come to depend on an extractive industry for their supplies, may also be seriously affected by exhaustion of deposits. Once plant has been laid down, the cost of removal would be great, yet the competitive efficiency of the industry is seriously undermined by the need for importing raw materials, or at least for bringing them from a distance. In time, depreciation charges fall more and more into arrears until the industry reaches a stage at which it simply collapses, leaving a medley of difficult social problems behind it. This, perhaps, is an extreme case, but it is an example of a process which, in some degree, has gone on in many parts of the country. Old tin and copper workings and derelict china clay pits and slate quarries in Cornwall and Devon, derelict blast furnaces in South Wales, old lead workings in Derbyshire and the Lake District, old lime and dolomite quarries in South Durham, old slate quarries in North Wales, and above all, abandoned coal pits in many districts—these and the remains of the communities which depended on them, the schools where they were educated, the churches and chapels where they worshipped, the shops at which they shopped, the gas works from which they drew their heat and light, the pipes which brought their water and the sewers which removed their waste, bear visible testimony to the wastage of social resources which inevitably follows industrial decay.

It is necessary to distinguish between long-term factors of an unpredictable nature and others leading to changes which can be anticipated. The exhaustion of deposits comes into the second category, but it is not impossible to guard against the "unpredictable" changes to some extent. Although it may not be feasible to forecast particular changes in the details of the industrial structure, it is possible to assess the dangers which threaten a whole economy, or any large part of it. Thus, it should not have been very difficult in the last years before the war of 1914-1918 to show the dangers inherent in the high degree of dependence of parts of Lancashire on one industry and on overseas markets. The gradual introduction of a wider range of other industries into Lancashire or the moving of capital and labour to other areas would have mitigated, if not entirely removed, the chronic depression which has since overtaken the cotton industry. Something can undoubtedly be done to anticipate the waning of any particular industry or section of industry in the normal process of industrial growth and decay. Such changes are inevitable, but the social results which they now entail could be very largely avoided if the dependence of a district on only one industry or a limited group of industries were also avoided without inviting adverse results on costs through abandonment of economic specialisation. When one decayed, others could "take the strain" and would prevent the enormous burden which has been placed on the economies of such towns as Oldham, Sunderland, Lanark, Dundee, Swansea, and many others, through excessive dependence on one industry. There are, however, some towns—mainly those which have been built around an extractive industry—which are so unsuitable for other industries that diversification on an economic basis would be impossible. When their native industry decays there is in these cases only one solution—complete abandonment of the site.

II. THE PRESENT LOCATION OF INDUSTRY

Definitions—Changes in Regional Industrial Balance—Regional concentrations of Industry—Recent Changes in the Location of Industry—Movement of Industry to the South—Outward Movement of Industry from the Centres of Towns—Changes in the Character of Industry.

Definitions

The word industry has grown to be used in a number of different senses. In its broadest significance the word covers all productive human activity, but its meaning as commonly used is not nearly so wide. For example, it often excludes agriculture and the professions, and there is frequently some doubt as to whether it includes, say, transport services. Yet, a report which deals with the location of industry must have, not, perhaps, a rigid definition but at least a clear understanding of the meaning of "industry."

For the present purposes, industry can be regarded from two standpoints, firstly as providing employment for human beings, and secondly as producing goods. From the one standpoint it would be measured, for example, by the number of persons occupied, and from the other by the net value of output, this being the only means of expressing the output of all industries in the same terms. Of these approaches, only the first can cover all gainful occupation, while the second excludes services and professions.

In either case, industry as a whole is frequently divided into a number of sections, according to the kind of employment provided or the kind of goods produced, and each is referred to singly as an industry, while collectively the sections are referred to as industries. Thus it is convenient to speak of the pottery industry, and the cotton and woollen industries, for example, and the whole range of individual industries together comprise "industry."

There is no sharp boundary separating one industry from another, though in practice a number of conventional boundaries have been laid down as a matter of convenience. Whenever it has been found necessary in this report to distinguish between different industries, one or other of the existing systems of subdivision has been used, according to circumstances.

Changes in Regional Industrial Balance

The broad movements of the insured population and of production as between the principal regions* are shown in figs 1 and 2. In both, the shift of a substantial proportion of the insured workers and of production from the old basic industrial areas to the West Midlands, Greater London and the South-East is clearly shown. In fig. 2, unfortunately, it has not been possible to break down the returns for the

* The various regions used in the relevant official statistics are listed and mapped in Appendix IV.

category "rest of England"; this district was split up in 1985, but not at previous Censuses of Production, so that no comparison could be made for the new regions. Fig. 1 also shows an interesting shift towards the South-West.

In fig. 3 appear the changes in employment between 1927 and 1937 in the major branches of industry. The fall in employment in the extractive and textile industries is due not only to the decline of the basic industries, but also to increased mechanisation, although the industries providing the machinery have not experienced an equivalent rise. The block showing the change in employment in transport and distribution masks the decline in employment on the railways, and the increase in employment in road transport and distribution. Figs. 1, 2 and 3, therefore, show changes in the proportional distribution of employment and output between certain areas or groups. The proportional distribution in the earlier year is represented by the area of the grey stippled blocks. The blocks are all the same height, and the width varies according to the proportion of the total which that block represents. The proportional distribution in the later year is represented by the hatched area, and thus the height of the hatched block on the vertical scale shows the change in proportional distribution between the two years. Where the hatched block projects above the grey block a region has increased its share between the two years, and where the hatching does not reach to the top of the grey block the region's share has diminished.

In fig. 4 are shown the numbers employed in each region in 1935 and the net output per person employed. The Census of Production does not cover enterprises employing up to ten people, but this exclusion is unlikely to alter materially the relationship between the regions. The unevenness of the value of the average net output per worker is striking, and may be accompanied by equally striking variations in the earnings of the industrial population according to the general industrial composition of the region. In Greater London and the West Midlands, where there is a wide diversity of light with a certain number of heavy industries, net output per person employed is around 85 per cent above that on the North-East Coast or South Wales, which are almost exclusively heavy industry areas. To some extent this is inevitable, for industries are mechanised to an uneven degree, and it may be observed that net output per person employed in some heavy industries such as blast furnaces is showing a fairly rapidly rising tendency with the progress of long overdue mechanisation. At the same time the high output in Greater London and the West Midlands suggests that their high proportion of newer and lighter industries is giving them a big advantage over the older industrial regions. Net output is determined largely by the extent of capital equipment, and it does not necessarily follow that a high average net output per person employed means high earnings. But in any case, unless the return to capital accrues to persons residing outside these regions, they are likely to offer better markets, which act as an important pull to industries producing consumption goods.

The changes shown above are, however, only of a general character, and further illustrations are needed in order to provide the material necessary for a critical discussion. In particular, information is required on the concentration of various industries in the different regions.

Figure 1—CHANGES IN REGIONAL* DISTRIBUTION OF INSURED PERSONS IN EMPLOYMENT (AGED 16-64), 1923 AND 1937
(Including distributive trades, etc.)

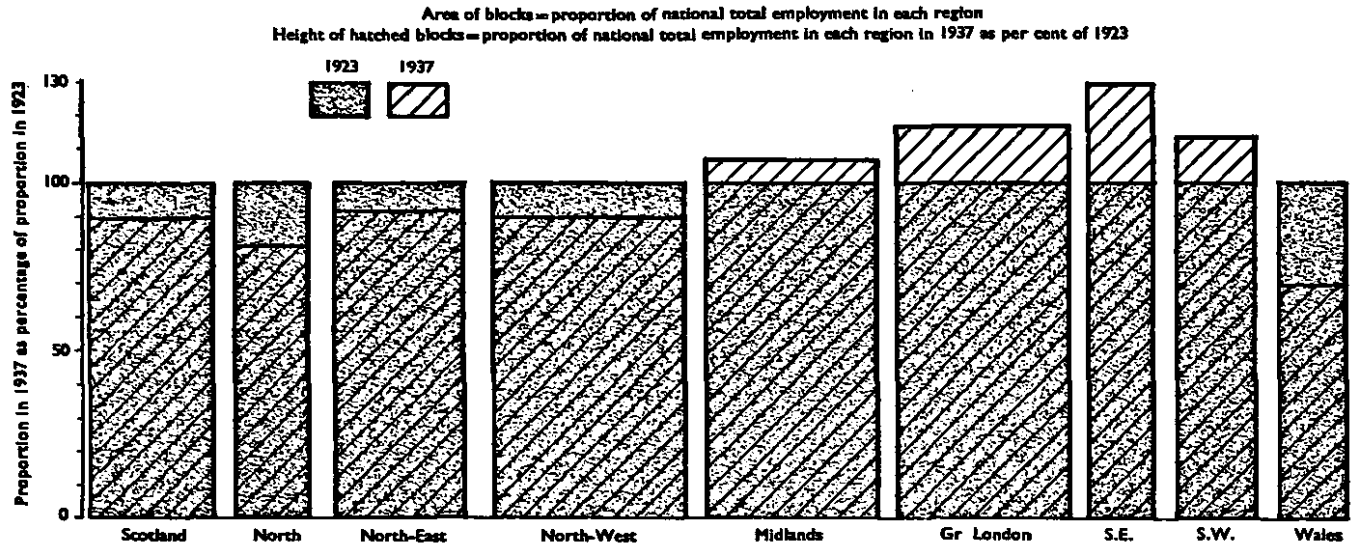
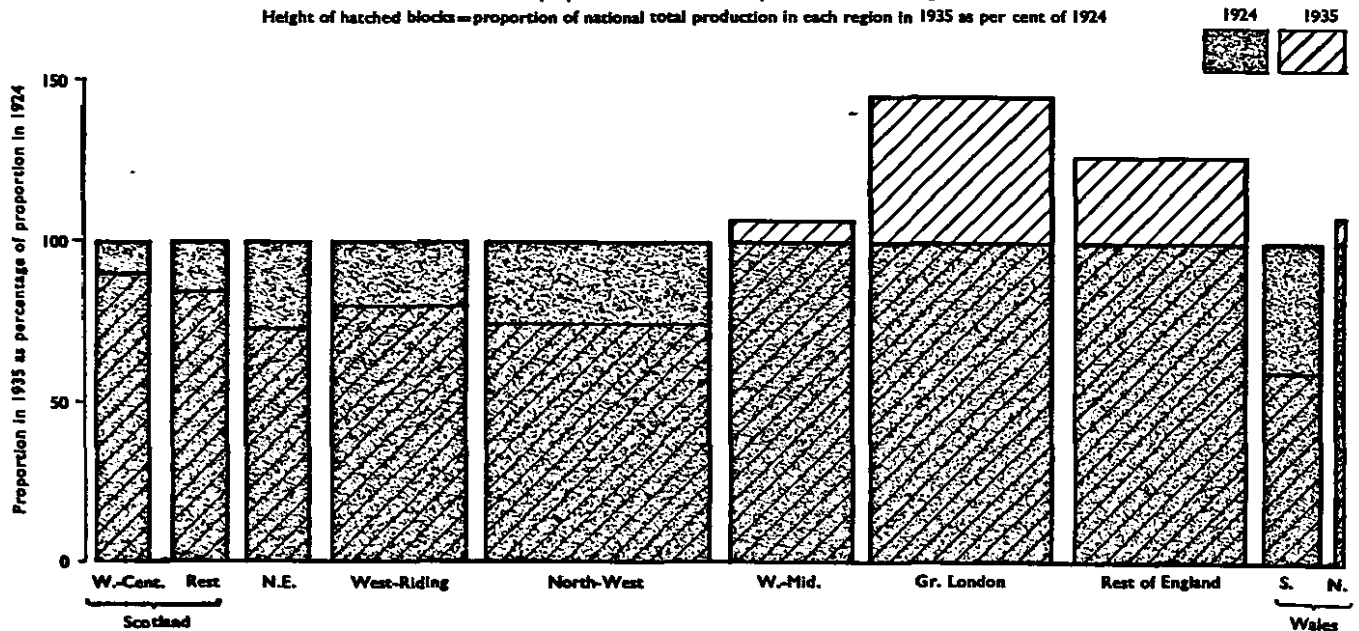


Figure 2—CHANGES IN REGIONAL* DISTRIBUTION OF PRODUCTION, 1924 and 1935

Census of Production, Distribution of Net output (money value)

Area of blocks = proportion of national total production in each region
Height of hatched blocks = proportion of national total production in each region in 1935 as per cent of 1924



* The regions used for unemployment statistics and for the Census of Production are shown in the maps at the end of the report.

Where the hatched block projects above the grey block a region has increased its share between the two years, and where the hatching does not reach to the top of the grey block the region's share has diminished —

Figure 3—CHANGES IN EMPLOYMENT BETWEEN CERTAIN TYPES OF INDUSTRY 1927-1937

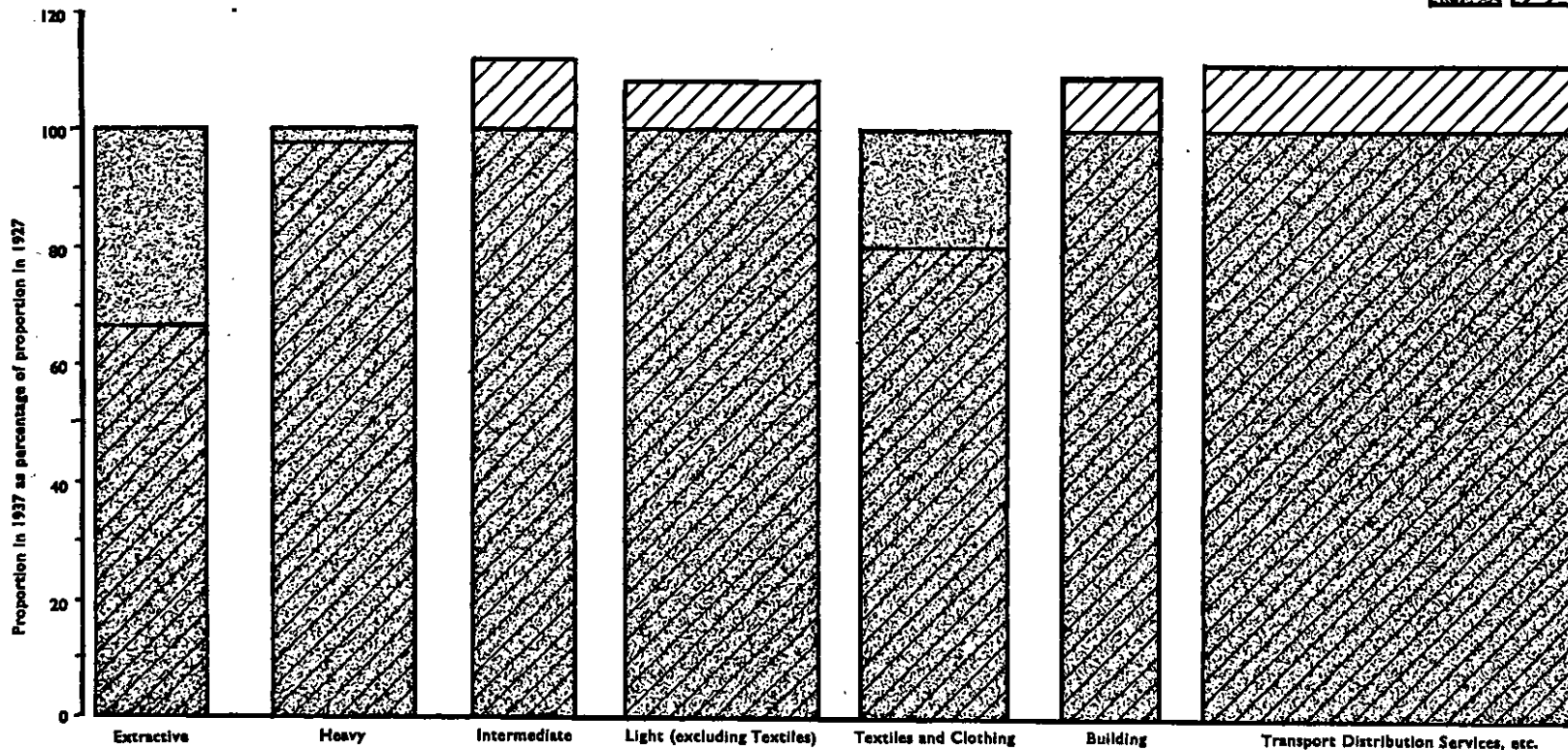
Insured persons in employment

Area of blocks = proportion of total employment falling into each category 1927

Height of hatched blocks = proportion of total employment falling into each category, 1937 as percentage of 1927

1927

1937



The criterion of "Heavy" "Intermediate" and "Light" is the proportion of women to men (all insured) in July 1937

Heavy $\frac{\text{Women}}{\text{Men}} < \frac{1}{10}$

Intermediate $\frac{\text{Women}}{\text{Men}} \frac{1}{10} \text{ to } \frac{1}{2}$

Light $\frac{\text{Women}}{\text{Men}} > \frac{1}{2}$

" HEAVY "

Non-metalliferous mining products.
Brick, tile, pipe, etc., making.
Metal manufacture, excluding tinplates, wire, wire netting, wire ropes.
Engineering, etc., excluding Electrical engineering.
Railway carriages, wagons, etc.
Shipbuilding and ship repairing.
Stove, grate, pipe, etc., and general iron founding.
Electric wiring and contracting.
Heating and ventilating apparatus.
Sawmilling and machined woodwork.

" INTERMEDIATE "

Glass.
Chemicals, etc.
Tin plates.
Wire, wire netting, wire ropes.
Electrical engineering.
Motor vehicles, cycles and aircraft.
Carriages, carts, etc.
Hand tools, cutlery, saws, files.
Brass and allied metal wares.
Tanning, currying and dressing.
Grain milling.
Woodworking, etc., except Sawmilling and machined wood-work.
Paper and paper board.
Wallpaper making.
Oilcloth and linoleum.
Scientific and photographic instruments and apparatus.

" LIGHT "

Pottery, earthenware, etc.
Electric cable, apparatus, lamps, etc.
Bolts, nuts, screws, rivets, nails, etc.
Watches, clocks, plate, jewellery, etc.
Metal industries not separately specified
Leather goods.
Food, drink and tobacco, except Grain milling.
Paper, printing, etc., except Paper and paper board, Wall-paper making.
Rubber.
Brushes and brooms.
Toys, games and sports requisites.
"Other" manufacturing industries.

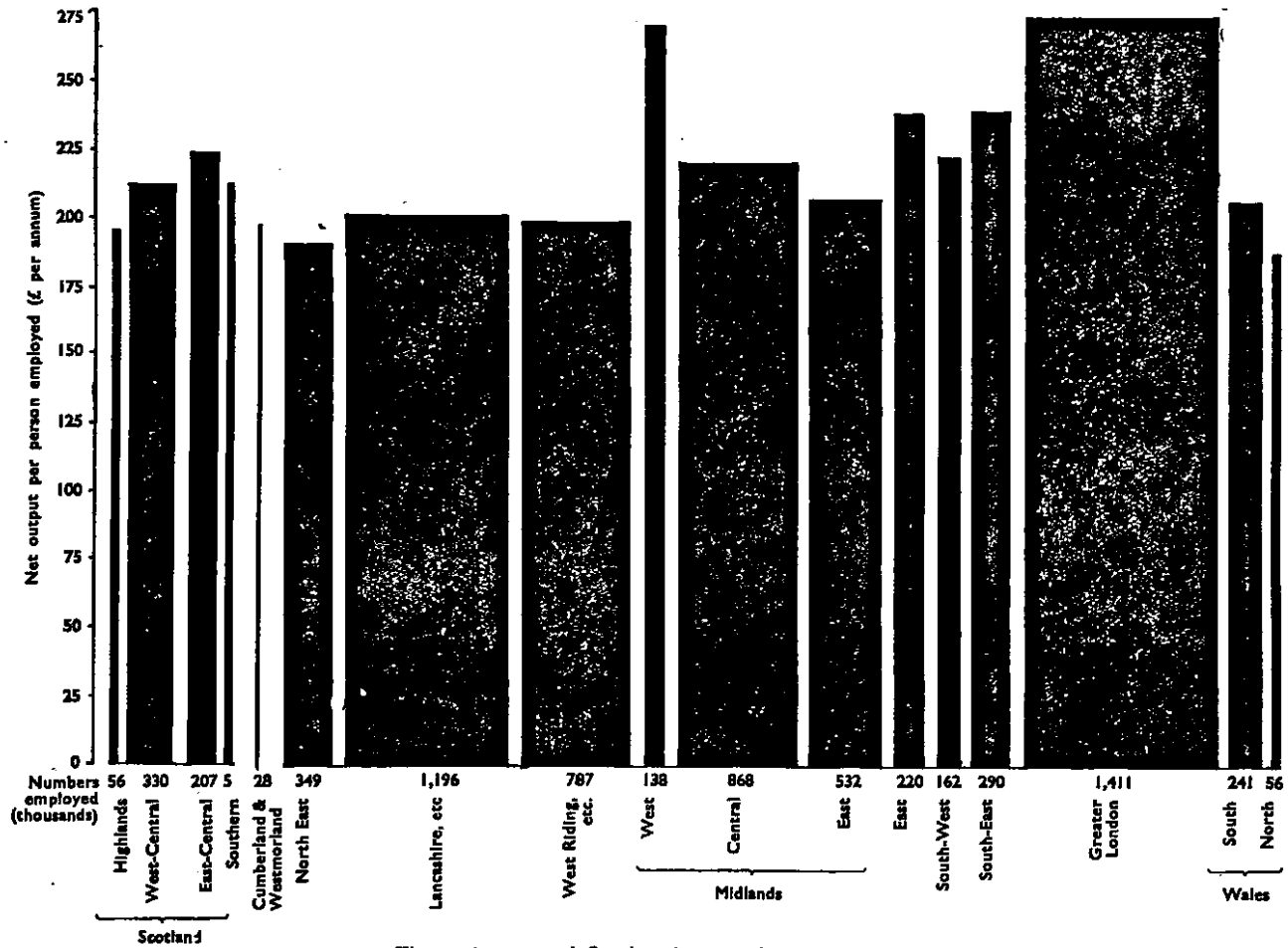
See Ministry of Labour Gazette, November 1937.

Figure 4—NET OUTPUT IN CENSUS OF PRODUCTION REGIONS, 1935

Industries covered by the census (preliminary results)

The horizontal scale measures the numbers employed, and the vertical scale the net output per person

The area of a block represents the total output of a region



The regions are defined and mapped in Appendix IV

In Table 1, Appendix I, it can be seen, for instance, that 27 per cent of workers in the glass bottle manufacturing industry are in Greater London*, and a further 26.90 per cent in region North IV (Lancashire and Cheshire). In earthenware, china and porcelain manufacture 79.10 per cent of all employees are in the West Midlands region, which includes the Staffordshire "Potteries." Again, as measured by the number of persons occupied, 86.8 per cent of slate quarrying is carried out in North Wales, while 44.56 per cent of cement and lime production is carried out in the South-East region. Boot and shoe manufacture, and also hosiery manufacture, are situated principally in the East Midlands, the respective proportions of occupied persons being 88.65 per cent and 63.70 per cent.

Consideration of these percentage figures is, however, likely to be misleading in an attempt to assess relative concentrations of individual industries. For example, in the fertilisers, dips and disinfectants trade, the largest individual percentage figure is 17.88 per cent in Greater London. Or again, 20.15 per cent of persons occupied in malting, brewing and distilling are in Greater London. Greater London has, however, a considerably larger population than any other region, and if industry were uniformly distributed according to population, Greater London would have the largest figure for every industry—i.e. every industry would appear to be concentrated in London. Other concentrations would be in Lancashire and Cheshire and in the South-East, which are next in order of population. There is, however, little interest in speaking of concentrations in this sense. Strictly, an industry can only be said to be concentrated in a region when there is more of it than would be expected in proportion to the industrial population of the region. What is required is some method of indicating these extra concentrations and deficiencies of industry.

The importance of this can be shown by a simple illustration: speaking in terms of persons occupied, it will be found that 20.12 per cent of the coal mining industry is in South Wales. This, however, is of much less significance to the inhabitants of South Wales than the fact that 30.0 per cent of the region's industrial population is employed in that one industry.

In fig. 5 the occupied population at the 1931 census is broken up by regions and industries. Each column represents a region, and the width is proportional to the total number occupied in the region. The column is divided vertically in proportion to the numbers engaged in each industry, classified under the principal heads. Thus the area of each rectangle represents the actual number of workers in an industry in a region. From this it can be seen, for instance, that the actual number of coal miners in the West Riding is nearly as great as in South Wales, but they are a much more important factor in the latter region.

Regional Concentrations of Industry

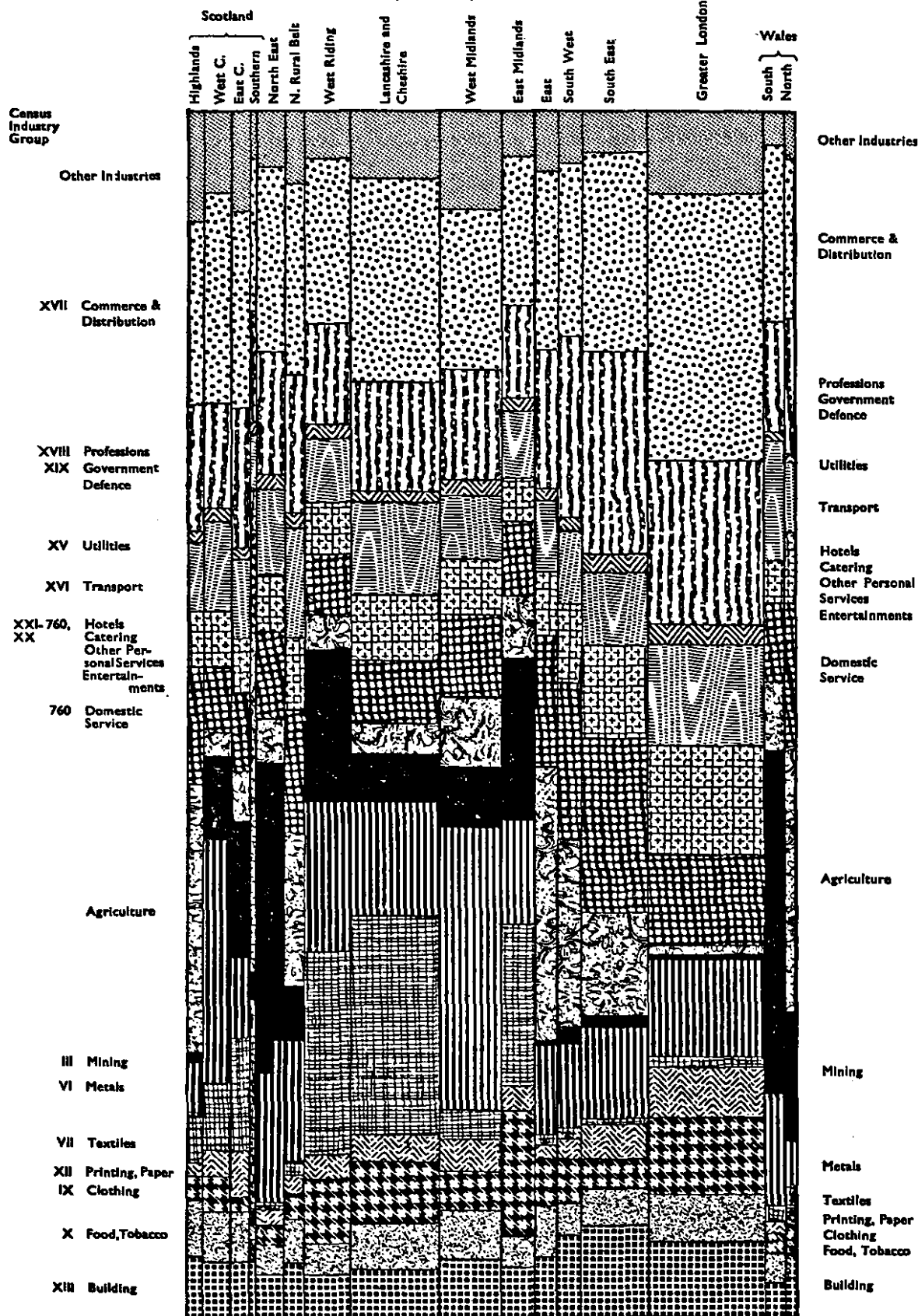
To meet the need for a measure of "extra concentration," the "location factor" has been evolved.) A full explanation of the methods by which this is arrived at will be found in Appendix II†. Here, however, a brief outline will be

* Table 1 is based on Census of Population regions, and all regions cited on pp 88-48 refer to that Census. For definition and map see Appendix IV. The data refer to region of enumeration. A large number of people enumerated in the South-Eastern region were probably working in Greater London.

† See also P. Sargant Florence: *Economic Journal*, December 1937, pp. 622-623, and 'Statistical Methods in Economic and Political Science' pp 327-8.

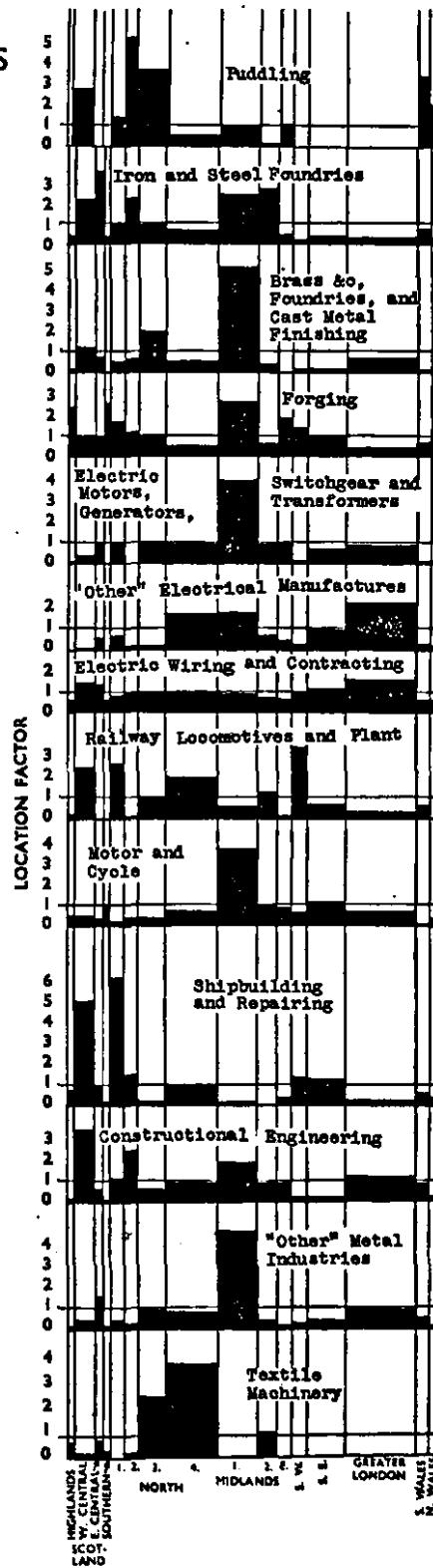
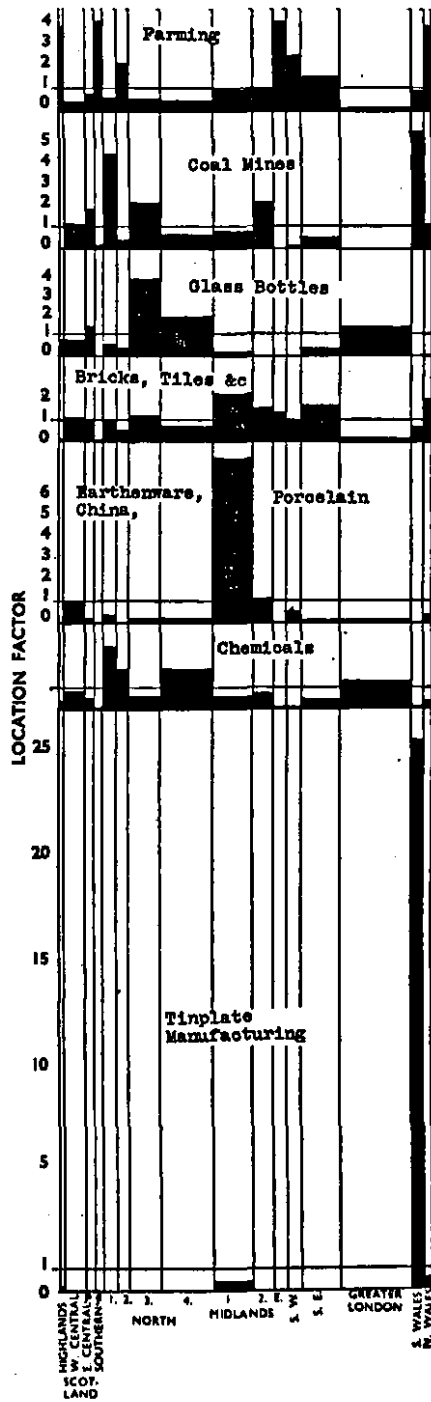
Figure 5 INDUSTRIAL and REGIONAL DISTRIBUTION OF OCCUPIED POPULATION 1931

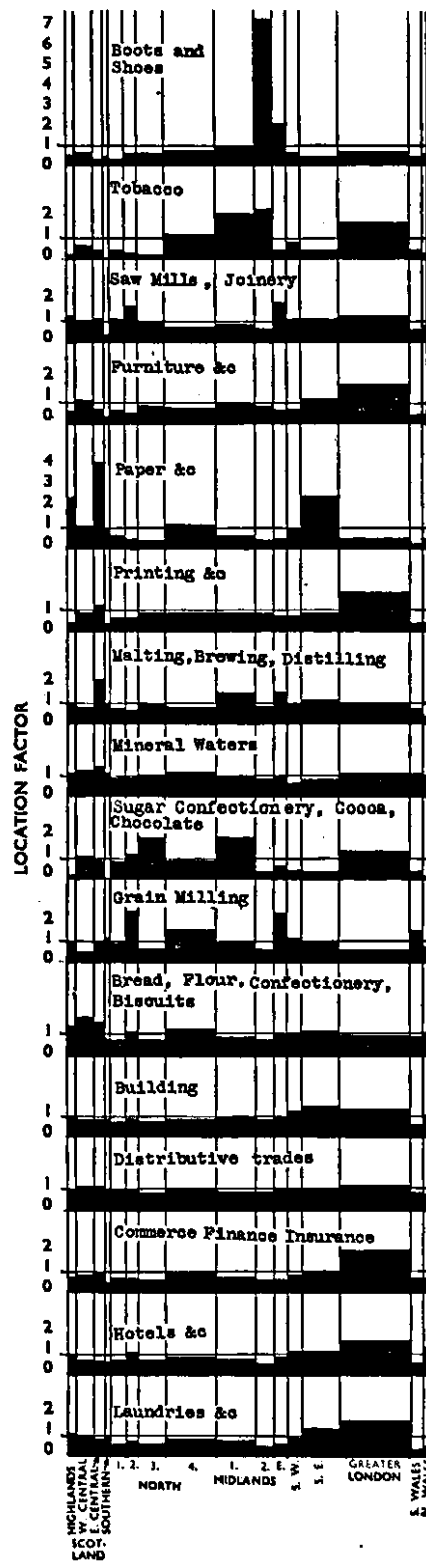
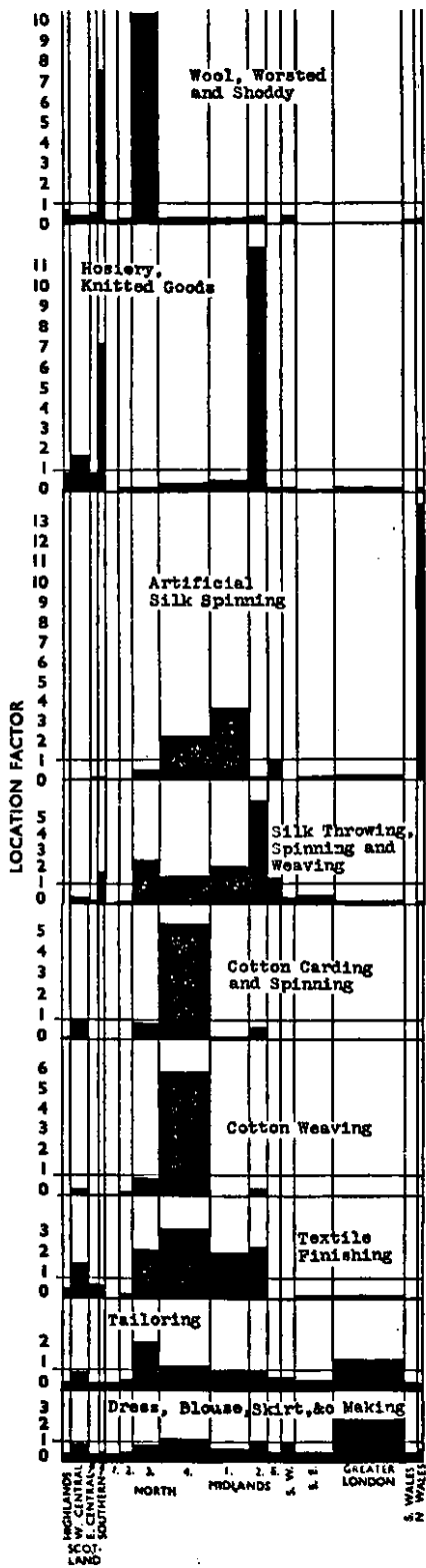
Census of Population Regions, see Appendix IV*



* Region of enumeration. The South East region probably includes many persons (particularly in groups XVIII and XIX) working in Greater London.

Figure 6—REGIONAL DISTRIBUTION
OF WORKERS IN CERTAIN INDUSTRIES
1931 CENSUS





sufficient. The location factor for a given industry in a given region is obtained by dividing the percentage of the national total of the given industry to be found in that region by the percentage of all industry in the region. Thus, 53.50 per cent of workers in the wrought iron and steel tube industries are in region Midland I, in which live 10.27 per cent of the total industrial population of Great Britain. The measure of extra concentration (in other words, the "location factor") is therefore 5.2 (i.e. 53.50 divided by 10.27).

Similarly, in Greater London, 2.06 per cent of wrought iron and steel tube workers are to be found, but in that area as a whole, 19.56 per cent of all industrial workers are employed. The location factor for the industry in Greater London is therefore 0.1 (i.e. 2.06 divided by 19.56). Fig. 6 shows the location factors for a large number of industries in the 16 census regions, and in Table 1 in Appendix I they are shown for 167 industrial groups. There are certain qualifications to this method of measurement, which are explained in Appendix II, but it represents a useful rough and ready method of judging industrial concentration.

Generally speaking, the industries with location factors approaching to unity are those which necessarily follow the population, such as bread-baking (with its related processes), building, retailing and personal services. Industries can, in fact, be conveniently arranged in order of the closeness of their attachment to the population. At one extreme are regular personal services such as hairdressing and dentistry. Next come property services, such as laundries, and then production for immediate consumption, such as baking, which need not be immediately tied to the population, but cannot (with certain exceptions) be very far away. The next group comprises industries manufacturing non-perishable goods of the consumer type, which are best placed reasonably near the chief markets, but which need not be located in every centre of population.

At the other end of the scale are the extractive industries, such as coal mining and slate quarrying, which must necessarily be located according to the deposits of the materials concerned. In Great Britain the coal seams are fairly widely distributed, so that coal mining is carried on in several regions, but the slate deposits, for example, are almost wholly situated in North and Central Wales, while iron ore is in the regions North II and Midland II. It does not, of course, follow that all existing deposits of a particular mineral will be worked, as some deposits are more conveniently placed than others, or are more economical to use.

At either end of the scale, therefore, are industries that must be located in particular places: those at the beginning must be everywhere where there is population, while those at the end must be where their raw material source is. Industries lying between these extremes, however, have a wider choice of locations, any of which would probably be suitable. In fact, generally speaking, the choice is so large that only a few of the possible locations can actually be used. It is in this middle range of industries that the relative cost of transport of raw materials and finished products exercises an important, though not necessarily conclusive, influence.

The following table shows the industrial composition of the 16 regions by indicating how many industries in each region lie within certain ranges of the location factor.

**PERCENTAGE OF THE 167 INDUSTRY GROUPS IN FOUR SEPARATE RANGES
OF LOCATION FACTOR IN EACH REGION**

Census regions	Location Factors				Total
	0-0.05	0.05-0.45	0.45-2.05	Over 2.05	
Greater London	9.6	21.5	57.5	11.4	100
South-east London	11.4	33.5	49.7	5.4	100
Northumberland and Durham	12.6	34.0	48.0	5.4	100
Northern Rural Belt	9.6	26.9	49.1	14.4	100
West Riding	5.4	26.9	56.8	10.9	100
Lancashire and Cheshire	2.8	20.9	64.0	11.7	100
West Midlands	5.4	14.4	61.0	19.2	100
East Midlands	10.2	26.9	52.6	10.3	100
East	21.6	26.4	45.0	7.0	100
South-west	17.9	32.3	44.2	5.4	100
South Wales and Monmouthshire	17.9	41.4	34.0	6.7	100
Rest of Wales	23.4	37.7	34.0	4.9	100
Southern Scotland	39.0	36.4	19.2	5.4	100
East Central Scotland	13.1	26.5	49.0	12.6	100
West Central Scotland	4.9	26.4	56.1	12.6	100
Rest of Scotland	21.0	39.5	29.3	10.2	100

This table, showing the percentage of industries within four ranges of the location factor, provides a useful perspective of the concentration of industry in the various regions. It will be seen, for instance, that 19.2 per cent of all industries in the West Midland region have a location factor of more than 2.05, and 61.5 per cent have a location factor between 0.45 and 2.05. This means that many industries are highly concentrated in the region, and it has its representative share of many others. The Northern Rural Belt, on the other hand, has a relatively high proportion of concentrated industries, but comparatively few in the middle range (0.45-2.05). A high percentage in the first two columns, as in the Southern Scottish region, means that many industries are absent or nearly absent. The figures depend, of course, on the arbitrary grouping of industries. The groups are set out in Table 1 in Appendix I. It must be remembered that the groups vary in size from over a million to under 2,000 employed.

Recent Changes in the Location of Industry

While there has been no census of population since 1931, other sources, such as the Census of Production, the Board of Trade survey of factory development, and certain statistics of the Ministry of Labour, give some indication of developments which have taken place in recent years.

In Table 2 in the Appendix appears a detailed list of the changes in output between the Censuses of Production of 1924, 1930 and 1935, as between the principal

industries in the chief industrial regions. Taking industry as a whole, the percentages of all output to be found in each region at the Census dates were as follows :

PERCENTAGE OF TOTAL NET OUTPUT OF INDUSTRY IN CENSUS OF PRODUCTION REGIONS* IN 1924, 1980 AND 1985

	1924	1980	1985
Greater London	17.1	21.2	24.8
Lancashire and Cheshire	20.8	17.8	15.5
West Riding	12.6	10.6	10.1
Northumberland, etc.	5.9	5.8	4.8
Warwick, etc.	11.6	12.2	12.8
Rest of England	15.9	19.0	20.2
South Wales and Monmouthshire	5.8	3.8	3.2
Rest of Wales	0.6	0.6	0.7
Scotland, West Central	5.0	4.9	4.5
Rest of Scotland	5.2	4.6	4.4
Great Britain	100	100	100

A comparison of the hatched and stippled areas in fig. 2 shows these changes in another form. It will be seen that while Lancashire, the West Riding, the North-East, and Scotland and South Wales showed declines, a conspicuous relative increase was shown by Greater London, the counties of Warwick, Worcester and Stafford, and Rest of England region. The latter, however, includes substantial portions of the North, Midlands, South-East and South-West, and the figures referring to it are therefore of comparatively little use, since they are particularly liable to mask declines in one area behind increases in another at the opposite side of the country.

The only recorded Greater London industries whose percentage figures fell between 1924 and 1985 were aircraft manufacture, from 47.2 per cent to 34.3 per cent, and the manufacture of plastics, buttons and fancy goods, from 63.0 per cent to 58.9 per cent, and even in these cases the actual output increased. The reduced percentages for London were therefore due to a greater proportionate increase in those industries in other parts of the country. The most conspicuous relative increases were in paper manufacture (from 15.8 per cent to 27.5 per cent), soap, perfumery and candle manufacture (from 25.1 per cent to 39.5 per cent), glass manufacture (from 19.4 per cent to 32.4 per cent), and mechanical engineering (from 11.9 per cent to 18.6 per cent).

Movement of Industry to the South

These figures show an actual movement of individual industries (though not necessarily of individual enterprises) from North to South. They do not show those cases where industries which were concentrated in some places have simply shrunk

* See Appendix IV.

in total output, while other different industries have sprung up elsewhere. Such developments do, however, affect the percentages given for "all industries," so that the above table and the last line of figures in Table 2 shows the changes which have taken place in the relative industrial importance of the different regions.

The following figures, which have been calculated from those published by the Ministry of Labour, show insured workers (aged 16-64) in employment in the ten administrative divisions of the Ministry*, expressed as a percentage of the national total in employment, in each of the six years 1923, 1929, 1932, 1936, 1937, and 1938.

REGIONAL DISTRIBUTION OF THE EMPLOYED POPULATION

Administrative Division*	Per Cent of employed persons aged 16-64 in each Division					
	June 1923	June 1929	June 1932	June 1936	June 1937	June 1938
Southern England:—						
London	18.9	20.7	22.3	22.4	22.1	22.4
South-Eastern	5.9	6.8	7.5	7.7	7.6	8.4
South-Western	6.8	7.2	7.8	7.7	7.7	7.5
Midlands	15.0	15.1	15.1	15.9	16.0	15.6
Rest of U.K.:—						
North-Eastern	11.2	10.7	10.8	10.2	10.8	10.4
North-Western	16.8	16.7	16.1	15.1	15.2	14.4
Northern	6.6	5.9	5.1	5.8	5.4	5.5
Scotland	11.0	10.5	10.0	9.9	9.9	10.0
Wales	5.8	4.4	3.9	3.7	4.0	3.9
Northern Ireland	2.1	2.1	2.0	2.0	1.9	1.8
United Kingdom	100	100	100	100	100	100

This table is illustrated in fig. 1.

If the "south" is understood to include the first four of the above divisions it will be seen that the relative proportions of employed workers in the South and in the rest of the United Kingdom have become reversed between 1923 and 1938. In 1923 46.6 per cent of employed persons were in the four southern divisions, and in 1938 46.1 per cent were in divisions other than the "south."

These figures also show the unequal incidence of the 1930-34 depression. For, although the actual numbers in employment in the four southern divisions declined slightly in 1932, the percentage figures continued to increase. The decrease of employment in the South was therefore below the national average.

The rest of the country has, however, subsequently begun to catch up, and this has become apparent, for example, in the 1937 percentage figure for London. This was lower than for 1936, although the actual number employed in London was higher in 1937 than in 1936.

* See Appendix IV.

The number of insured persons employed in London has, in fact, increased by 48.7 per cent between 1923 and 1938, whereas the increase for the United Kingdom as a whole during the same period is 20.9 per cent.

It is interesting to mention here that a drift (consisting of new growth in the South, accompanied by decline in other parts) is taking place in the U.S.A. It was led by the rapid development of the Kraft pulp, paper, and rayon industries in the South, in connection with the southern pine forests, accompanied by growth of petroleum refining, heavy chemical, and other process industries. In course of time the lop-sided growth of the Kraft pulp industry led to a demand for greater diversification.

Examples of industrial drift can also be found in several other countries, such as the U.S.S.R. and Belgium, where there has been a serious decline in the Mons-Charleroi area, accompanied by an increase in Antwerp and elsewhere. There are also the Belgian "Special Areas" of Borinage and the Région Frontalière. In Germany the development in the Halle-Magdeburg area has been accompanied by declines elsewhere, and unless total consumption of steel expands to an extent which does not at the moment appear likely, the development of the new Hermann Goering works in the Salzgitter area, designed to use local low-grade ores, is likely to lead to a decline in the relative importance of the Ruhr, where the bulk of the steel industry has hitherto been concentrated.

As far as Great Britain is concerned, it has been suggested that the natural tendency is for people to go to the South on account of the better climate. Industry developed mainly in the North because the principal sources of raw material (including coal) were there. A change in the general character of industry, combined with the development of transport facilities and the electricity grid, has greatly reduced the relative importance of raw materials as a factor determining location. As a result, the London market has become one of the principal attractions for industry, and this tendency has been strongly supported by the preference of managers and their wives for living in the South. It is difficult, if not impossible, to measure such preference, but the number of well-to-do northerners who choose to live in the South after retirement suggests that the pull is considerable.

Outward Movement of Industry from the Centres of Towns

While the foregoing figures from the Census of Production give some indication as to inter-regional movements of industry, they do not show a simultaneous trend of industry outwards from many of the main centres.

Improved transport facilities and the ease of personal contacts by telephone are stimulating industrialists to move from old premises within cities to new premises, either on the fringe or in newer neighbouring towns.

This kind of development is proceeding rapidly in London at the present time. Figures recently published by the London County Council show that the population of the central area (City of Westminster and ten neighbouring boroughs) has

declined by half a million since 1871. The population of London County has declined by 150,000 since 1901, while that of "Greater London" as a whole has increased by 1,600,000.

Extensions of the fringe do not consist merely of housing—dormitory development—but as soon as new suburbs become established, industries are attracted there, as has happened for example at Speke (Liverpool). On the other hand, the industries may precede housing, as they did to a large extent at Slough, Park Royal and Hatfield.

The Board of Trade's "Survey of Industrial Development," for 1936 and 1937, from which the following figures have been taken, clearly shows this movement.

	1936	1937
Factories opened in the London Administrative County .	111	82
Of these, transfers from fringe, or nearby town . . .	1	2
" " " " " other central districts . . .	2	4
" " " " " elsewhere . . .	—	—
Factories closed in the London Administrative County .	180	120
Of these, transfers to fringe or nearby town . . .	48	38
" " " " " other central districts . . .	2	—
" " " " " elsewhere . . .	5	7

Similar figures are not available for cities other than London, where the tendency is most marked, but the trend is fairly general. In at least one case, for example, it is being fostered by a speculative builder, who builds modern factories on the fringe of a town and canvasses the occupants of older factories in the centre to move out to the new factories. This process has been aptly termed "industrial slum clearance."

To some extent this movement of industry from the centre to the fringe of towns may seem like a reversal of the tendency for the population to congregate in towns. Strictly speaking, however, it is not so much a reversal as a change in the manner of using the town as a form of social organisation. There is much more tendency nowadays to use the centres of towns for purposes such as general administration, shopping, and entertainment, and to place the manufacturing plants, along with most of the housing, in an outer circle. An interesting but extreme illustration of this is provided by recent developments in Birmingham, in the neighbourhood of the Civic Centre. Open spaces such as the war memorial, and public buildings such as the municipal bank, have appeared in an area that was formerly largely devoted to industry, and, in fact, the blackened chimneys of rolling mills surround the still white stone of the new buildings.

The tendencies are, however, complex and need further study. For instance, the area of Central London devoted to industry and commerce has continued to increase, despite the number of factories moving out, probably largely owing to

development of service industries such as garages. There seems to have been a tendency for some of the smaller manufacturing firms to return to central areas owing to dissatisfaction with high labour costs and lack of contact with customers experienced in outer suburban areas.

Changes in the Character of Industry

Simultaneously with the changes in location already discussed, there have been great changes in the character of production, the extent of which does not fully appear in the published figures either of employment or of output. The employment figures show the redistribution of the labour force only. At the same time there has been a great increase in productivity per head, which has affected different industries to a very different extent, and thus changes in numbers employed bear very little relation to changes in the value of output. But that is not all, for the incidence of price changes has been very unevenly distributed, and changes in the physical volume of production are quite out of relation with changes in the value of output.

Between June 1923 and June 1938 the number of insured work-people employed in all industries and services increased from 100 (taking June 1923 as the base) to 121.5, and for all manufacturing industries to 114.9. Therefore those industries with an index of less than 114.9 in 1938 had increased by less than the mean and are to-day of less relative importance than in 1923. Full details for each industry appear in Table 8 in the Appendix.

The industries showing the greatest decline in relative numbers employed are the following:

INDUSTRIES WHICH HAVE DECLINED IN RELATIVE MAGNITUDE

Industry	Index for June 1938 (1923=100)	Numbers Employed June 1938
Mining and quarrying, other than iron and coal.	40.8	9,604
Tinplate	44.4	12,211
Carriages, carts, etc.	49.0	11,568
Jute	51.4	17,992
Cotton spinning and weaving	56.8	251,184
Pig iron (blast furnaces)	58.6	14,879
Coal mining	59.5	701,713
Iron ore and ironstone mining	64.8	9,826
Textile bleaching, printing, dying, etc.	66.7	65,986
Woollen and worsted	67.7	164,781
Linen	69.4	46,591
Lace	72.2	11,855
Hats and caps	76.9	24,206
Iron and steel smelting and rolling	85.9	188,586
Watches, clocks, plate, jewellery, etc.	87.0	86,415
Boots, shoes, slippers and clogs	88.1	111,792
Dressmaking and millinery	89.8	98,288

The decreases in coal mining, iron ore mining, and the production of pig iron are, of course, comparatively well-known. While in the case of coal mining, the decrease has resulted largely from a diminution in British exports, iron ore is won increasingly by mechanical means, particularly in the more recently developed deposits in the Midlands. In the case of pig iron, there has been a substantial increase in the output per man employed, and the decrease in employment masks an actual increase in output of pig iron as between 1923 and 1937, the output in the two years being 7,440,500 tons and 8,496,600 tons respectively, though it has since fallen to 6,763,000 tons in 1938.

Loss of exports has also been largely responsible for the decline in the cotton industries (which is partly concealed by short-time work), and tinplate manufacture, but it cannot be held to account for all the contractions listed above.

Thus the construction of carriages, carts, etc., has been replaced by that of motor cars, vans and lorries, while the decline in the numbers employed in hat and cap making and in dressmaking and millinery is largely due to the introduction of machinery and mass-production methods in those industries.

The fact that textile finishing has declined less than the basic textile industries of cotton and woollens seems to indicate that proportionately more work is put into the finishing processes than formerly. Textile finishing is, of course, also increasingly concerned with rayon and mixed fabrics, so that a decrease in the finishing of cotton and woollen goods has probably been offset to some extent by the finishing of rayon and other materials.

The following industries have increased almost exactly in step with industry in general: glass manufacture (excluding bottles and scientific glassware); hand tools, cutlery, saws, files, etc., manufacture; carpet making; leather tanning, currying and dressing; grain milling; paper and paper board manufacture; printing, publishing and bookbinding, and rubber manufacture.

INDUSTRIES WHICH HAVE INCREASED IN RELATIVE MAGNITUDE

Industry	Index for June		Numbers Employed June 1938
	1937	1938 (1928=100)	
Electric wiring and contracting	389.0	396.8	88,169
Heating and ventilating apparatus	353.9	360.0	18,254
Artificial stone and concrete	297.7	307.4	26,934
Electric cable, apparatus, lamps, etc.	265.4*	254.2*	163,698
Scientific and photographic instruments and apparatus	224.7	241.3	38,918
Stationery and typewriting requisites	198.3	232.9	10,225
Constructional engineering	184.0	212.2	42,367
Motor vehicles, cycles, aircraft	196.4	209.4	360,886
Electrical engineering	199.6	199.3	111,422
Silk and artificial silk	222.1	187.0	63,546
Explosives	137.1	184.2	29,082
Paint, varnish, red lead, etc.	184.6	183.3	22,979

*A small part of this increase is due to a change in the basis of classification.

The part played by trade depression in changing employment is clearly shown in Table 8 of the Appendix. Almost without exception, industries show an increase in employment from 1927 to 1929, followed by a recession to a minimum in 1931-32-33, and a continuous rise till 1937, and then a slight fall. Some industries, of course, reacted more strongly to the depression than others.

Thus employment in lead, tin and copper mining fell in 1933 to a little over one-quarter of its amount in 1927, and then recovered sharply to three-quarters in 1937. On the other hand, hosiery manufacture fell to a minimum (in 1931), only 3.5 per cent below the 1927 figure, and recovered in 1937 to 20 per cent above.

Some industries, owing to the superimposition of a rapid expansion, showed little or no actual contraction during the period 1929-33, but their expansion was less rapid than in the subsequent years. Thus, in the manufacture of electric cables, apparatus and lamps, the index rose from 120.0 in 1927 to 146.6 in 1930; dropped to 144.4 in 1931; and subsequently increased without interruption till 1937. The case of printing, publishing and bookbinding is similar, while electrical wiring and contracting never showed a decline at all.

The case of tobacco manufacture is of particular interest, as it shows a period of maximum activity in 1929-33, followed by a decline, the index for 1937 being slightly less than for 1927. This seems to indicate some connection between smoking and general inactivity. In view of the prohibition of smoking in many factories, and the tendency in offices to smoke and chat during periods of idleness, such a connection may, in fact, exist. The decline in numbers employed, however, is due largely to increased mechanisation.

Details of the changes in net output of the industries covered by the Census of Production are given in the preliminary report published in the Board of Trade Journal of December 23, 1937. The results are summarised in broad groups in the table on the next page.

The reports of the Census of Production provide the material for the study of changes in the physical volume of production which has been made by the London and Cambridge Economic Service.* In order to compare outputs in 1930 and 1935, each item of produce in 1935 is revalued at 1930 prices. By this means an index is obtained for 1935 related to 1930. A similar index is obtained by revaluing the 1930 output at 1935 prices. The two indices for an industry differ in so far as the balance between the items making up the group has shifted. These indices have been compiled for nearly all the trades separately distinguished in the census, but in many cases the material was incomplete, and some products had to be omitted. An index for each industry has been computed by taking an average of the indices for the constituent trades weighted by their net outputs (including the items which, owing to incomplete data, did not figure in the index).

The following table shows the changes in the position of the industries covered by the Census of Production with regard to employment, money value of net output, and physical volume of production:

* Special Memorandum No. 47.

**CHANGES IN MONEY VALUE AND PHYSICAL VOLUME OF OUTPUT
AND EMPLOYMENT, 1930-1935**

Industrial Group	Employment	Money value of net output	Production Index*	
	1935 as per cent of 1930		at 1930 prices	at 1935 prices
Iron and steel	108	125	122.6	115.6
Engineering, etc. . . .	99	105	(147.8)	(120.8)
Non-ferrous metals . . .	109	123	(142.6)	(132.3)
Textiles	101	106	135.5	131.1
Leather	105	101	95.2	95.0
Clothing	105	99	(115.1)	(113.8)
Food, drink and tobacco	107	105	108.9	107.6
Chemicals	108	120	116.2	114.0
Paper, printing, etc. . .	105	106	—	—
Timber	100	103	—	—
Clay, building materials	109	119	131.9	109.5
Miscellaneous	103	101	110.8	111.5
Building and Contracting	96	91	—	—
Mines and quarries . . .	82	88	92.7	92.3
Public Utility services . .	99	106	123.4	117.6
Government Departments		115	—	—

NOTE : The Census of Production did not cover firms with only ten employees or less.

* The index is printed in brackets where it is based on a low or unrepresentative proportion of the industry. Where the proportion is very low the index is omitted. The components of the engineering index do not include ship-building. The clothing index excludes tailoring, which accounts for nearly two-thirds of the industry's net output.

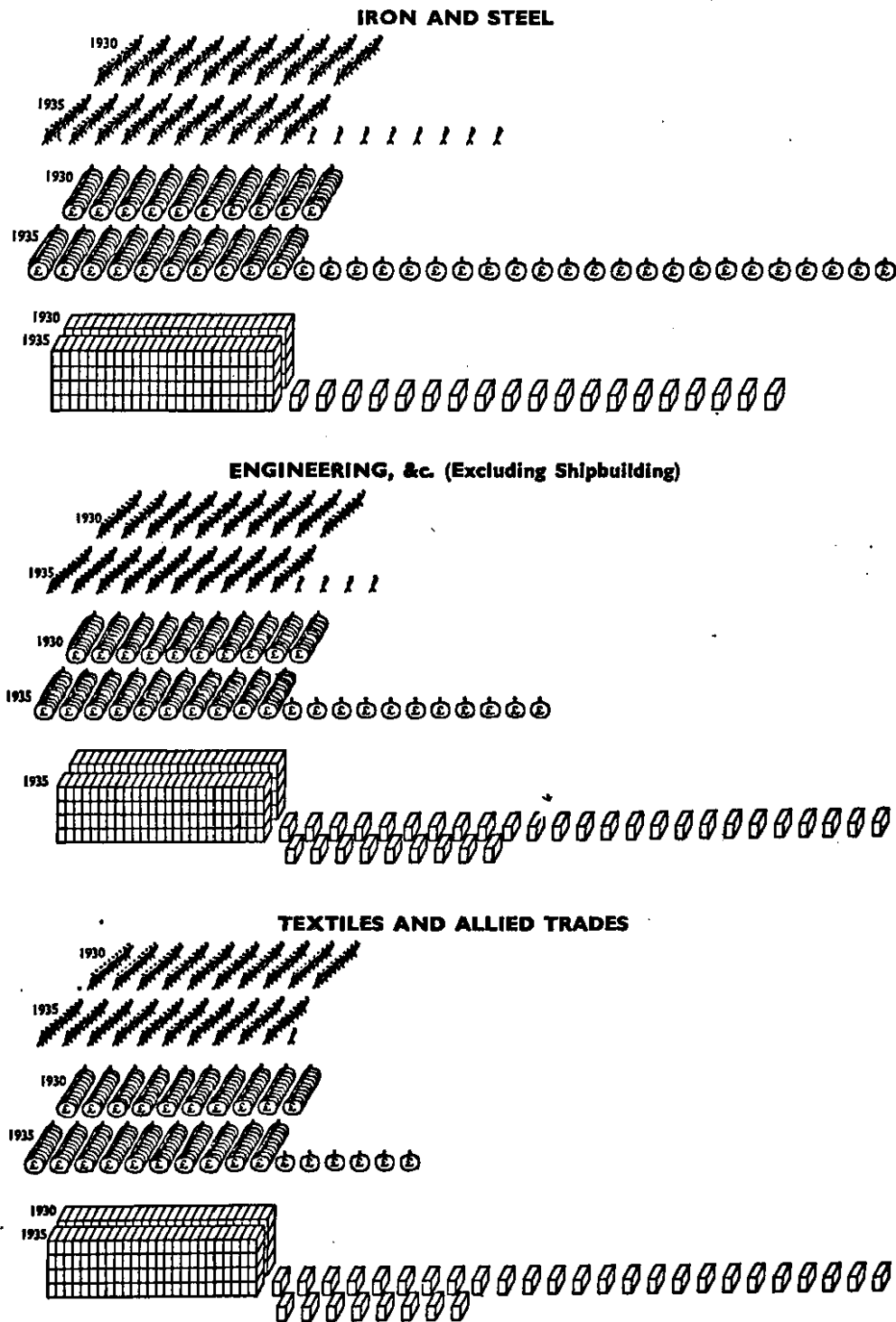
Of the various changes which this table shows as having taken place in the structure of industry between 1930 and 1935, those connected with employment alone have already been considered. A comparison of the indices for employment and net output, however, gives a reliable indication of the degree of advance in technique and organisation made in the period under consideration, because no substantial changes in the length of working hours have taken place. It will be seen that in every industry, except clothing, mines and quarries, and building and contracting work, the index for net output increased, and in some cases by much more than the index for employment. This development was partly due to amalgamations as a result of which the smaller plants of a group were frequently closed down, and their output taken over by the larger and, perhaps, more efficient works. In the case of the Distillers Co. Ltd., for example, distilleries at Campbeltown and elsewhere were closed.

This process affected location, in that industries which were originally scattered tended to become concentrated at the places where their strongest units were situated.

To some extent this process has recently been reversed, and manufacturers are beginning to open branch factories in order to reduce transport costs to their more

Figure 7—PERCENTAGE INCREASE IN EMPLOYMENT, MONEY VALUE

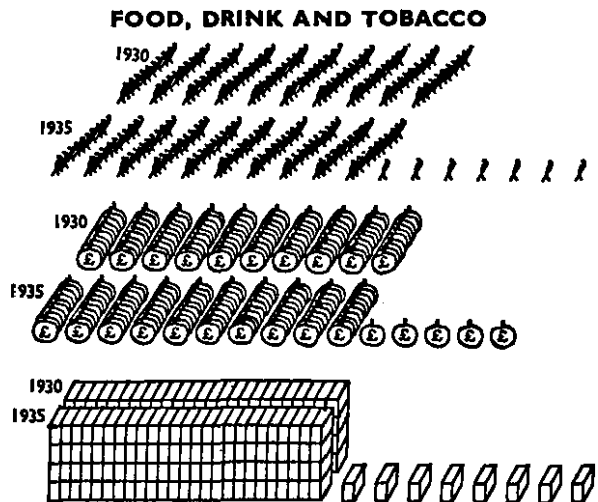
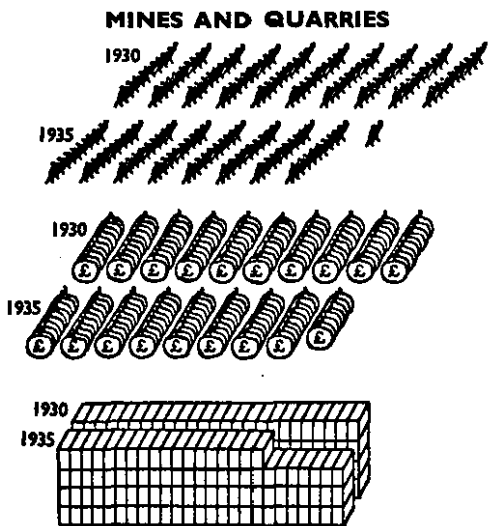
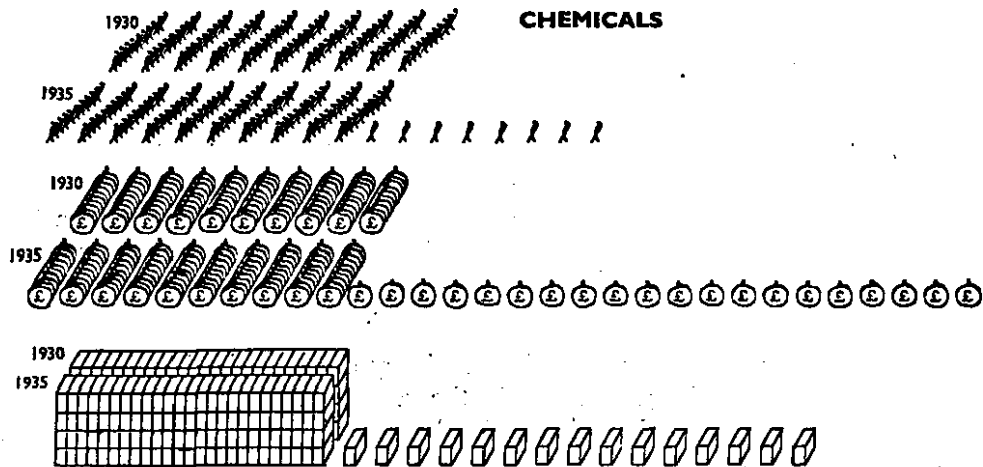
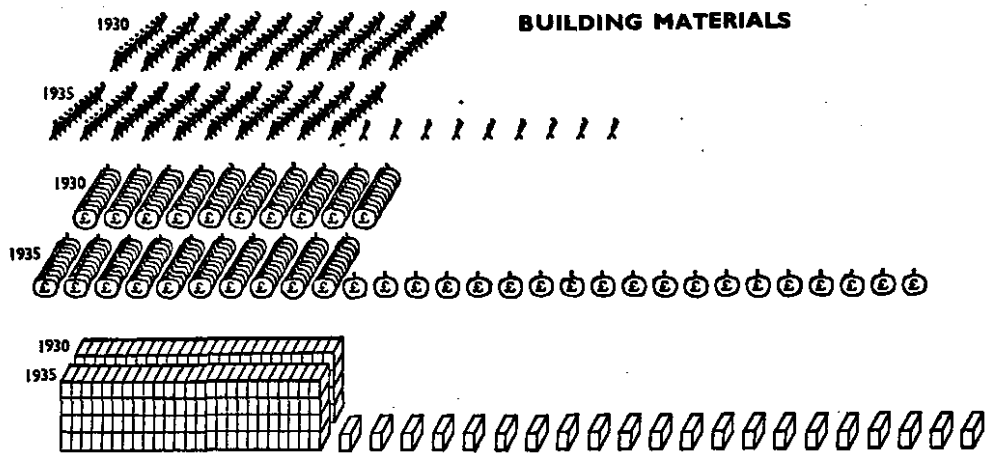
Census of



Note.—See London and Cambridge Economic Service Special Memorandum No. 47. (The production index is the arithmetic mean of *i* and *i'*.)

OF NET OUTPUT AND PHYSICAL VOLUME OF OUTPUT, 1930-35

Production



distant markets. Thus, a well-known radio set manufacturer has recently decided to open a "duplicate" factory in Lancashire, while the Co-operative Wholesale Society provides several examples of duplicated factories placed in or near the various large centres of population.

The principle of dividing production among several plants is affected not only by questions of transport, but also by the best economic size of manufacturing unit. This, of course, is not constant for any given product, but may vary greatly with technical changes in the manufacturing process. Thus it was possible, at one time, to produce steel strip economically at the rate of 10,000 tons per annum, but with modern plant the economic minimum is nearer 250,000 tons per annum.

Such changes obviously have a profound effect on location, since, in order that the user may reap the advantage of technical improvement, the larger plant must produce at its economic capacity, or the saving on production costs will be offset by the incidence of heavy overhead charges. Hence smaller units must, in such instances, eventually be superseded by the single large unit.

The Ebbw Vale plant of Richard Thomas & Co. is potential example of this process, though it has still to prove itself a lower cost producer than some of the smaller plants.

From the economic viewpoint the question in such cases is whether the gain is greater from placing small plants near the principal markets, thus reducing transport costs on finished products, or from concentrating production in a larger and more efficient unit. The trend of technical progress is by no means always in the direction of larger plants, and there are examples where small economic producing units have been evolved in recent years.

The speed at which the productive efficiency of industries is being increased through the medium of large increases in the volume of output per employee has also a general bearing on regional industrial development.

Industries which are able greatly to increase the productivity of existing factories are less likely to experience expansions taking the form of establishment of new plants, which may be located in different areas from previous units, and they may even greatly increase their output without producing much additional direct employment in the place where they are located.

III. FACTORS AFFECTING LOCATION

Recent Location of Industry is partly Fortuitous—Factors Affecting Location are Constantly Changing—What Happens in Practice—Raw Materials—Labour—Quantity of Suitable Labour—Influence of Special Skill—Trade Unionism—Reputation of Local Labour—Site and Services—Water Supply and Waste Disposal—Incompatible Industries—Accessibility of Site—Utility Services—Local Rates—Local Regulations—Bargain Sites—Markets—Finance—The Nuffield Trust—S.A.R.A.—Main Types of New Factory Enterprise—Inventors and Inventions—Finance Institutions—“Nursing” of New Issues—Two Problems Involved—Cost of “Vetting” New Proposals—Linkages—Industrial Evolution—Industrial Offshoots—Chance Location of Initiator—Amenities—Conclusion

In the preceding chapter the present location of industry has been described, and it has been shown that there are relatively large differences in the industrial composition of different parts of Great Britain.

Before it is possible usefully to discuss whether any steps could be taken to modify these differences by guiding industry to certain selected places, it is necessary to analyse the economic and other circumstances which normally affect location.

Some may consider it academic to discuss in detail the large number of factors involved, and it is fairly plain that the average business man is in no way equipped or disposed to weigh so complex a set of unknowns before choosing a site. The line might even be taken that it is mischievous to encourage the ordinary industrialist to think too much about location because he cannot possibly solve all the unknowns. With a half-knowledge of the subject he may well make worse blunders than those who have been guided hitherto by forces whose working they did not realise. Such forces have produced, for example, the Morris works at Oxford, the woollen industry in the West Riding, and the small-town printing works of Frome, Aylesbury, Beccles and Cheltenham.

While recognising these possible criticisms the case for studying causes of location remains unanswerable. Large concerns which have most at stake do, in fact, habitually base their choice of site on the most complex and thorough studies of this problem, and it is inevitable that other concerns should follow their lead and become more aware of location influences. Reduced dependence on particular sources of labour and raw materials make it inevitable that more industries should be free to choose their sites on other grounds, in some cases having little to do with economics, and this in turn means that the drift of industry must become more erratic unless it is carefully watched. The very large share of the real costs of industry which now falls not on the shareholder or entrepreneur, but on the national taxpayer or local ratepayer, makes it inevitable that central and local government shall, however belatedly and reluctantly, take some interest in the repercussions of industry's choice.

The subject therefore presents two apparent dangers. One is that the community may be penalised by industrialists saddling it with unnecessary burdens and wastes without consulting it. The other is that industry may be obstructed in its development or burdened with higher costs, through State control compelling it, or public moral pressure persuading it, to choose a less economic location. In order to steer between these two evils it is necessary to find out more fully what determines economic location, and to make sure that any policy adopted takes account of this knowledge.

Recent Location of Industry is partly Fortuitous

Since the primary object of industries is to make profits, and since the operating costs of an industry can vary substantially according to its location, the correct choice of site should receive the most careful attention. While in certain cases, particularly in more recent times, this attention has certainly been given, such cases are outnumbered by others in which the economic consequences of location have received, at best, only partial consideration. Indeed, the location of works has sometimes been affected by circumstances which were entirely irrelevant to the industry itself, such as the fortuitous location of the initiator, or the social ambitions of his wife. The subsequent success or failure of the individual works should, however, in a state of perfect competition, be determined by economic circumstances which, by eliminating badly located units, would determine the ultimate location of the industry as a whole. There might, of course, be several locations equally good from the economic point of view. In such cases an originally fortuitous location at one of those places would have been largely responsible for the final location of the industry.

The fortuitous nature of such location is, however, offset to a certain extent by the fact that an idea for the initiation of an industry probably results from some circumstance such as the presence of a similar industry, or of a particular raw material, or a demand for a particular kind of product. In other words, the apparently fortuitous idea may actually be due partly to favourable economic conditions.

In some cases industries have grown up or developed from old-established local crafts. This was probably the case, for example, with the pottery industry in North Staffordshire. In other cases industries have grown from offshoots of other industries which may, or may not, have subsequently disappeared. Offshoots of this kind do not always bear a very close relationship to the parent industry, as will be seen from examples quoted later, but they can usually be carried on, in their early stages, at the same factory. Industries which are subject to wide seasonal fluctuations of demand are particularly prone to produce offshoots in an effort to balance their output and labour requirements.

A general survey of causes which appear to have influenced the location of industry in the past gives the impression that their operation was frequently unknown to or little understood by the initiators. Even if this had not been so, the causes were more difficult to control than they are now, and it is by no means certain that a full knowledge of the localising factors would have resulted in different

(location.) Thus the manufacture of cutlery was not located at Sheffield as the result of a survey of the whole country, carried out with the object of finding the best economic location for that industry. It simply grew there* because suitable conditions, such as supplies of raw material, and facilities for the heat treatment of steel, were present alongside the necessary craftsmanship. In this particular case, indeed, it is difficult to say which came first, the craft or the facilities. While the progress of the craft demanded improved facilities, the development of facilities produced corresponding progress in the craft. In addition, the presence of the industry would provide the stimulus for technical progress in metallurgy, the fruits of which would, in turn, be reaped by the industry. The advantages acquired were therefore largely cumulative.

Many of the old industries which were strongly localised grew up in a similar manner, hand in hand with their ancillary interests. The tradition of skill and mental outlook ensured that the necessary personnel to maintain the industry would be forthcoming, and the greater the complexity of the ancillary system, the more difficult it became for another unit of the same industry to be started in a different locality.

Factors Affecting Location are Constantly Changing

While some of the factors which affect location can be attributed to natural causes, and therefore regarded as uncontrollable, science and invention will always attempt to overcome them if they happen to contravene human wishes. Many factors, once regarded as supreme have, in fact, been circumvented in this way; for example, the transmission of power in the form of electricity has overcome the necessity to locate works near other sources of power, such as streams. The point to be emphasised here, however, is not so much the fact that the working of certain natural localising factors can be purposely modified, but that certain localising factors have themselves ceased to operate.

It has often happened, for example, that an industry has started in a particular place for some definite reason and, having become established, has remained there although the original reason for its presence has disappeared. Thus brass-founding began near Birmingham because there was a natural supply of sand which was well suited for making the moulds. The supply of sand became exhausted, but the industry remained there though using artificially prepared sand which could equally well be obtained elsewhere. Again, lock and key manufacture was located in Willenhall and Wolverhampton because the requisite special skill was available alongside supplies of a special grade of iron which, until the middle of last century, was only produced in South Staffordshire. With the progress of metallurgy, and the replacement of a large proportion of the skilled labour by machinery, these reasons have ceased to apply, but lock and key-making is still the principal occupation of the inhabitants of Willenhall. Thus it seems that an industry involving more than a small amount of craftsmanship will tend to take root and to remain localised in the absence of conscious effort to make it otherwise.

* The history is given in more detail on page 86.

On the other hand, the continual trend towards the replacement of specialised craftsmanship by machinery will, of course, tend to diminish the localising influence of particular kinds of skilled labour, for an industry which previously depended on skilled labour might become mechanised to such an extent that it no longer needed any special skill.

In addition there is a growing recognition by entrepreneurs of the several factors which affect the economic location of an industry, and of their relative importance, with the result that the obvious factor is not so often allowed to overshadow others. Nevertheless, this is a trend which must be carefully guided, as a partial knowledge of relevant factors may be more dangerous than simply to follow the existing location of the particular industry. For what may initially appear to the entrepreneur to be the best location for his factory may not actually be in the best long-term interests of the community, the industry as a whole, or even of the entrepreneur himself.

Finally, during recent times, the relative importance of the various localising factors has been changing much more rapidly than in the past, so that causes which quite recently exerted a decisive influence are now often of quite small significance. In particular, proximity to the market has assumed greater relative importance, partly as a result of the growing policy among producers of charging a uniform price delivered rather than a uniform price ex-works. In effect this means that the manufacturer apportions the total annual cost of transport to all customers equally over the year's output of goods. Proximity to market, by minimising the total annual transport cost, enables the manufacturer to reduce his selling price.

What Happens in Practice

In an attempt to ascertain the reasons which most influence factory location, the editor of *Business* sent a questionnaire to executives of 648 representative manufacturers. The replies showed that cheap and easily accessible transport was the factor usually regarded as most important.

An Inquiry by the Board of Trade seems to show that convenience of premises is held to be of greatest importance. "Convenience of premises" is, however, a term which lacks precision, and might, in fact, include ease of access to transport.)

As is well known the Board of Trade Annual Survey of Industrial Development gives the numbers of factories opened, extended, transferred and closed. In the course of obtaining their information in 1985, 1986 and 1987 the Board of Trade also made enquiries as to the reasons which influenced the various industrialists in their choice of location. The following passages are quoted from the 1987 report.

"An attempt has been made to obtain some information as to the motives which influence industrialists in the choice of sites for their factories. This information was obtained orally and is in many respects vague and incomplete, as there was little opportunity for the careful and exhaustive questions necessary to secure reliable statistics. Despite, however, the incomplete and somewhat unreliable nature of the reports, it has been felt, in view of the interest shown in the movement of industries and of the inadequate information available on the subject, that it

would be desirable to include in the survey of classification of the reports, which were obtained in 416 cases in 1937, and 405 cases in 1936. The classification will be found in the following table. Where, as in some cases, more than one reason has been given, the classification has been based on what appears to be the main reason."

The Board obtained reports on 365 cases in 1935, the results of which are also included in the following table:

	No. of Cases		
	1935	1936	1937
(a) Accessibility of raw materials	88	27	26
(b) Proximity of markets	28	24	34
(c) Suitability of labour	37	56	67
(d) Cheap land, low rent or low rates	20	23	34
(e) Proximity to other factories in the same industry	26	38	44
(f) Convenience of premises	208	224	212
(g) Proximity to employer's residence	8	13	2
Total	365	405	416

The survey for 1937 went on to examine in greater detail, by regions*, the 416 cases reported in that year.

"(a) *Accessibility of Raw Materials.* Of the 26 cases, there are 5 each in Greater London and the N.E. Region, and 4 in the N.W. Region. Classified by trade groups, 9 are in the brick, tile, etc., trade and 8 in various food trades.

"(b) *Proximity to Markets.* Of the 34 cases, 13 are in Greater London, 6 in the S. and S.W. Region and 5 in the N.E. Region: the first and last of these regions cover important concentrations of population, while 5 out of the six cases in the S. and S.W. Region related to small establishments working for a purely local market.

It may be noted that 8 of the cases are in the clothing trades, 6 in the engineering trades, and 4 each in the iron and steel trades and the timber and furniture trades.

"(c) *Suitability of Labour.* Of the 67 cases, 25 are in the N.W. Region, 22 in Greater London, and 11 in the Midlands. The principal trade group concerned is clothing, which accounts for 24 of the cases, followed by the textile trades (11) and the furniture trade (6).

"(d) *Cheap Land, Low Rent or Low Rates.* Of the 34 cases, 18 are in the outer London areas and probably represent the attraction of these areas as against the inner London districts where land is dearer and rents higher. Eight cases are in the Midlands, of which 4 are in the Wolverhampton and Walsall district.

*These regions are not the same as those used in the Board of Trade Census of Production, nor do they coincide with other regional divisions used in this report.

“(e) *Proximity to Other Factories in the Same Industry.* Of these 41 cases, 14 are in Greater London and 12 in the Midlands; 7 of those in Greater London are in the clothing trades. This group of trades accounts for the largest number (13) in the country as a whole, followed by 7 in the engineering trades, 6 in the vehicles trades and 5 in the textile trades.

“(f) *Convenience of Premises.* This classification comprised one half of the total for which particulars were obtained, and an attempt has been made to obtain further details of the considerations involved. In 181 of the 212 cases concerned, suitability of existing buildings was stated to be the chief reason; in 15 cases it was reported that the selection of the site was due to the existence of trading estate facilities, 7 to the availability of transport facilities, and 2 to the availability of cheap power. No precise reasons were stated in 7 cases.”

The geographical distribution of the establishments which reported “suitability of existing buildings” as the primary factor in the selection of their site was as follows:

	1936	1937
Greater London	114	97
North-West England	34	41
The Midlands	22	16
Scotland	9	11
North-East England	7	9
The Eastern Counties	2	4
South and South-West England	1	2
Wales and Monmouth	1	1
Total	190	181

The principal trade groups concerned in these establishments were:

	1936	1937
Clothing	31	27
Timber and Furniture	30	18
Engineering	23	29
Paper, Printing and Stationery	17	20
Iron and Steel	15	14
Textiles	13	30
Food, Drink and Tobacco	12	14
Vehicles	11	10
All other Trades	38*	24*
Total	190	181

* Including 18 in 1936 and 15 in 1937 in the “Miscellaneous” group of trades.

The classification (a) to (g) made by the Board of Trade is not, of course, exhaustive, but it includes all the factors which can be easily isolated and discussed separately. There are, however, other factors which are less easily definable, but which nevertheless exert a strong influence on location in certain cases.

It is convenient to discuss the primary factors first, but for present purposes the Board of Trade classification has been slightly modified. Factor (e) of the Board of Trade List is discussed later under the heading of linkage. Linkage, however, not only affects factories in the same industry in so far as they use the same raw materials or ancillary services, but also refers to cases where two *different* industries are located near one another for similar reasons. Factor (g) is considered among the fortuitous factors which have no direct connection with industry itself, but which nevertheless affect location. The following is the grouping which has been adopted:

- (1) Raw materials, Board of Trade group (a)
- (2) Suitable labour, " " (c)
- (3) Site and services, " " (d) and (f)
- (4) Access to market, " " (b)
- (5) Finance

Each of these groups can be further subdivided, and some of these sub-headings of different main groups will tend to coalesce. For example, access to markets involves the question of transport, which is closely connected not only with the supply of raw materials, but also with availability of labour. Again, the item "Site and services" includes such factors as local rates, cost of essential services and capital costs, which also touch finance.

The relative importance of these factors will, of course, be different for different industries, and in any particular case, the appropriate weight will have to be given to each. In the ensuing discussion the various factors are first treated individually and without reference to one another. Certain other factors, which do not fall under any of the above headings are then considered, and finally the relative influence of the various factors in certain typical cases is examined.

Raw Materials

At one end of the scale of raw materials are those used after little preliminary processing, their sources being largely, if not entirely, determined by nature. At the other end are the highly processed raw materials—for example, special steels or leather—the sources of which depend upon the existing locations of the factories where they are made. Any of these materials may be either home produced or imported and in the latter case are, again, affected by nature in so far as the position of the seaports is mainly determined by physical features of the coastline.

The cost of any particular raw material is usually lowest at its source, but if an industry uses several different raw materials the relative importance of each must be considered.

What matters to the individual industry is, of course, the total cost of all its raw materials as delivered at its works. This includes the cost of transport of the various materials from their respective sources to the works, and will be affected by different transport rates for the several materials, and by the relative quantities used. From the viewpoint of materials alone, there will generally be a point or points of minimum transport costs, and various locations could be graded in order of increasing cost of transport of raw materials. Thus, for home-produced minerals, proximity to the mine or quarry would secure the lowest cost for the material in question; while for imported materials, seaports in general would be the points of lowest cost as far as the manufacturer in the U.K. is concerned. If certain materials are usually landed at particular ports, for instance, on account of special facilities for landing, then the choice is further restricted to those ports, unless it is found that the special facilities could economically be installed at another port.

It is not generally realised that there is a considerable degree of specialisation, as between different ports, in the kinds of goods imported. We have examined the values of imports of certain selected materials at all the principal ports of the U.K. during the years 1933-35. It appears that timber is imported, in varying quantities, at almost every port, while grain and flour are also fairly well distributed, although the quantities imported at ports other than Bristol, Hull, Liverpool and London are relatively small. Meat imports appear to be fairly generally distributed, but London is the only port dealing with chilled and frozen meats in any quantity. One reason for this is that very few ports have adequate cold-storage facilities. The meat imports at other ports therefore consist largely of cured and preserved meats. On the other hand, raw cocoa is imported only through Bristol, Hull, Liverpool and London, and it is interesting to compare the locations of the principal chocolate manufacturers, Cadbury (Birmingham), Fry (Bristol), Rowntree (York) and Terry (York). Zinc ore and concentrates are imported only at Bristol, Swansea and the Hartlepoons, though the last named accounted for only 5 per cent of the imports of these materials in 1935 and probably still less in subsequent years, as the works at Seaton Carew have been closed.

In some cases, by virtue of financial linkages with raw material suppliers, certain manufacturers may be able to obtain raw materials below market price. This would obviously favour a location near the linked source, as otherwise the cost of transport might annul or even outweigh the advantage of the cheap supply.

In many instances the same raw material is obtainable from several different sources, and the more widely those sources are scattered the less is the localising influence of that particular raw material. An interesting case is that of certain raw materials which are intrinsically cheap, but which are so bulky, or inconvenient to handle that transport costs are out of proportion to the value of the material, and render its use uneconomic except at the source. Separated milk is a good example of this. It is frequently thrown to waste as it cannot be economically transported even to places only a few miles away. Again, sugar beet cannot economically be transported to any great distance, and the extraction of sugar must therefore be carried out near the beet fields. Another example is scrap iron, which

is normally used in the open hearth process of steel manufacture. When steel prices were low it did not pay to collect the material except from the largest and most concentrated sources. The recent rise in the price of steel has enabled some of the smaller sources to be economically tapped, but even now no payment can generally be made to owners of small quantities of scrap. The whole sum paid by the manufacturer for the collected scrap goes into the cost of collection and transport.

Although the cost (including transport to works) is usually the most important factor concerning raw materials, there are certain other factors which must be taken into account in some cases. A location which was disadvantageous in respect of these factors might be regarded as increasing the total cost of raw material, but it is not always easy to assess such advantages or disadvantages in terms of money, so that their importance must be gauged by responsible individuals in the enterprise concerned.

Of these factors the most important is probably the reliability and continuity of the source or sources of supply. If a factory is to be located by reason of proximity to a source of raw material supply, it is obvious that the supply must not be liable to fail, or to vary widely in its quality. Security of the means of transport also enters into the question if the works are not located at the source. Any doubt concerning the reliability of transport from a particular source would count as a point against that source. In certain cases, facilities for inspecting samples must also be considered. Again, due thought must be given to the possibility of the source of raw material becoming controlled by a shortsighted monopoly, which might try to exploit its consumer by increasing prices after the factory had been located.

Labour

This is, perhaps, the most complicated of all the principal localising factors. In fact, its influence is largely unpredictable, for not only is local labour likely to be materially affected by the advent of industry, but its character may gradually change owing to external and often uncontrollable causes.

The influence of labour on location may be considered in terms of quantity and quality. The former covers such matters as the amount of competition for labour in the local labour market, and the relative demand for the three main classes of labour (male, female and juvenile); while the latter covers special skill, training and adaptability.

Generally speaking, the presence of male labour will imply the presence of a proportionate amount of potential, if not actual, female labour, but the proportion of course, will not be anything approaching equality, for industrial employment of females is confined largely to the age groups between 14 and 30.

Quantity of Suitable Labour

The Ministry of Labour figures for the total numbers of insured persons (aged 14-64) in all industries and services (except agriculture) at July 1938 were approximately 10 million males and 4 million females. Industries in a given area should,

therefore, provide employment in appropriate proportions for both sexes, and there should, of course, be a similar balance as between adult and juvenile labour, as it is obvious that the two classes cannot be separated to any great extent. It follows that an existing lack of balance should encourage the introduction of new industries of a kind which would redress the balance. Very often, however, the reverse happens. The success of a certain type of industry attracts others of a similar kind, and aggravates the lack of balance.

The last column of Table 1 shows how some industries provide employment predominantly for males, while others employ a large proportion of females. The figures show for each industry the proportion of males to the total number of persons occupied in the industry.

It is not easy to obtain information as to whether particular kinds of labour are available in a district. The Ministry of Labour, of course, publishes figures as to the number of *insured* persons registered as unemployed, but the actual state of affairs may be masked by the fact that in some areas large numbers of *potential* workpeople are not insured. In Tyneside and South Wales, for example, the number of women registered is relatively small, so that female unemployment expressed as a percentage of the total insured in those districts may be misleading. The point is more fully considered in Chapter V (pages 130-136).

Owing to this inadequacy of data it is difficult for the entrepreneur to discover new locations which would provide the type of labour required, and the tendency is for him to go where someone else has already made a beginning. Good potential labour may thus be entirely missed, while on the other hand, the flocking of employers to a few places where suitable labour happens to have been found, soon creates a shortage there, as has happened, for instance, in the Great West Road area of London.

Some information could be obtained from a laborious study of the Census, but as this is only taken decennially, the information very soon becomes out of date. And in any case, it would give no guide to any peculiar local conditions or preferences, such as the recent prejudice in the Rhondda, for example, against employment of females in factories. There are several cases where works have been located as a result of an existing surplus of certain kinds of labour. For instance, new works of Prices Tailors Ltd., at Middlesbrough were attracted by plentiful female labour.

Influence of Special Skill

The need of particular skill is gradually losing its relative importance as a localising factor, for although skill is still required in industry, it is of a different kind from that of, say, fifty years ago.

A good example of an industry located almost entirely by skilled labour—it might almost be said in spite of certain other disadvantages—is the pottery industry.

To quote the Board of Trade evidence before the Royal Commission on the Geographical Distribution of the Industrial Population:

“The manufacture of china and earthenware is highly localised in ‘the Potteries’ district of Staffordshire. According to Stamp and Beaver,* there are certain difficulties in explaining why the industry should have become concentrated there. There appear to have been no records of pottery works there before the seventeenth century. ‘In the Middle Ages the making of rough earthenware pots was a typical domestic industry widespread over the countryside; in fact, carried out wherever there was clay together with wood for firing. In the seventeenth century coal replaced wood for firing, but on practically all the coalfields there are belts of clay suitable for rough pottery manufacture. It would seem that the industry was favoured in the North Staffordshire Coalfields because of its isolation, and the comparative poverty of the region agriculturally. The agricultural land was in the main occupied by small-holders, and the industry grew up as a sideline to agriculture. Pots were made in a shed at the side of the dwelling-house or the cowshed. The men dug their own clay, often in their own garden, and at least some of the families dug the coal with which to fire the ovens. Lead for powder glazing was obtainable from Lawton Park, six miles north in the carboniferous limestone. And thus there grew up amongst the agricultural population a large number of skilled master potters.’ It is noteworthy that the Potteries have maintained their dominant position in the industry notwithstanding that it is an inland district and much of the raw material has to be brought from a distance, e.g. china clay from Cornwall. The explanation is probably to be sought in the type of men, the Wedgwoods and others who, through generations, served the industry. Technical progress was rapid and the industry was always ready to experiment; but the underlying motive was that the potters’ trade was ‘a skilled trade with a tradition to follow’ and new inventions were made ‘supplementary to skill and not subversive to it.’ ‘The Staffordshire potteries by native skill improved their own earthenwares until they put other centres out of business.’”†

Technical progress often takes the form of eliminating the human element by mechanisation, with the result that many processes which were formerly carried out by the craftsman are now done by machinery. For example, in a heat treatment shop in a works making, say, steel springs, the furnacemen formerly judged temperature by eye and the length of time required for annealing by experience. In a modern shop automatic temperature control, or at any rate recording pyrometers are probably installed, which largely eliminate the necessity for this experience, although the need for a fair amount of intelligence and education in making use of the instruments remains and in many examples may be increased.

On the other hand the mechanisation of processes has increased the demand for semi-skilled machine operators—that is to say, men whose skill takes the form of adaptability and intelligent knowledge of machine jobs as compared with the older

* ‘The British Isles: A Geographic and Economic Survey,’ page 581.

† ‘Great Britain from Adam Smith to the Present Day,’ by G. R. Fay, pages 807-810.

types of craft skill) Intelligence of the type required is the result rather of secondary and technical education, ability to read blue-prints, use precision instruments, with perhaps a knowledge of elementary trigonometry and logarithms, and variety of works experience rather than the product of long apprenticeship to a craft. Where mechanical processes are becoming increasingly specialised and the types of skill required increasingly differentiated, therefore, employers may be forced into the necessity for giving some training in particular processes to any recruit whether previously skilled or not, for which reason the employer will look primarily for the qualities of "quickness in the uptake" and general intelligence. There are, of course, wide differences in the "trainability" of labour in different districts; for example, a Londoner would probably learn certain industrial processes more quickly than an East Anglian. But practical experience is showing that the rigidity of labour skill is much less in practice than is sometimes supposed. Employers on the Team Valley Estate at Gateshead, for instance, have been surprised by the adaptability of local labour to processes new to Tyneside.

The process of replacement of skilled craft labour by machinery has not diminished the demand for skilled labour so much as changed the nature of demand. Mechanisation gives rise to a demand for super-skilled men both for the maintenance of expensive and intricate plant, and for such occupations as tool-making, the importance of which is very greatly increased by mechanisation. Operatives skilled in particular trades are therefore still required, and their availability may have some influence on the location of industries in which they find employment. Their localising influence may be neutralised to some extent, however, by the fact that super-skilled men are among the most mobile of all classes of labour. Similarly young skilled operatives who have quite recently finished their training are often ready—and even eager—to move to a new location. On the other hand, several well-known works provide courses of training for particular kinds of skilled labour—for example, Glenfield and Kennedy in engineering—and there might be some tendency for industries employing such labour to be attracted to the place where the training is carried on. It is not generally possible for an industry to start training its own labour until it has become well established, although there are exceptions. For example, a well-known shirt factory started with untrained country girls.

It should be observed that there is a certain amount of bias, in training, towards the methods and processes of the older industries. This bias is not confined to the training provided by industries themselves, but is also noticeable, for example, in public technical institutes where the prominence sometimes given to such a subject as mining is scarcely justified by the proportion which that industry now bears to the total industry of the nation. This may be due to the time lag so frequently found between industrial processes and technical training. Education should be ahead of industry's requirements, but, in practice, is usually behind.

Trade Unionism

Industries have sometimes been attracted to certain localities by the prospect of obtaining cheap labour—an attraction which industrialists seem to associate

with the existence of heavy unemployment, the prevalence of low-wage industries or the absence of strong trade unionism.

Trade unionism is a characteristic of industries rather than of places, and the employer who chooses a particular locality to escape trade unionism will generally find that the union follows him, with eventual standardisation of wage rates. The arrival of a new industry will not stimulate the local growth of trade unionism unless there is already a trade union in the industry concerned, but if the location has been chosen to escape trade unionism, the existence of a union is implied. The trade unions are, however, undoubtedly at a disadvantage in many new industrial areas owing to the difficulty of having to organise on the basis of either home or workplace, which may be many miles apart, and also owing to mixed and sometimes non-co-operative elements in the employed population, and other factors such as the rival attractions of the cinema or gardening as alternative leisure pursuits. Even in the absence of trade unionism the arrival of new industries increases local competition for the existing labour, which automatically tends to increase the average level of wages.

Antagonism between trade unions and employers, however, seems to be declining, and in some cases employers are encouraging their employees to join the appropriate unions; for example, in the pottery industry. The fact that strikes are by no means always due to the existence of unions is borne out by the large number of unofficial strikes which have taken place recently without union support, and often against union instructions.

A further localising aspect of labour is furnished by differential wage agreements, under which wages for a particular kind of labour are lower in some regions than others. For example, the printing of books has become concentrated in provincial towns below a certain size, such as Frome, Beccles, Aylesbury and Rochester, through the adoption by the printing industry of a zoning system for wage rates.

Again, wage differences such as those between London and other places, which are intended merely to compensate for differences in the cost of living, affect the location of industry, but their tendency seems to be to concentrate industry on the fringe just outside the boundary of the higher wages area. There are several instances of works which have moved from Central London to outlying towns such as Watford in order to reduce their wage bills.

Reputation of Local Labour

In some cases, industries have been deterred from locating themselves in certain districts, notably the Special Areas, because the local labour has gained a bad reputation for fomenting trouble. On the basis of stoppages, as compared with other areas, there seems to be little justification for this reputation in the case of the Special Areas, but it has certainly played a part in discouraging industries from establishing themselves there.

An important localising influence is exerted by labour when in any area there is a pronounced mental attitude towards particular kinds of work. For example,

the inhabitants of districts which are or have been principally concerned with heavy industries have a more or less contemptuous outlook on the light industries while, conversely, workers in the latter would look down upon work at a blast furnace. This, of course, is closely connected with the worker's pride in his own work, which is well known to be an important factor in efficient performance. It is evident that a new industry starting in an area where the people are psychologically opposed to it will suffer a serious handicap, for if its employees have a sense of inferiority, the resulting resentment will prevent them from doing their best work. On the other hand, if the workpeople feel that their former industry has "let them down" their resentment will be directed against that industry, and they will be more ready to accept a new one, particularly if it has gained a reputation for success elsewhere.

There is also a continual tendency among workers to go into jobs which they consider to be of a higher status, even at lower rates of pay than they might otherwise receive. Thus office work of any kind is usually preferred to factory work, and this is having a marked effect in London—particularly in the Great West Road area. The resulting tendency is to push new light industries farther out to places where there is less office competition. This question of status is of great importance, though its dependence on changeable human preferences makes it very difficult for the industrialist to take it into account. Differences in security of employment are probably decisive in many cases.

Site and Services

There are several factors which can conveniently be grouped together as concerning the site, and each should be given its due weight according to individual circumstances.

In the first place, there are the physical features of the site, such as the solidity of the ground for foundations, and the possible necessity of extensive levelling and clearing.

Other features, such as a tendency to become waterlogged, or liability to subsidence or snowdrifts, should also come into consideration, while the general climate may affect the workers or the processes. Climate is not so important now as formerly, for any desired atmospheric conditions can usually be produced artificially, though this may not always be economical.

Water Supply and Waste Disposal

The water supply has often to be considered not only from the point of view of quality but also of quantity. While some industries such as paper and rayon manufacture require large quantities of water, others require water with peculiar properties; for example, brewing, and the manufacture of aerated waters. The latter cannot use water with a high content of organic nitrogen. The soft water of the Pennines was particularly suited for use in the cotton, woollen and dyeing industries. Again, industries which use any appreciable quantity of steam prefer

water which will give a minimum of scale and corrosion in their boilers. Soft water is not necessarily the most desirable as it is frequently very corrosive, although not scale-forming. The efficacy of modern methods of water treatment removes many of the restrictions on choice of site, as it is usually possible to render most water supplies suitable for use in boilers. The treatment, however, costs money, and it is evident that, if other things are equal, a naturally suitable supply of water is to be preferred. Such supplies, however, are somewhat rare. For some industries an abundant supply of cooling or process water is necessary, so that in such cases proximity to a river or canal, or the possibility of sinking a well must be considered. If the supply has to be obtained from a well, arrangements will have to be made for discharging the "used" water (as distinct from normal drainage) and this leads to the general subject of the disposal of industrial waste and effluents.

The disastrous results of uncontrolled tipping of waste from collieries, blast-furnaces and chemical works are only too familiar in certain parts of the country; while the discharge of effluents into rivers, canals, and estuaries has, in many cases, had to be prohibited. Instances have, in fact, occurred where such prohibition has led to the effluent being put to a useful purpose. For example, the "slop" or spent liquor which remains after the distillation of alcohol from fermented wort (of molasses) is now sometimes used as fuel, in which case the calcined residue, which contains potash and other useful chemicals, is sold for purification and the heat of combustion is used in the distillery for the production of process steam. The spent liquor can also be used for making glycerine, or as cattle food or fertilizer. The ability to dispose of effluents and other waste will therefore have some bearing on the choice of site, as it is understood to have had, for example, in the case of a xylonite works, which was located at Manningtree, Essex, where it could discharge effluents into the tidal water and also bring supplies of raw material in glass-lined tanks by barge.

At present there is considerable lack of uniformity between different districts in the matter of services such as drainage and water supply. In general, local authorities are bound to accept into their sewers waste fluids and effluents from industrial premises, but they need not do so if they can show that the effluent is likely to damage their works, or if it exceeds in quantity the capacity of the existing system. The latter provision enables local authorities, in effect, completely to balk the industrialist, as they can say that the existing sewers are incapable of dealing with the proposed effluent, and that they are not able to enlarge them. The Public Health (Drainage of Trade Premises) Act, 1937, which came into operation in July 1938, is designed to secure some measure of uniformity in this matter, but enables local authorities to pass on the costs of enlargement to the industrialist.

As regards water supply, very few authorities are compelled to supply water to trade premises, though most of them are willing to do so, on varying terms. Sometimes, however, mains water may not be adequate in quantity for all industrial purposes, such as condensers, for example, and other sources of supply frequently have to be found.

Incompatible Industries

If it is proposed to establish a new industry in an area where other industries are already established, the effects of the old and new industries upon each other will have to be considered. As an extreme example, it would not generally be possible to locate any new factory near cement works, as these nearly always cause a deposit of fine dust all over their immediate surroundings. Again, a food factory would have to be located where the atmosphere was clean; a biscuit factory once had to move because of carbon dust in the atmosphere.

Conversely, the new industry may itself be objectionable to other industries or to residents. There are, of course, regulations concerning the location of certain "offensive" trades, such as fellmongery, catgut manufacture, blood drying, and kindred industries, but there are other forms of nuisance, both public and private, which are not covered by such regulations. The choice of site must be made with a view to possible trouble from this source, as an aggrieved party might obtain an injunction, for example, to restrain the factory from making a noise, emitting smoke, or even sounding a siren in the early morning.

Dangerous trades such as petroleum refining, or the manufacture of oil products, explosives and fireworks, have their range of choice of site limited by the risk of causing damage to neighbouring property. Such a trade might, for example, have pressure put on it to pay part of the fire insurance cost of a neighbouring works, or other buildings, which would, in effect, increase its own operating costs.

Accessibility of Site

Another well-known group of factors concerns the accessibility of the site both for rail and road transport. Proximity to railway centres or main lines, and good roads will obviously reduce the capital expenditure on sidings and private access roads, while good passenger services by road or rail will simplify the problem of obtaining labour.

On the other hand, proximity to roads or railways might, in some cases, be a disadvantage; for example, a manufacturer of scientific instruments would want a site which was free from such vibrations as would normally occur in the neighbourhood of a main road or railway. Smoke, fumes and dust also have a bearing on the subject, and any industry which required a clean atmosphere might again have to be located away from the roads and railways.

Utility Services

Services, such as gas and electricity supplies, telephones and postal facilities, will exert some influence on location, in so far as they may be cheaper, or more efficient in one location than in another. The local cost of electricity and gas can also be regarded as one of the site features, and may in certain cases have an important bearing on location. While the development of the Grid, the policies of supply authorities, and other factors are tending to level out electricity tariffs, some very wide differences still remain.

As regards gas charges, the range of variation has not been so great, at any rate in industrial districts. Where coke-oven gas has been available users have sometimes been able to gain a substantial advantage by arranging a private supply, and where towns are able to offer low scales of charges to industrial consumers through the purchase of coke-oven gas in bulk, this has undoubtedly had, in several cases, an important positive influence on location. Some gas undertakings have been unwilling to purchase coke-oven gas, particularly where there is a fear that it would result in the dismissal of municipal employees, but there is now an increasing willingness among gas undertakings to supplement their own output by taking over local supplies of coke-oven gas. In Derby, Middlesbrough, Newcastle, Rotherham and Sheffield, for example, considerable quantities of coke-oven gas are purchased by the local gas undertakings.

Local Rates

Local rates also rank as a payment for public services, and should receive due consideration, but calculations should be based on the actual amount of rate payable and not on the poundage rate, as seemingly low poundage rates are often offset by high assessments. It is, however, frequently forgotten in industry that derating, introduced by the Local Government Acts, 1929, has made the incidence of rates of much less importance than was formerly the case. For example, the total annual rate bill of all Birmingham industrialists is now not greatly in excess of £240,000. Local rates still apply fully to housing, however, and therefore affect industry indirectly through wages, and through social and environmental conditions.

Local Regulations

Many powers of regulation touching industry are administered by local authorities, and there seems to be some latitude in the strictness with which they enforce regulations. While in some cases special strictness or laxity might be without particular motive, it is obvious that they affect an industrialist's choice of location, and might, in some cases, be purposely practised by local authorities with this in view. Thus an authority which was keen to increase the rateable value of its area might not permit a cheaply-built factory to be erected for the experimental stages of a new industry. On the other hand, a local authority which was keen to attract new industry could go out of its way to make things easy for the entrepreneur.

Bargain Sites

"Bargain sites" are sometimes important in determining the location of industry. For various reasons, such as bankruptcies, sites with or without buildings, become cheaply available, and industries have sometimes been tempted by these. The effects, however, have not always been entirely beneficial to the industry concerned, as the location may not have been really suitable for it, and the buildings may soon require expensive adaptation.

Markets

While markets have always exerted some influence on the location of industry, their importance relatively to other factors has increased greatly during recent times.

This is partly due to a change in the character of industry as a whole, and partly to a variety of other requirements on the part of the purchaser, such as the present tendency to demand very rapid and regular delivery of goods.

There has, moreover, been a great change in the outlook of industry, brought about largely by competition. For whereas manufacturers at one time adopted a "take it or leave it" attitude and let the purchasers go to them for their requirements, the dominant position is now held by the consumer and the manufacturer, through his sales organisation, spends much time and money in persuading the consumer to buy.

The consumer has, of course, realised the significance of this trend. Members of the public have grown to expect guarantees and free service for several months after purchase, and if a manufacturer is to provide these refinements with sufficient promptitude to satisfy the consumer, and at the same time economically, he must either place his works near the principal market, or establish a service depot there.

The costs of these after-sale services and, indeed, of the whole sales organisation (including money spent on advertising) now constitute a much larger proportion of the manufacturer's total expenses than was formerly the case, with the result that the importance of the market as a locating factor has been correspondingly increased.

The consumer may, of course, be another industry—for instance, the plastic moulding industry is the consumer of moulding compounds—and in this case, quick deliveries (preferably from stock) are required; while in many cases a certain amount of technical co-operation is necessary between user and producer; for example, between moulder and tool-maker.

This trend has been accentuated by a change in the general character of industry. If the present total output of industry is compared with that of forty years ago it will be found that a much greater proportion now consists of small consumers' goods, and a smaller proportion is accounted for by the heavy industries. These served to a large extent overseas markets, but even if exports are left out of consideration the home market for their products was not itself sufficiently localised to affect their locations. They were therefore sited according to raw material supplies and other relevant factors, such as ports from which their goods could be exported.

The trade in small consumer's goods, however, frequently requires the rapid delivery of relatively small consignments, which is most economically carried out by motor van direct from manufacturer to retailer. While the market for some products is localised to a certain extent—for example, the trade in high-class clothing is largely concentrated in London—the majority of the products of industry are sold all over the country. A factory cannot, therefore, be placed near all its markets, and could either find the point of minimum transport costs for its particular group of markets, or could go to the place where the most important market was situated. In the first case, it might not in practice be conveniently near to any one of its markets, and would thus lose such advantages as ready access for service. In the

second case, it would have these advantages, at any rate in connection with its main market, at the risk of perhaps slightly increased transport costs.

Alternatively, the manufacturer might open a duplicate factory, so as to be located near each of two principal markets. This scheme is now being tried in the radio industry, for example, and by the Co-operative Wholesale Society. The more attention is paid to costs delivered to the consumer rather than costs ex-works, the more this tendency is likely to be reinforced. The whole matter is, of course, bound up with the question of the best economic size of a factory. From the technical point of view larger units are usually more efficient than smaller, but there is an economic maximum size—which will be different for different processes—beyond which further centralisation gives no gain of efficiency. On the other hand, the risks of dislocation, mistakes and inefficiency are normally greater in one very large plant than in two or three smaller ones, run with a considerable amount of autonomy.

In all such cases, the important consideration is to reduce to a minimum the combined cost of production and marketing. If a manufacturer does not possess a complete transport organisation of his own, it is evident that existing public transport facilities must play a large part in deciding the location in respect of markets. Quick, direct services from the factory to all the principal markets are obviously an advantage, and it is quite likely that the possession of a direct railway route to almost everywhere in the country is one of the reasons for the industrial development of London.

Finance

The mechanism for the finance of new industries has a powerful effect on industrial location. In the first place, as has now been recognised in dealing with the reconstruction of the Special Areas, it is necessary to stimulate new industries in regions faced with the decline of the older staple industries. In the second place, the finance of new industries in the past has generally been carried out by wealthy individuals, sometimes through some existing business interest or family connection, sometimes mainly as a speculation. Areas which have relatively few such men are likely to get relatively few new enterprises. In the third place considerable direct influence on location can be exercised through financial backing or control. More than one case is known in which a rich man with his home in London has chosen say Slough or Welwyn as the site for a new enterprise backed by him, partly on account of personal convenience. It should, however, be added that in certain cases, though only since the distress of the Special Areas became a common concern, finance has been made available, by one or two financial institutions acting with a normal profit incentive tempered by a certain public spirit, to new enterprises on condition that they are located in areas in which they are most needed.

In the main, however, the trend has been strongly in the other direction and until recently it was almost impossible for a new enterprise to obtain finance if it

was to be started in one of the Special Areas. It is hardly surprising that both the individual and the small finance company were reluctant to risk their funds on the establishment of an industry amid depressed conditions, but a vicious circle had been created by this state of affairs. A region is depressed because it needs industries to employ its workpeople. Because it is depressed it is a poor market for consumer goods, and therefore probably a bad location for a light industry, finance for which it is consequently difficult to obtain.

The Nuffield Trust

It would probably be difficult to over-emphasise the help given in breaking this vicious circle by the Nuffield Trust, formed to administer the gift of £2 million provided by Lord Nuffield in December 1936 to assist in attracting new industries to the Special Areas. Largely through the broad conception of its terms of reference and the energy of its trustees, it has been able to act quickly. Psychologically it has been of great assistance in acquainting the City of London with the whereabouts of places such as Cyfarthfa, Bishop Auckland and Cockermouth and their needs; and practically it has already shown that there are sound schemes awaiting finance, that these can be guided to the Special Areas and, most amazing of all, that they can make profits there. The fact that this fund is understood to be nearing exhaustion is perhaps one of the most serious threats facing the continuance of the reconstruction of the Special Areas.

It was, perhaps, largely on this account that the Treasury Fund of £2 million was set aside by Parliament under the Special Areas (Amendment) Act, 1937. Loans are granted from this fund to industrialists proposing to set up in the Special Areas. The fund is separately administered by the Special Areas Loans Advisory Committee which, however, has not gained quite the same reputation as the Nuffield Trustees. The Treasury Fund also grants loans under certain conditions to industrialists establishing works in "certified" areas outside the Special Areas. At present the certified areas machinery is relatively unimportant compared with the Special Areas machinery.

S.A.R.A.

It would, of course, be quite unfair to mention the Nuffield Trust in these terms without also mentioning the admirable work done by the Special Areas Reconstruction Association Ltd. formed in June 1936 in accordance with the Special Areas Reconstruction (Agreement) Act of 1936 to finance small businesses in the Special Areas. The capital of the Association was privately subscribed by concerns in the City and by certain industrial undertakings. The nominal capital is £1 million and the life is limited to 10 years, though after that period an extension can be obtained by agreement. Advances are as a general rule limited to a maximum of £10,000.

Main Types of New Factory Enterprise

Broadly speaking, there are in practice three main types of new enterprise involving factory construction:

- (1) The construction of a new works to make an established product, either on traditional lines or with some improvement, for instance, in method of manufacture or design; or, perhaps, in a locality where it enjoys some "freight protection" from existing competitors or some special advantage in raw material supplies, or other ways;
- (2) The construction of a new works to make a product not already made in Great Britain. There have been many examples of this in recent years, some stimulated or assisted by tariffs, such as home-made wine or certain pharmaceutical products (coming under the key industries duties), or basic-Bessemer steel; and several resulting from the immigration of refugees with specialised industrial experience; and
- (3) The construction of a new works to make some entirely new product, or operate some entirely new process resulting from an invention or technical development.

As far as the first is concerned, the post-war period was largely a period of industrial concentration during which the recognition of the technical benefits of large-scale production tended to distract attention from the wider economic factors, such as access to markets, which in many cases favour the duplication of works in different locations. Finance for such developments is often provided by local interests in the area where it is proposed to establish the works, while in other instances an established concern may decide to extend its interests by erection of further works in other parts of the country. In such cases finance does not always present serious problems. It is generally possible to estimate with accuracy on the basis of past experience what the capital and operating costs will be, while a market survey or knowledge of existing customers in the area will generally show how far the proposed works will be able to dispose of its product.

Although independent local banking has largely disappeared in England and Wales, except, perhaps, in Lancashire, the part played by provincial stock exchanges in this financing process should not be under-estimated. It is not always realised that there are a large number of smaller industrial companies situated in different parts of the country, the shares of which are only quoted on provincial exchanges, such as, say, Sheffield, and which often enjoy a high local reputation even if combined with somewhat limited marketability.

If companies of this sort wish to raise money they can generally do so through provincial brokers who, moreover, are always on the look-out for new enterprises, the shares of which can be introduced on the local exchange and which they are sometimes prepared to "nurse." Often, moreover, there are, even in the smaller industrial towns, accountants or solicitors with funds for investment at their disposal, and these frequently favour local companies, partly out of local patriotism and partly because they can easily keep in close touch with them.

Nevertheless, even in these cases, difficulty in obtaining finance does undoubtedly hold up a number of sound propositions. The reason is mainly the same one which has enormously increased the difficulty of financing all new development in recent years—the increasing rarity (largely owing to death duties, super-tax and other increased burdens on big incomes and capital in the social interest of redistribution of wealth) of private individuals with surplus funds which they are willing and able to risk on new industrial enterprises. A subsidiary reason is that with the increased necessity for specialisation in industry and with the larger average size of businesses which have followed advances in technique and industrial organisation, it is increasingly uncommon for a successful small industrialist to branch out into some quite new field. A successful printer of the last generation would acquire an engineering business and manufacture, say, Diesel engines, in which he believed there to be a big future. Without necessarily deploring the decline in this type of expansion, which had its disadvantages, it would be true to say that it has increased the difficulty of financing new enterprises.

In the case of the second example—manufacture in Great Britain of a product not already made here—again the provision of finance does not always present overwhelming difficulties. In some cases a British company may make a licence agreement with a company abroad for the manufacture of a product of the latter behind the British tariff wall. The British company may be able to provide finance from its internal resources, or, if it has a good record, it will not have great difficulty in raising funds temporarily from one of the joint-stock banks, and in due course, by a public issue. Buying processes abroad has recently been criticised as being likely to kill research in this country. While it is obviously better that new developments in processes and products should be made at home rather than imported, this would be better achieved by stimulating British research and invention rather than by hindering their importation.

In other cases a refugee may be able to bring a certain amount of capital with him which will facilitate the raising of the extra capital required. In the case of Jewish refugees from Germany there are a few unofficial arrangements for fostering developments of this kind.

Here again, however, better organised facilities for raising money would save an enormous waste of time and effort, and would speed up the growth of new industries. One case is known where a refugee brought to England a process which had been well established and profitable in Germany. He was able to provide about half the capital required himself and it took him over two years of patient and continuous work to find the other half. The new works was in operation four months later, is already doing well, and employs about 250 people.

In another case a Swede who, although not a refugee, has made England his home, has been trying for nearly four years to bring about the manufacture in this country of a building material well established in Sweden. After endless negotiation of all kinds he has at length persuaded one of the largest British combines to take up this product. He was, however, quite unable to raise new finance for the purpose.

But if there are difficulties in raising money in the first two general cases, they do not compare with the difficulties in the third case, when the product or process is entirely new. This is not altogether the fault of financial institutions. Inventors as a class are not easy people to deal with, and there is less community of outlook between them and the City than between an artist and a bookmaker. Inventors are generally imbued with a deep distrust of "finance," and there are many cases where they have received nothing for their ideas and died in garrets. The City, on the other hand, has learnt that inventors are not generally inclined to place too modest an estimate on the value of their work and, more important, they generally grossly underestimate the time (and consequently the capital) which will be required, and the difficulties which will have to be overcome before their invention can be translated into a profit-making enterprise.

Inventors and Inventions

Inventors are very often not scientists, or at the best have only a pseudo-scientific training. They are more closely related to artists, and there is an urge to invent just as there is an urge to create in the realm of art.

Unfortunately, very few inventions are in a commercially applicable form when they leave the inventor, or even his small exploiting syndicate. The resources required in research and development are often beyond such a syndicate, and there should be an enormous scope for the research departments of large concerns who, however, are usually too inclined to look for fully-perfected inventions instead of those of promise which can be developed. The first link between invention and development-research is a weak one. When the chain of events reaches finance there are several links missing.

From the general point of view the costs of developing or even trying out any new invention are enormously increased owing to the slowness of the process of "finding finance." A genuine inventor should be occupied with inventing and not with hawking his invention round in the hope of finding money for it. And while the "patent broker," or promoter, to some extent fulfils a genuine function in this field, his commission is a heavy charge on the capital of the company if and when formed—not always because he makes big profits, but because his efforts are made unnecessarily difficult owing to the lack of established channels for such business. The slowness of the process is further illustrated by the fact that, as a broad generalisation, the new capital flotations of one favourable period have frequently been looking for a home in the previous one. Pobjoy Airmotors, the Follsain process, Monospar Aircraft and Pollopas were all looking for finance in 1928-29.

Finance Institutions

A good deal of interest has been aroused recently by the events which have arisen out of paragraphs 397-404 of the Macmillan Report of 1931, relating to the finance of small industries and companies who require sums which it is uneconomic to raise by public issue. After much argument and discussion among the Big Five banks in the spring of 1933, Credit for Industry, Ltd., was brought into the world in March 1934, by United Dominions Trust, specialists in hire-purchase finance, with, it

was understood, the backing of the Bank of England. Other companies of somewhat similar scope have followed since. In June 1934, the Charterhouse Industrial Development Co. was registered by the Charterhouse Investment Trust with £500,000 paid-up capital, and in July 1935 Messrs. J. Henry Schroeder announced the formation of Leadenhall Securities Corporation with a capital of £250,000.

Apart from these there are a few fairly old-established industrial finance houses in the City, the chief of which is, perhaps, the Industrial Finance and Investment Corporation which is associated with the merchant banking firm of S. Japhet & Co. Other comparatively recent companies largely concerned with industrial finance are the New Trading Co. and the First British-American Corporation, while O. T. Falk have at various times undertaken work of this kind. Certain of the large merchant banks also engage in industrial finance work to a limited extent, and their activities in this direction have tended to increase with the decline in the volume of bills for discounting. Very often this is done through apparently independent companies operating from a different address which, however, may in fact be simply a back-door entrance to the merchant bank. Most of these banks have always had a substantial business in new issues, and for this and other reasons it is of the utmost importance to them to reserve their name for association only with the class of financing normally looked on as the most highly respectable.

The five chief merchant banks are Hambros Bank, Baring Bros. & Co., J. Henry Schroeder, N. M. Rothschild and Sons, and Lazard Bros. Apart from these there are considerable numbers of well-known merchant banks which are also of importance, among which are: Robert Benson, B. W. Blydenstein, Brown Shipley, Dawnay Day & Co., Erlangers, Robert Fleming, Grindlay & Co., Guinness Mahon & Co., Helbert Wagg & Co., Higginson & Co., C. Hoare & Co., S. Japhet & Co., Kleinwort & Sons, Samuel Montagu & Co., Morgan Grenfell & Co., M. Samuel & Co., and Brown Harriman.

Financial trusts play a big part in the finance of new enterprises. Among these may be mentioned companies such as the British Shareholders Trust, Industrial Selection Trust, Anglo-Scottish Amalgamated Trust, British Pacific Trust, British Empire Trust, Gresham Trust, Nelson Financial Trust, Phoenix Investment, Second Broadmount Trust, Sherwood Trust, Venture Trust, Carlton Trust, Lothbury Investment, Ocean Trust, London and Yorkshire Trust, Power Securities Corp., and Standard Industrial Trust.

An interesting definition of the difference in function between an investment trust company and a financial trust was given by the Chairman of the Venture Trust, Ltd., early in 1936. The primary function of an investment trust is to acquire and hold various investments for the sake of the interest and dividends to be derived from them, the acquisition of profit from realisations of investments being a purely incidental matter. The finance company, on the other hand, exists primarily for the purpose of dealing in investments of various kinds, the main object being to acquire these investments and sell them again at a profit. With a finance company the interest or dividends to be obtained from the investments are a secondary consideration.

This fundamental difference between the business of an investment trust and that of a finance company naturally involves a considerable difference in what must be the basic policy of management. In the case of an investment trust, since income from interest and dividends is the primary consideration, there is no real objection to the acquisition of comparatively large blocks of the same shares or securities. Moreover, in cases where the yield is satisfactory, the question of temporary capital depreciation of the holding can be disregarded to a much greater extent. The question of subsequent ease of marketability is also of comparatively minor importance.

With a finance company, however, the position is entirely different. Since the main object in this case is capital profit, the somewhat meagre income from dividend and interest being merely a secondary consideration, the portfolio must not only contain no stocks or shares which are likely to slip away in market value in slack times, but must also be of an easily marketable nature and quantity.

Although they are seldom concerned with the finance of industry in Great Britain, mention should also be made, for purposes of differentiation, of the specialised finance houses which concentrate on the finance of one or a few particular types of enterprise—e.g. gold mining, plantations, etc. It is, however, interesting that a new tin mine in Pahang should have a specialised finance house catering for its needs, and would almost certainly have less difficulty in raising capital than a new engineering company in Peterborough. Some of the more important of these specialised finance houses are: Amalgamated Finance Co. (rubber and tin), British and Chinese Corp. (Chinese railways), Malayan Rubber Loan and Agency Corp. (rubber), Union Corporation (gold, other metals and general), Selection Trust (mining), Johannesburg Consolidated Investment Co. (gold and general), General Mining and Finance Corp. (gold and general), Consolidated Goldfields of South Africa (gold and general), London Tin Corp. (tin), Anglo-American Corp. of South Africa (gold and general), African and European Investment Co. (gold and general), Malayan and General Trust (tin), Java Investment Loan and Agency, Ltd. (plantations), Eastern Plantations Finance (plantations), Eastern International Rubber and Produce Trust (plantations), British South Africa Co. (land, minerals, etc.), British North Borneo Co. (land), Hudson's Bay Co. (land and minerals), British Overseas and General Investment (South American utilities), and British Industries and General Investment (rubber).

“Nursing” of New Issues

Mention has already been made of the part played by provincial stockbrokers in industrial finance. The big London firms on the whole do less “nursing” (which is the important thing as far as new industries are concerned), but some “nursing” sometimes has to be done prior to an issue, and it is therefore relevant to mention a few of the leading stockbrokers handling new issue business: Ian Anderson and Nairn; Belisha & Co.; Cazenove, Akroyds and Greenwood and Co.; Cohen, Laming, Hoare; Crews & Co.; Keith, Bayley and Rigg; Linton-Clarke and Co.; Myers & Co.; Rowe and Pitman.

Most of the various types of firm to which attention has been drawn above in describing some of the financial institutions of the City are concerned in some way or other with industrial finance in general, rather than with the finance of new industries, this being a particular case with which many of them are called on to deal from time to time.

Two Problems Involved

There are obviously two types of problem involved in the finance of small companies: (1) which is relatively easy, to put capital at the disposal of small established concerns who can show a profit record and a reasonable case for imagining that more capital would mean, for instance, expansion of sales; (2) to assist by capital and advice companies who have new patents or inventions to develop, but no profit record to show. In the past a few companies have been formed specially to deal with new inventions—the Finance Company of Great Britain and America, Ltd., an early and imposingly-named offspring of I.C.I. and Chase National Bank, is an example. This particular company had to face the slump and other troubles at an early stage in its career, but had behind it in the I.C.I. research and development departments as good a team for “vetting” new processes and propositions as any ever likely to be collected. Yet it cannot claim to have had any great measure of success. There are, as indicated above, several concerns associated with City as opposed to industrial interests which have also operated in this field for some time, but none of them has forged the necessary links between invention and finance.

Cost of “Vetting” New Proposals

One great trouble has always been that the aggregate costs of “vetting” new propositions generally exceed the profits which can be expected on the small proportion of successful ones, owing to the difficulty of finding any firm or organisation which can deal with the wide range of industries, into contact with which a concern which attempts the finance of new processes is usually brought. This is the more true when it is realised that “vetting” must include an estimate, not only of the technical soundness or feasibility of the processes, but also of the commercial possibilities.

An important statement was made by the Chancellor of the Exchequer in November 1985 with regard to the checking of company flotations designed to exploit processes based on dubious or unsound scientific foundation. The three main Government Research Departments—the Department of Scientific and Industrial Research, the Medical Research Council and the Agricultural Research Council—were put at the disposal of banks, issuing houses and brokers to furnish them with reports on the scientific merits of the methods or substance for the development of which it might be proposed to make a public issue. Without in any way belittling the work of these research departments, since there is no doubt that they can be of far greater use to industry and finance than has yet been realised, it would, however, be true to say that they have not in all cases got the necessary combination of commercial with technical outlook. Moreover, they can, from the

nature of their responsibilities, only make a complete and exhaustive report on a subject, whereas what is often wanted is a quick opinion based on sound judgment and wide knowledge which will enable a decision to be taken as to whether to proceed with further investigation or to reject the application for finance at an early stage. Sound "vetting" must concern itself not only with the technical soundness of a process, but also with its commercial prospects. There are a large number of inventions which are technically sound and which represent a slight, but not revolutionary, advance on existing methods or products. If the sales organisation of the established interests in the field is good, the chances of successfully introducing the new product are small, it being often forgotten that an efficient sales organisation may be a more important, if less tangible asset than an efficient works. To be a success a new invention must be so much better than earlier products as to sweep the latter off the board. The process of "vetting" often consists not so much in verifying technical claims as in determining the extent of demand for the new products and the forces which govern it, the output of rival products, the location of the plants in which they are made, the areas or industries in which they are sold, the costs and selling prices in the two cases, and a host of other economic facts with a technical background. Many new industries are protected by patents, and without entering into a discussion of the value of patent protection, or the use of patents by established concerns to bar the way to newcomers, it may be said that the report of a patent agent is generally an integral part of the technique of "vetting".

From the financial point of view there are two general alternatives, either to aim at a quick flotation and a profit on the issue, the company then being left to its own devices; or to work on a participation in the company which is nursed through its teething troubles until it emerges into the forefront as an established producer (or not, as the case may be). Hitherto the first method has been the usual one owing to the existing financial structure which naturally tends to concentrate the attention of a merchant bank or issuing house on issuing, but it is the less satisfactory of the two and tends almost to put a premium on over-capitalisation at a time when the company can least afford it. Owing to the very serious lack of technical knowledge characteristic of the City, the extent of over-capitalisation of new companies often passes unrealised. It is no exaggeration, and has been confirmed by several unbiassed authorities in the industry, that the plant and other tangible assets of a company which recently raised about five times that sum from the public could be duplicated for £100,000. The great majority of new inventions probably do not require sums of more than £5,000 to £50,000 for the first two years of commercial exploitation—precisely that range of capital which it is most difficult to raise, so that the fact that it is easier to raise twice the amount actually required and that, with luck, the rest will come in useful later on, obviously encourages the inventor and his agent or the promoter to join hands with those who are financing him in making the best possible use of an opportunity when it comes.

A not unjustified criticism of the one-sided nature of the assistance given to the Special Areas has been made by an officer of the Tyneside Industrial Development Board to the effect that everything has been concentrated on assisting the industrialist

to set up his works, whereas little attention has been devoted to assisting inventors in the practical development and industrial exploitation of their inventions.

There is no doubt that the evolution of better facilities for the finance of new industries would be a great contribution to the problem of the Special Areas and to areas which are in imminent danger of becoming depressed through being over-dependent on a limited number of industries.

Linkages

Linkages are of several kinds. They may consist, for example, in related technical processes; in the use of the same raw materials; in the employment of the same kinds of skilled labour; in one industry using as its raw material the finished product of another industry; or in an ancillary industry making special plant, or providing special service for the main industry.

Thus makers of textile machinery and roller leather are located in East Lancashire in order to be near the main centres of the cotton and woollen industries, although to some extent the migration of the woollen industry to the West Riding was due to the development of weaving machinery in connection with cotton in Lancashire. Conversely, a new entrant into either of these industries is practically compelled to go into the traditional location, since the ancillary services and skill are there. The establishment of a complete range of new ancillaries at some other location could not, in all probability, be justified merely for the sake of the single new works, since one economic unit of the ancillaries could probably serve several units of the main industry. On the other hand, if the main industry is sufficiently large it may be able to have its own independent system of ancillaries. This has happened, for example, in the case of the Ford Motor Co.'s works at Dagenham. The complete system is then a movable unit, although any one of the component trades, if regarded as a separate industry, would be tied by a linkage.

Many of the Birmingham industries provide excellent examples of location by linkage, the relationship existing chiefly in materials and processes; for instance, brass and copper goods required by the electrical industries.

The usual reason for juxtaposition of linked industries is to minimise transport costs, but this may sometimes be effected at the expense of being compelled to employ more costly labour. In such circumstances it might be advisable to choose a location elsewhere, the increased cost of transport being offset by cheaper labour. For example, works making moulded plastic products for use in motor cars might, perhaps, be profitably situated at some distance from the assembly works. On the other hand, local loyalty often results in preferential placing of orders with local firms.

Finally, mention must be made of a miscellany of factors which exercise an indirect, though frequently very powerful, effect on the location of industry. They are mostly of a non-economic character, and would be difficult to bring into any computations based on factors such as those discussed earlier in this chapter.

The most important of these is probably the process which has been called

industrial metabolism, though industrial evolution would perhaps more accurately describe the changes which actually take place.

Industrial Evolution

One of the best examples of this process is provided by Coventry, where a watch-making industry developed into the manufacture of bicycles, which in turn gave rise to that of motor cars, and more recently aero-engines and aeroplanes. This kind of development is based partly on the similarity of the skilled labour required, and partly on ability to use at least a proportion of the same plant for the old and the new manufacture. It also depends on the fact that these industries usually have a number of skilled workers working more or less independently, with a wide range of adaptability. It follows that industries which employ labour and plant of a highly specialised character peculiar to themselves, or depend largely upon some geographical feature, are less likely to produce this kind of development than others which are not so specialised. Thus coal mining is extremely unlikely to undergo evolution in the foregoing sense, while the manufacture of electric light fittings, for example, could quite easily do so. Again, leather manufacture (tanning and dressing) is less likely to develop in this way than, say, cotton weaving, which has already given rise to the weaving of rayon, staple fibre and other similar materials.

An extreme example of a rapid change in industrial composition by this process is provided by Wolverhampton, where it is stated that scarcely a single person is employed in the same work as he was ten years ago. This kind of development, assuming that the necessary conditions exist for its progress, can originate from several causes.

As an illustration, there may be a fall in the demand for the product of a certain factory. This may cause the management to embark on the manufacture of, say, certain parts for use in another product, the demand for which is increasing. This may, in turn, lead to the manufacture of the complete new product involving, perhaps, the installation of some new plant. A revival in the demand for the original product would then result in overloading those parts of the plant which were used for both the old and the new products, so that those sections of the plant with their quota of labour, would have been duplicated. In effect, there would then exist complete plants for the manufacture of both products, and a subsequent increase in the output of either might result in one or other of the processes being moved into a separate factory. The two would then be independently subject to the usual economic and other influences which affect industries, and either of them might similarly produce yet another different manufacture. Development on these lines produced the cycle industry in and around Birmingham. A works making sewing machines accepted a large order for bicycles, and subsequently changed entirely to cycle manufacture. The large British Celanese plant at Spondon near Derby started during the War of 1914-18 as a Government factory for aeroplane dopes, which made the basis not only for the subsequent rayon factory but for the process used in it.

Secondly, new developments may result from an idea suggested to a worker by the work on which he is engaged. Such ideas are not strictly in the same category as those which start a new industry from the beginning. They are closely bound up with the existing plant and process, and may, at first, involve little or no fresh plant, and their very occurrence depends on the nature of the work on which their originators are engaged. As an example of this may be mentioned the Ekco radio works at Southend, which was started in 1926 by a local electrician.

Again, an industry purchasing its raw material in the form of a semi-finished product, might decide to manufacture such raw material for itself. The capacity of the raw material plant, however, might exceed the requirements of the original manufacture, thus leaving a surplus for sale as raw material. This happened, for example, in the case of the Ford works at Dagenham, where the capacity of the blast furnaces has been more than sufficient for the rest of the works, and the excess output has been sold as pig iron. In an extreme case the newer industry might become more important than the older, even to the extent of completely replacing it.

This last process could equally well work in the opposite direction. For example, a factory which manufactured moulding powder might put in a moulding press and start making certain kinds of mouldings. A big demand for these might cause the factory to start purchasing moulding powder from outside, and possibly to devote its whole energy to the moulding process.

Industrial Offshoots

Closely allied to "industrial evolution" is the general question of offshoot industries. There is no sharp line of demarcation between an offshoot and an evolution of the kind just discussed, the difference lying merely in the closeness of relationship between the older and newer industry. Thus the entry of F. Hill and Sons into the manufacture of light aircraft from that of storm-proof windows might perhaps be regarded as an evolution in so far as a certain amount of timber and some of the same plant is used for both. On the other hand, the launching of an extensive ice-cream business by T. Wall and Sons, Ltd., sausage makers, can hardly be regarded as an evolution by any stretch of the imagination. It was, however, an offshoot deliberately produced by the company to balance seasonal fluctuations in its turnover.

Other examples of this kind of change are provided by a company who made engine packings, surgical dressings, etc., and launched a subsidiary for the purpose of making golf, cricket and hockey balls on the same premises, and by another concern which changed from the manufacture of aeroplane propellers to that of ship's cabin, office and bank fittings.

Offshoots of this character exert a certain amount of influence on location in so far as the location of the offshoot industry might have been different but for its connection with an existing industry.

The origin of offshoots sometimes lies wholly in the accident of the initial idea,

or even in a purely fortuitous occurrence. Thus the accidental omission of the size from a quantity of hand-made paper resulted in a product with absorptive properties. This material was the first blotting paper.

In other cases, offshoots are produced for a definite purpose.

Factors which exert a powerful influence in inducing industries to produce offshoots are variable seasonal demand and supply. In some cases industries meet seasonal peak demands by laying up stocks, but where this is not possible (e.g. in the case of perishables) the industries in question either have to close their works during off-peak periods, or enter into the manufacture of some other product for which the peak demand (if any) comes at a different time of year. Examples of the former policy (laying up stocks) are provided by the radio receiving set manufacturers, who have to meet a heavy peak demand in the autumn. In the case of perishable goods, however, the stock policy is generally impossible, as it was for T. Wall and Sons, already cited as an example of producing an offshoot. Another example, though not concerned with perishable goods, is provided by a Birmingham works which manufactures bicycles and perambulators, for which the peak demands occur respectively in spring and autumn. The importance of retaining labour is a big influence, and led to the acquisition, by Electric and Musical Industries, of the Rudge-Whitworth bicycle business, and the construction of a new plant at Hayes alongside the E.M.I. plant.

Seasonal supply affects certain industries, such as fruit canning and jam manufacture, and may cause them to go into some different kind of production during the seasons when fruit is not available. Facilities for storing fresh fruit have, however, overcome the necessity for this to a certain extent.

Chance Location of Initiator

The chance location of the initiator was once a very important factor in the location of industry, though it is probably of less account now than formerly. Many existing works undoubtedly owe their location to this factor: one recent example of this is the location of the Sorbo Rubber Products Co.'s works at Woking.

Amenities

Finally, an increasing influence is being exerted on the location of industry by amenities, not of the industrial kind, but connected with the residential and recreational sides of life. Industrialists, and their wives, are choosing places where they will be able to have a wide choice of recreation during their leisure, and to secure sound and economic opportunities for their families. To some extent this also applies to the workpeople who are, however, more restricted in their movements owing to the method of administration of the labour exchanges. It is, of course, only natural that grimy and ugly places should be repellent to anyone with a free choice, while a wide range of facilities for recreation—and shops for the women—are a powerful attraction. Among the most picturesque examples of breakaways from conventional sites are Booth & Brooks Ltd., makers of iron piano frames and gramophone turntables at Burnham-on-Crouch, Essex, and Wellworthy Piston

Rings at Lyminster, Hants, the first of which is understood to owe its choice of site to a proprietorial taste for yachting, and the second to fishing and shooting attractions.

Amenities exert a strong influence on industry in general through what may come to be known as "the conference industry." The holding of periodical conferences is becoming the usual practice among all kinds of bodies, from political parties to technical institutions. These conferences are often held at a seaside or other resort, partly because those places are equipped to deal with relatively large influxes of people, but chiefly because of their amenities. In this way the industrial merits of different districts are brought to the attention of participants.

Conclusion

In any actual case, location is based on a combination of the foregoing factors, or some of them, and the issue is further complicated by the extent to which the several variables can sometimes influence one another. An interesting example of the interplay of the various factors is provided by the cutlery industry of Sheffield, already referred to on page 57. As the example was given by the Board of Trade in their evidence before the Royal Commission on the Geographical Distribution of the Industrial Population, it is quoted here in their words.

"The cutlery industry began in the Sheffield district some 400 or 500 years ago. An iron industry based on local coal-measure ironstones, charcoal supplies and water power had existed long before, but specialisation in cutlery was made possible by the excellent grindstone material provided by the local millstone grit, and it was encouraged by the advent in the sixteenth century of skilled Flemish settlers. Skill tended to accumulate in the district and the industry has remained highly localised there. The discovery of stainless steel by Sheffield manufacturers some twenty-five years ago has emphasised the supremacy of the district in cutlery manufacture."

Here three of the primary factors discussed earlier in the chapter have combined to locate the cutlery industry. First, a supply of raw materials, both coal and iron ore, was available. This, in connection with water power—a site feature—enabled an iron industry to be started. A further raw material in the form of millstone first enabled the grinding process to be carried on, and specialisation was encouraged as a result of skilled labour concentration.

Another interesting example, also from the Board of Trade evidence, concerns the paper manufacturing industry.

"Paper mills were established on the banks of streams which originally served both to turn the beating engines and to supply the water which is required in the processes of production. Kent, which enjoyed a plentiful supply of good water, took the foremost place in the production of high-grade papers, but paper-making was carried on in many parts of the country, producing for a local market from locally collected rags. When steam power became available to replace water power one

cause of the mills being located on streams disappeared, but the other remained and in many cases mills remained on the old sites. With the growth in the demand for cheap paper of the newsprint and wrapping variety, the industry came more and more to depend on imported supplies of wood pulp and to a lesser extent of esparto grass. It is stated* that by 1907 it had become important that mills should be near railway and canal transport so that raw material and coal could be brought from a distance at the lowest possible rate, and the finished article be readily transferred to the widest and best market. Consequently the tendency was towards large scale units located on or near the seaboard and the principal centres of the industry are now the North Coast of Kent and the Mersey. As a result of the changed conditions many paper mills have been closed. Nevertheless, the industry remains widely diffused owing to the demand for better-class papers for which pure water supplies are highly important."

The normal process of finding the best economic location would consist of finding the places (or perhaps the unique place) which gave the lowest total cost of production and marketing. The following example† referring to four possible locations for a proposed cement mill to manufacture for a metropolitan market in America, shows how the various factors must be separately weighed and the results combined.

Site A was 5 miles from property where both limestone and shale could be secured by a royalty arrangement. The limestone was overlain with a suitable shale which, in turn, was covered with from 6 to 8 feet of earth. The materials could be transported to the works by a private railway, which would have to be built. Site B was 7 miles from good deposits of stone and shale, but both were heavily overburdened, and would have to be taken out by separate operations. Trucking was adjudged to be the most economical means of transport under the conditions. In this case, also, the materials could be taken out on royalty without purchasing the property.

At site C, limestone and shale were adjacent to the site in a hillside quarry, but the former material was very hard.

Good limestone deposits were included in the property at site D, and clay could be obtained by a truck haul of $1\frac{1}{2}$ miles.

Location A had a better rate on coal than C, but not as favourable a rate as B and D. Electric power was cheapest at A. C had approximately the same power rate as D, but, on account of the hardness of the limestone at C, the engineers estimated that from 15 to 20 per cent more energy would be used. Labour cost was lowest at C, highest at B, and about the mean of these two at A and D. On account of the hardness of the rock at C it was estimated that an extra £10,000 a year would be required for repairs.

Since site A was some distance from a large town, allowance was made for

* 'The Paper Trade,' by A. Dykes Spicer (1907), page 84.

† Holmes, W. G.: 'Plant Location' (McGraw Hill Book Co., Inc.).

the maintenance of an administrative office in the city where it was expected that most of the cement would be sold. But at site A practically total exemption from taxation was held out as an inducement by the community to secure the mill (cf. British Special Areas procedure). Location C was in an adjoining State which had a State income tax. Sales cost was estimated to be lower at B than at A or C because of its relative proximity to the market, and higher at D because of its greater distance, transport costs having been computed from prevailing freight rates on cement. The rate at D was disproportionate to the mileage because of an adverse break of rates near the State Line, which had to be crossed.

From these various unit costs the total cost, delivered to customer, was calculated as shown in the following table.

COST PER BARREL OF CEMENT DELIVERED TO CUSTOMER.

	Site			
	A \$	B \$	C \$	D \$
Raw Materials at the Mill				
Limestone	0.14	0.16	0.18	0.10
Shale	0.02	0.03	0.02	0.03
Gypsum	0.04	0.04	0.04	0.04
Fuel and Power				
Coal	0.27	0.19	0.80	0.22
Electrical Energy	0.18	0.22	0.26	0.20
Works Expense				
Mill Labour	0.14	0.16	0.12	0.14
Superintendence, Repairs, Development	0.08	0.08	0.09	0.08
General Expenses				
Administration, etc.	0.06	0.05	0.05	0.05
Insurance	0.01	0.01	0.01	0.01
Taxes (including income)	0.06	0.08	0.10	0.08
Bond Interest	0.05	0.05	0.05	0.05
Amortisation	0.06	0.06	0.06	0.06
Distribution				
Packing, Sack Cleaning and Sack Loss	0.07	0.07	0.07	0.07
Sales	0.10	0.09	0.10	0.11
Transport to Market	0.83	0.24	0.80	0.40
Total	1.61	1.58	1.70	1.64

It can be seen from the table that site B, at which raw materials and labour cost most, is actually the most economical site when all factors are taken into consideration.

In the above calculation the cost of real estate, plant and equipment has been taken to be the same for all the sites. While this was very approximately true in the example considered, it would not necessarily be so in all cases.

This process can be applied to most industrial enterprises, although the computation of some of the unit costs may be more difficult in some cases. The example given, of course, applies only to four sites within a relatively small region, but the process can obviously be extended to any number of different locations.

While the above calculation yields a definite answer in singling out a particular site as the best, this may not always happen. The calculation might show several optima, in which case the final selection could be made on the basis of other factors, such as personal preferences of the initiator. It must always be borne in mind, however, that no particular location is likely to be permanently the best. Economic conditions are continually changing, and if, in making the choice of location, the initiator can foresee the trend of such changes, his enterprise will probably achieve greater success than it would otherwise have done.

In the case of some industries there is one determining factor which outweighs all others, and the industry can only be located successfully in the places indicated by that factor. For example, the location of the alkali works of Imperial Chemical Industries is fixed by the salt deposits of Cheshire, and the works could not be economically located except near such abundant supplies of salt. On the other hand, there are numerous industries for which economic considerations do not single out an optimum location, but permit a wide range of choice. Moreover, in such cases there is less difference between the best locations and second best, so that an entrepreneur might be content to accept one of the latter in order to gain some other advantage—possibly of a non-industrial character.

It is in this kind of industry that the non-economic factors exercise the greatest influence, and in which there is the strongest case for some measure of national guidance, since some relatively unimportant cause may lead to an enormous number of such industries following one another to one particular region.

IV. TRADING ESTATES

Experience of Existing Trading Estates—The Economics of Trading Estates—Government Trading Estates—Summary—**Trafford Park**—Nearness to Market—Supplies—How Sites are Obtained—Transport Facilities—Diversity of Industries—A Profitable Enterprise—Industries on the Estate—**Slough**—Standard Factories—Social Centre—Financial Position Services—Amenities—Diversity of Industries—**Letchworth**—Industries at Letchworth—Financial Position—**Welwyn**—Sites Held Under Lease—Services—Industries at Welwyn—**Team Valley**—**Treforest**—**North Hillington**—**Other Trading Estates**

All industries need sites and buildings, while many also have to use transport of various types, electricity, gas, water, process steam, heating installations, and to an increasing extent, canteens and recreational facilities for their staffs. In the past each works has made separate arrangements for the provision of each of these facilities, sometimes from its own resources and sometimes by contract with outside agencies such as local utility undertakings. Recently, however, public interest has developed in trading estates as a means of providing on a communal basis some or all of these requirements, often accompanied by the renting of premises to individual tenants, instead of separate ownerships. (This raises the questions whether such collective provision can be economically superior to individual provision and if so in what circumstances.

Experience of Existing Trading Estates

As a preliminary answer, reference need only be made to the experience of two of the leading trading estates in Great Britain, namely, Trafford Park and Slough. These estates are run on normal commercial lines by joint stock companies, and have for many years shown consistently good profit records. It should not be forgotten, however, that in their early stages they were not free from financial difficulties, and Slough had the benefit of the earlier expenditure of a great deal of Government money on the site.

At the same time, most manufacturers located on the estates are obviously satisfied that they are at no economic disadvantage in being there rather than at independent sites of their own. Unless these industries are merely staying where they are on account of inertia, it follows that the trading estate companies are in a position to provide accommodation and services on a competitive basis with profit to themselves. It must, nevertheless, be pointed out that both these estates, and also the garden cities of Letchworth and Welwyn, demanded the sinking of a large amount of money before they were brought to the profit-earning stage.

From the point of view of the location of industry in general, it is therefore necessary to examine more closely the whole principle of trading estates, especially as it appears that they will probably play an increasing part in determining the location of industry in the future.

The Economics of Trading Estates

The following questions suggest themselves as an approach to the problem:

- (i) What is the nature and magnitude of the economic gain resulting from the location of factories on a trading estate rather than on independent, though not necessarily scattered, sites?
- (ii) How is this gain achieved?
- (iii) Is there any reason why the same gains should not be achieved by industrialists acting independently: i.e. is the possibility of these gains peculiar to the trading estate system?
- (iv) Are there any economic limits, upwards or downwards, to the size of a trading estate, and to the size of works located on it?
- (v) Do the same economic factors apply to the location of a trading estate as to that of an individual works?

To take these questions in order, the magnitude of the economic gain is rather difficult to define, as there is no clear standard by which to measure it. If it is assumed that the manufacturers located on an estate are at no economic advantage or disadvantage as compared with an independent location, then any gain from the system must appear as profit to the trading estate. On this basis, the average return on shares in the estate company may, perhaps, be taken as the monetary value of the economic gain. The average return on the nominal value of the shares in Trafford Park Estates Ltd. since its foundation in 1896 is 3.687 per cent. If the present rate of dividend, namely 7 per cent, is maintained, the average must gradually increase, but for its first twelve years the Company paid no dividend. Slough Estates Ltd. pay higher dividends (which have been supplemented for several years by capital bonuses) than Trafford Park Estates Ltd., but a strict comparison cannot be made owing to differences in the early history of the two concerns.

Even if manufacturers on the estates enjoy no economic advantage as compared with independent locations, trading estates appear, therefore, to be able to yield a return of at least $3\frac{1}{2}$ per cent on capital invested, on a 40-year average.

It is, however, fairly certain, on the basis of sample inquiries which have been made, that most tenants of factories on trading estates do enjoy some advantage, in addition to that which appears as profit to the trading estate company. The following example shows how difficult it may be to measure this indirect, though very real, gain. The success of many new enterprises depends on the speed with which it is possible to start production. Long delays in the early stages, after the necessary capital has been raised, deplete capital resources and irritate shareholders; meanwhile, there may be a radical change in the outside economic circumstances compared with those ruling when the enterprise was first started. Yet it is equally essential that new enterprise should not rush into production without a full knowledge of estimated capital and operating costs, nor without a careful choice of site and a sound appraisal of labour requirements. If all the factors involved have to be separately investigated it necessarily takes time and costs money at a stage when both are particularly precious. A trading estate can enormously simplify and cheapen this initial investigation.

If, then, as appears very probable, there are economic gains from the trading estate principle, the next question is how are these gains achieved?

Trading estates apparently attract the industrialist, because:

- (a) He can obtain a factory on a rental basis, without capital outlay;
- (b) He can generally obtain a suitable building much more quickly than he could by independent action;
- (c) He knows that the factory will have services of water, gas, electricity, and sometimes process steam at suitable charges;
- (d) His requirements in the way of special features of internal construction in the factory can usually be met by a proportionate increase of rental—again no capital outlay is required;
- (e) He knows that the factory will be well situated for transport, and adequate labour will probably be available;
- (f) He obtains, within the rental, common services such as canteens, recreation grounds, and fire services, the pooling of which brings about considerable reductions in cost;
- (g) He can make a full investigation of probable costs much more easily on a trading estate than on an independent site.

Trading estates not only provide these facilities, but provide them economically, for a number of reasons. The factory buildings on a trading estate are generally standardised. This results in reducing both the cost and time for building. Moreover, if a factory is vacated by an enterprise which fails, it will be suitable with, at most, minor modifications, for another tenant. Further, the prospective tenant does not have the trouble of deciding upon design. It has been stated earlier that factories built for one purpose are rarely suited for any other. While this is certainly true of factories built to their own requirements by individual companies, and subsequently vacated, it does not apply to trading estate factories, for these are generally little more than walls, floor and roof, with services which are readily adaptable to almost any industrial purpose. If there is, in fact, any disadvantage, it is probably outweighed by the reduction in cost of building.

The management of a trading estate can also in all probability raise the capital for land and buildings at a lower rate of interest than could be obtained by individual industrialists, other than well-established firms.

Further, transport facilities and services such as gas and electricity can usually be more cheaply provided for large groups of factories than individually. Rail sidings are generally brought on to the estates, and factories which require their own sidings can easily arrange to have them. There are, of course, many factories which do not require their own sidings, and some which hardly use rail transport at all. As regards the provision of electricity and gas, the saving lies in the reduced cost of distribution. At Slough the company has undertaken its own generation of electricity, and while charges have not, hitherto, been particularly low, increased use has enabled a series of reductions to be made, the last having been in July 1938.

It is clear, however, that the cost of distribution to a compact group of factories on a trading estate would be less than to the same factories on scattered independent sites, unless those sites happened to be within the framework of an existing distribution system—e.g. in a large town. If a trading estate is able to purchase in bulk from the Grid through its own transformer station, and act in the capacity of supplier to the various tenants on the estate, obvious economy can be effected. As regards gas, the saving is, again, usually in distribution, though in some special cases where there are coke ovens on or near the estates, very cheap gas is obtained as a by-product.

Moreover it can be safely assumed by the industrialist that the location chosen by the trading estate management is suitable for a wide range of industries and that he will only be advised to become a tenant if the location seems likely to suit his needs. The practice of advising prospective tenants on these lines is gaining support among existing estate companies who, though in keen competition with each other, now realise that it is not in their best interest to secure tenants in locations which are not really suitable, and which may lead to the tenant leaving them at a later date.

It can be seen, therefore, that while some of the gains might be achieved without recourse to trading estates, the chief are the direct result of the collective system practised on these estates. This collective system is not necessarily peculiar to trading estates, but it is difficult to see how such a system could be built up without merely reproducing the conditions of a normal trading estate.

The question whether there are economic limits to the size of a trading estate, and of the works which can be located on trading estates is one on which there is no conclusive evidence. Existing trading estates in Great Britain vary in size from a few acres in the case of Cyfarthfa, Dowlais, and Pallion, for example, to 1,200 acres at Trafford Park. The small estates mentioned above, however, are not, in the strict sense, trading estates, for they do not provide communal services.

Factories located on trading estates vary, again, from the smallest experimental concern, in one of the "Bijou" factories at Slough for example, to the works of Metropolitan-Vickers Electrical Co., at Trafford Park, employing well over 15,000 people. Purely from the point of view of numbers employed, therefore, there seems to be no reason for believing that there is an economic limit to the size of works which can be located on trading estates. There may, however, be cases of works which occupy very large areas of land in relation to numbers employed, or in relation to actual floor space in buildings, which might not be suited for such a location.

As for the size of the estate itself, it is clear that the full economy of pooling certain facilities and services cannot be realised unless there is an adequate number of participants. A certain minimum demand from factories is necessary to make the installation of process steam worth while. A fully-trained fire brigade would need a larger number of factories to support it.) In fact, it is probable that the full facilities normally associated with trading estates could not be economically provided for less than, say 75 factories of average size)(around 5,000 square feet).

Finally, as regards the location of trading estates, it is evident that to a large extent the same factors apply as in the location of individual works. The correct choice of location is evidently even more important for a trading estate than for an individual factory, as the loss caused by a wrong location would be proportionately greater. The choice of location for a trading estate must be made with a view to the requirements of a wide variety of industries, and a suitable site must also be available at an economic price. On the other hand, it is very unlikely that many of the industries now flourishing on the various trading estates would have gone there but for the estates. In fact, some people would have been ready to assert that the location could not be economic. The establishment of a trading estate introduces factors which may actually change the balance between an economic and an uneconomic location.

Of mistakes made in the creation of trading estates, it is probable that lack of any planned relation between industrial facilities on the one hand and labour and housing availability on the other is the most serious. The government estates have been deliberately placed near large unemployed populations, but an investigation of the average weekly expenditure on transport to and from work of employees on the trading estates would probably show some high figures. At Slough the trading estate has in recent years made considerable efforts to solve the housing problem, but even so, girls employed on the estate often have to sleep two or even three in a room in the houses where they board.

Government Trading Estates

The experience of the older trading estates in attracting industrial enterprises has largely influenced government policy in connection with the Special Areas rehabilitation programme. In fact, three estates have already been established, in the Team Valley near Gateshead on the Tyne, at Treforest near Pontypridd, South Wales, and at North Hillington near Glasgow. The industrial aspects of these estates are described in the later part of this chapter, but some general questions of principle call for comment here. The entry of the Treasury into the industrial field in this way shows a profound if reluctant change in the official attitude towards industry in general—in fact, a conspicuous departure from the principle of *laissez-faire*.

Parliament has been compelled by circumstances to take steps to assist the Special Areas, and although its action in financing trading estates is undoubtedly a gamble, it is one which can be justified in the national interest. Whether the whole of the money spent by the Treasury will ever be remunerative in the ordinary sense is another question. For example, part of it has gone in the form of grants through the Commissioners to refund payments of income tax and local rates. This (if included as part of the initial cost of the estate, which is open to argument) cannot ever bring a direct return, but can only come back in the form of reduced unemployment and consequently improved national economy. Money spent on land and buildings can at least be regarded as comparatively safe capital, but the return on it may not be large, particularly if the development cost has been heavy, as, for instance, in the Team Valley. The non-profit terms of the limited companies which

operate the trading estates include provision for the payment (after an initial period free of interest) of interest on capital at 4 per cent. This, however, may not be earned until the estates are reasonably full.

The original estimate for the acquisition of the land for development at Team Valley was approximately £875,000. Up to the end of January 1939, with development practically finished, some £860,000 had been spent, apart from actual factory construction. As the estate can eventually accommodate some 500 factories, total expenditure on all accounts may possibly reach £5 millions. It has so far been about £1.5 millions. The cost so far of North Hillington (£528,000) and Treforest (£763,000) has been lower—North Hillington may in fact already be bringing a return on money spent and its authorised expenditure has already been increased to £925,000.

The government trading estates have brought about an immediate increase in the value of the surrounding land. In the Team Valley, for instance, speculators bought large areas of land surrounding the estate and resold at higher prices. Around North Hillington, however, local authorities have kept out the speculator, most of the surrounding land being owned by Glasgow and Renfrew.

Provisions have been made, in the Special Areas (Amendment) Act, 1937, for assistance to depressed places outside the Special Areas through the agency of site companies and by payments similar to those made by the Commissioners in the Special Areas. Under this Act the Lancashire Industrial Sites Co., was formed in January 1938 in order to afford assistance to districts in Lancashire and neighbouring counties which the Minister of Labour certifies to be in need of assistance. The Company cannot call up its capital until this certification has been made. The capital of the Company is £260,000 and was subscribed as to three-quarters by banks, insurance companies and the L.M.S.R., and as to one quarter by the Government. By June 30, 1938, 41 "areas" had been certified. Though these site companies would perform some of the functions of the government trading estates, by purchasing land and letting it to industrialists, the facilities would not be so comprehensive. Obviously, however, such sites could be developed as trading estates, with the same facilities as those in the Special Areas.

It has been suggested that as some of the concerns establishing themselves on the new estates have merely vacated older factories in the region, the resulting net advantage to employment in the region is nil. As a general rule, however, firms occupying existing premises in a Special Area, and wishing to move into a new factory on the trading estate, have to show a programme of expansion which appears likely to be realised, before they are allowed to do so. Although in a very few cases an industrialist may have moved out into a new factory which he cannot afford, there are far more examples where removal has been a precursor to expansion. Moreover, the first essential with a new trading estate in practice is to get some factories in occupation, and the removal of factories from old into new premises has helped in this respect.

It is by no means clear how far trading estates in general have affected or will affect the distribution of industry as between regions. There are people who hold

that their chief effect is to collect the existing industry of a particular region, and confine it within a relatively small geographical area, and that their influence in attracting new industry into the area is small. This opinion may be the result of some confused thought as to what is meant by attracting industry into an area. If it is taken to mean the enticement of an industrialist from, say, Park Royal to Team Valley, then the opinion is probably well founded. But the encouragement of industry in one place does not usually or necessarily imply its withdrawal from somewhere else. If conditions are made favourable for the growth of industry in Team Valley, then industry may be expected to grow there without closing down any factories elsewhere.

There is a widely held belief that expenditure of public money on trading estates in certain areas is injurious to the interests of other areas, especially where there is also economic depression. This again comes dangerously near the "lump of employment" fallacy.* In so far as investment in a public trading estate proves successful in stimulating new enterprise, the benefits of additional demand will be shared by even distant areas, and expansion of the national income should be regarded by each industrial community as being more vital than whether an individual new works is started in town A or town B in the same region.

People in the Special Areas are at present forced to accept a lower standard of living because such a large proportion of them are unemployed. If they are put into employment, their increased purchasing power will increase the market for all the usual consumer goods, and hence make room for increased output capacity in the industries which make them. The labour required for the increased output should, in the ordinary way, be drawn from the local unemployed.

It is also sometimes argued against the Special Area estates that they touch only the fringe of the local unemployment. Naturally, an estate or estates to absorb directly all the unemployment in an area such as South Wales would have to be of vast dimensions. The expectation is, however, that the estates will have a snowball effect. Once it has been shown that many kinds of industry can operate economically in the Special Areas, the resistance to going there will be largely broken down. In the meantime, the direct employment provided on the estates gives rise, in the usual way, to other employment in the local services and shops. The benefits accruing from the estates cannot, therefore, be measured simply by the numbers actually employed on them. In fact, it must be years before their full effects can be gauged.

Further, some criticism has been directed at trading estates in general, on the ground that they are liabilities from the point of view of defence against air attack. This is discussed in Chapter VII.

Finally, in so far as industrialists may have been influenced by the existence of government trading estates to place their works in locations different from those they might otherwise have chosen, some responsibility for possible failures may be thrown on to the government. The industrialist who goes to a government estate is not, of course, under any compulsion to do so. He goes there in view of the

*The fallacy that there is only a certain number of jobs to go round, and if A gets one he is probably depriving B of one.

advantages offered, presumably after weighing them against drawbacks. No legal liability therefore attaches to the government in the event of failure, but, at the same time, if failure threatened, it is possible that some measure of assistance might be forthcoming from the government, which would naturally try to minimise the number of bankruptcies.

If a large number of failures should occur more or less simultaneously a very difficult position might arise. In view of the fact that many of the enterprises on the government estates have started at about the same time, it is quite possible that if a slump hits one of them it may also hit others, which would be at about the same stage of development. In addition, enterprises on the government estates usually have a minimum of capital, not having had to purchase land or buildings, and may for that reason be less stable in a slump, especially as they are not in a position to raise loans on the security of their ownership of land and buildings. On the other hand, concerns starting on the Special Area trading estates are subject to a careful scrutiny of their affairs before they are accepted, so that they may, on the average, be less likely to fail than industrial concerns elsewhere. Several of the trading estate companies, although they avoid any form of interference in the affairs of their tenants, do their best to help them if they get into difficulties. If, for instance, the trouble is lack of orders, such help through the agency, perhaps, of individual directors with other interests, can be of a very practical kind.

Summary

Before going on to describe in detail some selected trading estates, it may be helpful to summarise the principal features of trading estates in general from the points of view of the industrialist, of labour, and of the community.

To the industrialist, trading estates offer factory sites, buildings, and the more common services on a rental basis, thus reducing to a minimum the initial capital required, and eliminating one of the major difficulties in starting a new enterprise. The proportion of the total capital required by a new industrial undertaking which is represented by land and buildings is surprisingly high—often over 50 per cent even in the case of works employing costly plant and machinery. Trading estates also possess other advantages, such as proximity to market, social facilities for workers, and, to some extent, advertising, in so far as the publicity of the estate frequently refers to works already located there, and influential visitors are frequently brought round on tours of inspection.

They also provide the facility of a definite industrial centre. Many new entrepreneurs, particularly those from abroad who come to manufacture in Great Britain in order to avoid tariffs or for other reasons, do not know exactly where to place their factory. They may know that they want to be near London, or Manchester, for example, but know little as to actual sites in those areas. It is obviously a great convenience to such people to be able to go to the central office of a trading estate and arrange for all their requirements. Not only is the question of site thus easily settled, but the industrialist does not have to consider separately the availability and cost of various other requirements common to all industry, such as

transport, gas and electricity supplied, etc. He knows that they are available on the estate. It does, however, usually remain for the industrialist to satisfy himself as to the suitability and adequacy of labour, though trading estates are usually near centres of population, and difficulty is unlikely to arise from this source. Some estates have made efforts to provide a certain amount of working-class housing.

On the other hand, the factors which determine location may not be the same for all the diverse industries on a trading estate, and it is therefore possible that in some cases the location may not actually be the best—for example, transport costs might be slightly reduced, without affecting other factors, by location elsewhere. In such cases the industrialist must obviously weigh the advantages of the estate against possible disadvantages.

From the point of view of labour, trading estates raise some interesting questions. In the first place, the wide diversity of industries, and the relatively large number of employers, make trade union organisation difficult. The workers have few common problems, and it is therefore difficult for a union organiser to raise any collective enthusiasm. While this would apply no less if the various factories were scattered instead of being collected on one estate, an industrial area of the size of, say, Trafford Park, would probably be much more homogeneous if it were not a trading estate. In other words, it is the diversity characteristic of trading estates which creates the special trade union problem.

On the other hand, the fact that there are frequently canteens and recreational facilities which are common to all factories on the estate makes for a general clubbing together of all kinds of labour. Thus, while trade union organisation according to trade may be difficult, labour tends to become organised simply as labour, but without the background of collective problems which usually forms the basis of trade union organisation. As a result, there is seldom the same enthusiasm that is found where a large body of workers is confronted with the same set of problems. The fact that so many of the workers often live miles away in different directions and are anxious to get home when work stops is a further obstacle to organisation.

For the community in general, trading estates secure the segregation of industrial from other kinds of development, and also economise industrial services in much the same way as service flats economise personal services. At the same time they usually make for diversity of interest in the area. The advantages of diversification from the point of view of providing balanced employment, and spreading the risks of the community over a wide variety of sources of income are considered in Chapter VIII.

The remainder of this chapter is devoted to a description of some typical trading estates. An examination of a complete list of trading estates in Great Britain would show that they fall readily into well-defined groups. In the first place, they may be divided into:

- (a) Trading estates proper, which build standard and other factories for letting to tenants, and which provide a large measure of communal services.

- (b) Industrial sites which are tracts of land considered suitable for factory development, where no communal facilities are provided, and where buildings usually have to be provided by the industrialist in the ordinary way.

These main groups can be subdivided as follows:

- (a) (i) Estates operated on normal commercial lines by joint stock companies, such as those at Trafford Park and Slough.
- (ii) Estates developed in connection with town planning schemes, such as those at Letchworth and Welwyn.
- (iii) Estates sponsored by the government as part of the Special Areas rehabilitation programme.
- (b) (i) Small estates acquired as subsidiaries to the main Special Area estates, such as those at Pallion (near Sunderland), St. Helen's Auckland, Larkhall, Cyfarthfa, etc. On these estates there are no communal services, but industrialists establishing works there can obtain financial assistance for factory building, etc., from the Commissioner.
- (ii) Sites acquired by government-assisted site companies, such as the Lancashire Industrial Sites Co., Ltd., outside the Special Areas, under the provisions of the Special Areas (Amendment) Act, 1987.
- (iii) Sites developed by speculative builders and others. There are numerous examples of these.
- (iv) Others.

Of the foregoing, group (a) is by far the more interesting, and typical estates in each of its sub-groups have been selected for description.

In group (a) (i) Trafford Park and Slough are described, the former as being the pioneer trading estate in Great Britain, and the latter as showing how a trading estate can attract a wide diversity of industry, and provide for it an economic location in a place which might not otherwise have had any outstanding industrial attractions.

Other important estates in this group would be, for example, those of the North Metropolitan Electric Power Supply Co. at Brimsdown, the Ford Motor Co. at Dagenham, and Slough Estates Ltd. at King's Norton, Birmingham.

In group (a) (ii) Letchworth and Welwyn Garden Cities have been described. Somewhat similar developments are taking place, for instance, at Wythenshawe (Manchester) and Speke (near Liverpool). These have been developed by the corporations of the respective cities, who also have powers to advance money to industrialists establishing factories there.

In group (a) (iii) Team Valley, Treforest and North Hillington have all been described.

Examples, classified as far as possible, have been given of individual companies established on trading estates, as these vary widely between different estates, and in several cases throw interesting light on some of the questions—such as linkages—discussed elsewhere in this report.

TRAFFORD PARK

The pioneer and largest trading estate in this country is that at Trafford Park, which dates from the end of the last century.

It occupies a site of about 1,200 acres adjoining the Manchester Docks and the Bridgewater Canal, and its own system of statutory railways connects it with the Manchester Docks, and with the main line railways.

Nearness to Market

The surrounding area is one of the most densely-populated parts of the United Kingdom. A radius of 25 miles covers a population of well over four millions, and includes the large industrial towns of south-east Lancashire and North Cheshire, while a radius of 50 miles, covering over 10 millions of population, includes, for instance, Liverpool, Birkenhead, Stoke-on-Trent, Sheffield, Leeds, Bradford and Preston. Within 75 miles are the Birmingham area, Leicester and Nottingham, while a 100 mile radius, covering over 18 million people, includes Hull and Tees-side, and only just misses Tyneside.

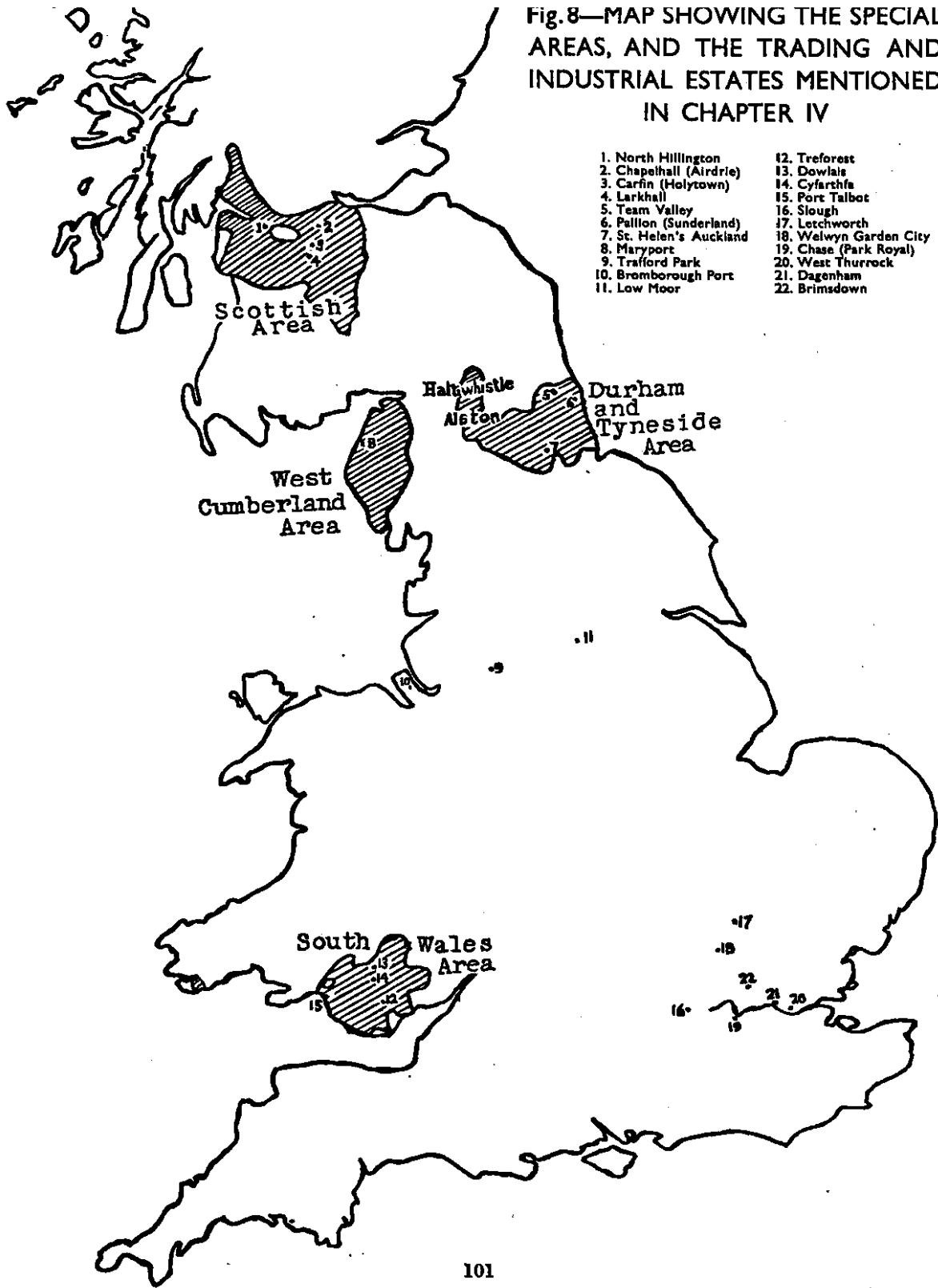
Supplies

The estate is favourably situated as regards fuel and power supplies. The South Lancashire Collieries, which are served by the Bridgewater Canal, are only three or four miles from the estate, while the rail haul from other collieries in the district is short. All the leading oil companies have established storage depots on the estate, so that fuel oil is readily available. Electricity is obtained from the Stretford Electricity Board, whose power station is located on the estate. About 85 per cent of the output is used for industrial purposes, and the prices vary according to consumption and load factor. The Stretford power station is interconnected with the Manchester Corporation "Grid" super-station, which is also located at Trafford Park. Gas is supplied by the Stretford and District Gas Board, 53 per cent of whose output is used for industrial purposes.

A special Act of Parliament was obtained in 1904 to give statutory powers to the railways in Trafford Park, and to enable all kinds of industrial facilities to be granted on, under, and over roads on the estate, either before or after these roads are taken over by the local authorities.

Soft water is drawn from the Manchester Corporation system and is brought from Thirlmere in the Lake District. An additional supply is being secured from Haweswater. Large quantities of water for manufacturing purposes can be obtained by sinking an artesian well in the red sandstone, and a number of such wells have already been sunk with a delivery ranging from 25,000 to 50,000 gallons per hour. Water for condensing purposes can be obtained by special arrangement from the Ship Canal or from the Bridgewater Canal.

Fig. 8—MAP SHOWING THE SPECIAL AREAS, AND THE TRADING AND INDUSTRIAL ESTATES MENTIONED IN CHAPTER IV



How Sites are Obtained

Firms wishing to acquire sites on the Trafford Park Estate can do so, either by purchasing the land outright for cash payment or by taking conveyance of the freehold of the land, subject to an annual chief rent. The second method, by which the land is fully conveyed for all time and not for any limited period of years, gives all the security obtained by outright purchase, but saves the immediate capital outlay.

In addition, certain blocks of buildings with road and rail facilities have been constructed by Trafford Park Estates Ltd. for letting on lease or yearly tenancy to firms desiring factory or warehouse premises, but not wishing, for some reason, to construct their own. There are also small "hive factories" with a floor area of about 2,400 square feet, which are rented at the rate of 10d. per square foot of floor area, by small and experimental concerns. It is stated that these factories, at this rental, are not economic to the estate company, but small enterprises which start in them usually grow into a larger factory on the estate.

The cost of building at Trafford Park is low, owing to ease of access and to the location on the estate of constructional engineering and concrete specialist firms, stockholding timber merchants, and other concerns connected with the building trade. Very little preparatory work is necessary for foundations, the subsoil being sand and gravel overlying red sand and sandstone rock.

Transport Facilities

The Manchester Docks, which are the termini of the Ship Canal connecting Manchester with the sea 85 miles away, have already been mentioned. The railways on the estate are Statutory Railways authorised by special Acts of Parliament, and each site can have its own private railway siding without any cost other than that of construction and maintenance of the junction with the main lines, and of any lines required on the site itself. The Trafford Park Railways are connected with all the main line railways and with those of the Manchester Ship Canal Co.

By special arrangement, traffic imported or exported via the Ship Canal is hauled by rail between Manchester Docks and private sidings in Trafford Park at owners' risk, inclusive of use of wagons and, in the case of import traffic, of stowage, at the following rates:

Open wagons	..	1s. 1½d. per ton import traffic; 6d. per ton export traffic.
Sheeted wagons	..	1s. 5½d. per ton import traffic; 10½d. per ton export traffic.

Diversity of Industries

Trafford Park has played a large part in diversifying the industries of Lancashire. Without it the contraction in the cotton industry which the county has had to face in post-war years would probably have left a much more serious mark, as the comparable contraction of the coal industry has done in South Wales, for example,

where there is much less of a substratum of secondary industries. Moreover, its influence cannot be measured only by the number of workmen employed on the estate: the employment provided itself helps to maintain the purchasing power of the local market, and the presence of a large works like that of the Metropolitan-Vickers Electrical Company is bound to influence the prosperity of other industries in the area (but not necessarily on the estate), such as copper wire drawing.

A Profitable Enterprise

Apart, however, from the valuable influence which it exerts in this way, Trafford Park Estates Ltd. is a sound commercial enterprise, and the trading estate is one of the few which have been built up to this position without some fortuitous financial advantage, such as indirect government assistance.

The financial particulars of the Company show that the cost of developing the estate was very heavy (about £1,500 per acre, excluding cost of land), with the result that no dividend was paid for the first twelve years. In 1917 a dividend of 5 per cent was paid, and this rate was maintained until 1933-34 when it was raised to 6 per cent. This dividend was repeated for 1934-35, was increased to 7 per cent in 1935-36 and 1936-37, and again to 8 per cent (including a bonus of 1 per cent) in 1937-38. If, however, the total amount paid in dividends is spread over the whole life of the Company (since 1896) the average annual dividend is 3.687 per cent on the nominal value of the shares.

The Company has an issued and subscribed capital of £650,000 in £1 shares and outstanding debenture stock of £449,300, while the general reserve stood at £59,000 on June 30, 1938. An analysis of the holdings of the Company is of interest, owing to the fact that some of its income is derived from subsidiary companies connected with the estate—an example of general importance to other trading estates.

The chief source of income (in 1937-38, £87,797 out of a total revenue of £104,971) is from rents and leases. The majority of land is held freehold subject to a chief rent or is rented on lease by the occupants, the amount of land sold freehold for cash being about one-third of the total. At June 30, 1938, 297 acres had been sold outright, 501 acres disposed of on chief rent, and 35½ acres had been taken on short leases or tenancies. Of the remainder, 109½ acres are occupied by roads and railways.

Apart from debenture and loan interest, etc., depreciation, rates, taxes and insurance, the main expenses of the Company are maintenance of estate, advertising, staff salaries, managing director's remuneration, directors' fees and legal charges, etc., which, in 1937-38, amounted to £15,396, or about 15½ per cent, of gross receipts from rents and subsidiaries.

The shares held in the Trafford Park Co. (which operates the statutory railway) stood in the 1937-38 balance sheet at £180,299 ("at cost, less reserves"). There is also a holding of 4½ per cent mortgage debentures (£12,000 at cost) in this company.

Grain Elevator Estate Ltd., in which the Company holds shares valued at £27,623 ("at cost") provided a yield of 10.67 per cent in 1937-38.

The income from Port of Manchester Warehouses Ltd. comes from 6 per cent preference shares and 4½ per cent first mortgage debentures (converted from 5 per cent and partially repaid in 1934-35). The average overall yield from this source is at the rate of 8.48 per cent on an investment standing at £85,908. Trafford Park Dwellings Ltd. gives an overall yield of nearly 5 per cent on an investment standing at £50,847.

The least profitable of all the subsidiary companies has been Trafford Park Cold Storage Ltd., the investment in which stands at £102,558, but which only contributes an overall yield of 2.32 per cent. An increase in the traffic of perishable foodstuffs handled by this subsidiary would influence the earnings of the parent company very favourably. In view of the desirability, for defence purposes, of decentralising from London some of the frozen or chilled meat imports, an increase of imports at Manchester is not improbable.

Industries on the Estate

A very wide range of industries, comprising over 200 industrial undertakings, and giving employment to about 50,000 people, is accommodated on the estate.

Perhaps one of the best-known companies was, up to 1930, the Ford Motor Co. assembly plant and body works, before these were moved to the new site at Dagenham. The Metropolitan-Vickers Electrical Co., who employ about 15,500 workers, have already been mentioned, while other companies in the electrical and cable field are the Lancashire Dynamo and Crypto Ltd., the London Electric Wire Co. and Smiths Ltd., Callenders Cable and Construction Co., Ltd., and W. T. Glover & Co., Ltd.

The chemical industries are strongly represented. In the dyes field the British Alizarine Co., not long ago acquired by I.C.I., has a large works, and other smaller companies are Bard and Wishart, and Sandoz Chemical Co. (who are associated with the well-known Basle firm). Courtaulds Ltd. also have a chemical works there. Corn Products Ltd., the large maize, starch, glucose and dextrine producers, have a works on the banks of the Ship Canal, and James Laing & Co., who are starch and farina producers, also have a works. A recent arrival of considerable importance is the firm of Thomas Hedley & Co., soap makers, who are associated with the American Proctor and Gamble combine.

Even the heavy industries are represented at Trafford Park by Messrs. Taylor Bros. & Co., a branch of the English Steel Corporation, who are manufacturers of railway wheels and axles, and have a large works.

A large group of firms are concerned with the building industry and building materials. There are 9 timber importers and merchants, manufacturers of mouldings, etc. : Messrs. J. Ashworth & Co.; Birkenhead & Co.; Illingworth, Ingham (Manchester) Ltd.; G. Mason & Co.; Remer Timber Co.; Frank Rosser; James Rowlinson; Watson and Todd Ltd.; and Waterhouse-Norgis Ltd.

The Trussed Concrete Steel Co., makers of "Truscon" floors, "Hy-rib" and pre-cast concrete products have two fair-sized works which have recently been extended. Other companies in similar trades are the Concrete Unit Co., Turner's Asbestos Cement Co. (a branch of Turner and Newalls Ltd.) who have a large works at the western end of the estate, and Liverpool Artificial Stone Co., who make hydraulic-pressed paving slabs and kerbs, and concrete tiles. The last-named company also has works at Liverpool and London.

Iron and steel stock-holding merchants are represented by Messrs. Hall and Pickles Ltd.; structural steel work by Ed. Wood & Co., Bannister Walton & Co., Redpath Brown & Co., and Skipworth, Jones and Lomax Ltd.; asphalt contractors by Penmaenmawr and Trinidad Lake Asphalt Co.; terrazzo specialists by Edgar Udney Co. There are also other firms in the miscellaneous building materials field such as W. E. F. Co., Ltd., makers of roofing felt; and William Kirkpatrick Ltd., stone and granite works.

Furniture is represented by Freedlands Ltd., Universal Furniture Products (Wembley) Ltd., and M. Hackney & Co., while an interesting recent addition to the estate is the works of F. Hills and Sons, Ltd., who originally started making patent storm-proof wood windows and later started to build "Hillson Praga" aeroplanes, already mentioned in Chapter III as an example of industrial evolution.

There is a wide range of food and drink industries. A. Guinness, Son & Co., brewers, and Brooke, Bond & Co., tea blenders, both supply well-known needs, while H. J. Heinz Co. have a depot for the distribution of 57 varieties of food products. Hovis Ltd., flour millers, and Macfarlane Lang & Co., biscuit and cake manufacturers, are well-known companies, while there are three edible oil and lard manufacturers—N. Kilvert and Son, the Southern Oil Co., and Robert Wilson and Sons (Barrhead).

The mineral oil storage installations of the chief oil companies have already been mentioned. Apart from these there are several small refiners of special oils: for instance, for lubrication or use in transformers. There are also companies in the rubber and allied industries such as the Rubber Regenerating Co., Rubber Latex Ltd., and A. Cairns & Co.

In the engineering field Massey-Harris Ltd., the well-known makers of agricultural machinery, and Ingersoll-Rand Co., makers of air compressors and pneumatic tools, are among the larger works. The Carborundum Co., who have a large works on either side of Trafford Park Road on the estate, market their abrasive products mainly in the engineering industries.

This very brief survey—which omits several quite important firms—gives some idea of the industrial diversification on the estate and of the fact that one works often attracts another, whether it is a competitor making the same product, or a complementary works in the sense that a manufacturer of electrical appliances, for instance, will require supplies of insulated copper wire. It will be observed, however, that industries making branded consumer goods by no means dominate Trafford Park, which in this respect differs from certain trading estates.

SLOUGH

The Slough Trading Estate, which is owned and operated by Slough Estates Ltd., consists of some 700 acres of land, about 25 miles from London, containing a variety of factories of all sizes available on rental terms, and also a housing estate. The Great Western Railway main line adjoins the estate, on which there are also 11 miles of railway track in a free collection and delivery area. The estate is served by a private passenger station, and is, under normal conditions, not much over 45 minutes from the centre of London. When the scheme for an arterial road straight through from the West Cromwell Road, by Hammersmith and Chiswick to the Kew end of the Great West Road, is carried out, this time—much of which is usually spent in or near Hammersmith Broadway—will be materially reduced. The south frontage of the estate adjoins the Bath road between Slough and Maidenhead.

The supply of gas, electricity, (soft) water and steam is undertaken by the Company at low rates, and there is a domestic housing estate of 2,000 houses attached to the industrial section, where houses are available for workpeople either to rent or purchase.

Standard Factories

As a result of the method of standardisation adopted in building, new factories of any standard type can be built within eight weeks, and can be let at relatively low rentals. Small ("Bijou") factories are available at rents on a basis of 1s. per square foot of floor space per annum. These are usually taken by new concerns starting production on a small scale, or by older manufacturers who are developing a new product. If they succeed, they usually move into larger premises on the estate. The number of factories on the estate has risen from 144 in 1932 to 270, occupied by 240 tenants, in April 1938. The average size of these is small, and the company rightly regard it as a strong feature of their position that no individual tenant represents more than about 6 per cent of the total rent-roll.

About 25,000 persons are employed on the estate, most of whom live in or near Slough; the proportion of adult women and of semi-skilled workers employed is distinctly higher on the estate than in other parts of the country.

The presence and growth of industry on the Trading Estate has caused an enormous growth in the population of Slough—from 16,000 at the end of the war to 60,000 at the present time. Large numbers of persons have come from the depressed areas, particularly South Wales—there is a substantial Welsh-speaking community in Slough.

Social Centre

A large Social Centre on the estate has a swimming bath and gymnasium, and provides facilities for table tennis, badminton, darts, billiards, and numerous other recreations. Many manufacturers on the estate subscribe to the Social Centre, and employees of these firms pay 5s. per annum for membership. Employees of non-subscribing firms pay 10s. per annum. Small extra charges are made for some of the games, and for refreshments. The facilities of the Social Centre are available to workers in the Slough area, and also to their families and friends.

Financial Position

The authorised capital of the Company consists of £819,000 in £1 shares, of which £735,000 has been issued. Reserves have risen rapidly throughout the slump from £135,000 in 1939 to £461,000 at the end of 1937, so that they are approximately equal to 60 per cent of the issued capital. Net profits, after deduction of tax, having been well maintained during the slump, rose to £99,113 in 1937, when a bonus of 5 per cent (as compared with 2½ per cent for the three previous years) was paid in addition to the 10 per cent dividend which has been maintained for many years.

The value of freehold land, buildings, equipment, plant, etc. (less depreciation and sales) has risen from £688,000 in 1930 to £1,147,000 in 1937. The additions to these items vary considerably from year to year, but have averaged £66,000 per year over the 7-year period mentioned, an indication of the continued progress of the Company in improving its equipment and facilities.

Services

A new turbo alternator of 7,400 kw. was installed on the estate in 1933, and a further high-pressure alternator of 2,000 kw. in 1936. A duplicate of the former, with a suitable extension to boiler capacity, has recently been installed. Successive reductions in the price of electricity have been made during the last seven years, and a further reduction came into force in July 1938, but in the past the rates of charge have been relatively high, and it is interesting to note that this has not prevented the rapid development of the estate. In this connection a point of considerable technical interest is the supply to tenants of steam for process and heating purposes measured and charged for by meter. Water, which is stated to be of a very high quality, and to have been responsible for attracting several firms, is obtained from artesian wells, of which there are now three on the estate.

Amenities

While neither the town of Slough nor the trading estate as a whole can claim aesthetic merit, the Company rightly lays great emphasis on the amenities of the surrounding district—a feature which plays an important part in the location of industry. Proximity to London and to the Thames Valley scenery are obvious advantages. There are four golf courses within a few minutes of the estate, and nine more only a few miles away. There are many tennis, cricket, rugby and Association football and rowing clubs in the neighbourhood, while for the less athletic there are the cinemas and riverside resorts in Maidenhead and elsewhere. It may even be not without importance for a trading estate to be within a few miles of Eton and Ascot.

Diversity of Industries

A very wide range of industries is accommodated on the estate. There are firms engaged in engineering of various kinds, electric lamp manufacture, cellulose paint production and spraying, printing and showcard making. There are manufacturers

of distempers, toilet requisites, drugs, and various chemicals. There are confectionery manufacturers, food preservers and packers, and clothing makers. All these, and numerous others, have gone to Slough mainly for the sake of convenient premises, in a district offering good amenities. Very few firms, apparently, have gone there in order to be near some related (or linked) industry.

High Duty Alloys Ltd., makers of "Hiduminium" and other special light alloys which are extensively used in the aircraft industry, moved to Slough from Walthamstow, while, also in the engineering field, Citroen Cars Ltd. have an assembly plant on the estate. St. Helens Cable and Rubber Co., Ltd. make cables, rubber flooring, ebonite mouldings and allied products; while Bell's Asbestos and Engineering Supplies use their premises at Slough as a warehousing and distribution centre. Two other firms in specialised engineering fields are Black and Decker Ltd., makers of mechanical rotary tools, who came to Slough from the U.S.A. in 1925, and British Miller Hydro Co., Ltd., makers of electrically-operated bottle-washing machines, who came from the U.S.A. in 1927. Large premises on the estate have recently been leased to the Heston Aircraft Co., Ltd., and Combined Optical Industries Ltd.

A large number of the works at Slough deal with the manufacture of products for domestic use, and a wide range of consumer goods. Examples of these are O'Cedar, who came from the U.S.A. to Slough in 1922; Aspro, who came from Australia to Slough in 1926; "4711" Eau-de-Cologne Parfumerie Fabrik; Northam Warren Ltd., makers of manicure products such as Cutex, Odorono and L'Onglex; Berlei (U.K.) Ltd., makers of corsets, who came from Australia to Slough in 1929; British Chewing Sweets Ltd., who came from the U.S.A. to Slough in 1926; and Fruit Products Ltd., who came from South Africa to Slough in 1927.

Slough Estates Ltd. also operate at King's Norton, near Birmingham, a smaller though similar trading estate.

LETCHWORTH

There are several examples of industrial estates which have been developed in conjunction with housing and social institutions, on garden city lines.

Of these the first was at Letchworth, in Hertfordshire, 84 miles north of London. It is controlled by First Garden City Ltd., which was registered in 1908.

The development of the town has been carefully planned, and separate areas are scheduled for factories (on both sides of the railway), for cottages (within easy walking or cycling distance of the factories), for shopping (in the centre of the town), and for residential purposes.

Standard factories, which have land adjoining for extensions, have been built to let to small concerns who do not wish to invest capital in the construction of their own buildings. These measure 100 feet by 40 feet, giving 4,000 square feet of clear floor space, well lighted by steel-framed windows on both sides and in the roof. They are let complete with lighting and heating installations, lavatory and office accommodation. In the case of larger works the Company are prepared to consider erection and sale on a rent-purchase scheme over a period of years.

In addition, factory sites can be leased for 999 years on a ground rent which includes road-making charges, land drainage, and electricity, gas and water services. The sites are level, and as the subsoil is chalk a solid foundation is obtained. Railway sidings can be arranged if required.

A considerable variety of industries is accommodated at Letchworth. This has been a matter of policy on the part of the management company in order that depression in any particular trade should not seriously affect the town as a whole, and has doubtless also assisted the attraction of further industries to Letchworth. Labour, skilled and semi-skilled, male and female, is plentiful, and about 4,000 out of the 11,000 factory workers come from the villages and small towns within a ten-mile radius, which have a total population of 63,000. This use of rural man-power follows Howard's original idea of "wedding town and country." About 2,950 cottages have now been built as part of the working-class housing scheme, and this number is increasing by 100 a year. The density of building is 12 to the acre. Recreational facilities include cricket, tennis, football, swimming, bowls, and billiards.

The Company itself owns the local electricity generating station, which has distribution powers over an area of 38 square miles in Bedfordshire and Hertfordshire, the local gas works, and the local water works. Fuel and power prices compare favourably with those in older industrial districts, and discounts are available for large industrial consumers.

Industries at Letchworth

The industrial enterprises which have been established at Letchworth fall into certain well-defined groups, usually with several in each group, bearing out the general contention that a works tends to attract both complementary and competitive enterprises. There are six printing and bookbinding companies together employing 1,000 to 1,300 people: the Garden City Press Ltd., who are specialists in colour, periodical and book printing; J. M. Dent and Sons, Ltd. (the Temple Press), who are well known for their "Everyman's Library" series; Letchworth Printers Ltd., who, besides carrying on a general printing business, own and publish the local newspaper and directory; Multicolour (London), Ltd., who specialise in colour cards and books; St. Christopher Press, commercial, scholastic and general printers; and G. W. Wardman, Ltd., (Commonwealth Press). Three companies allied to this group are Addresslet Co., Ltd., who print and publish names and addresses of postal advertisers; W. C. Bowry and Co., makers of stationers' sundries, files etc., and the Standard Advertising Tape Co., Ltd., who make coloured and overprinted tapes and ribbons.

The engineering industries are strongly represented. In the heavy section, Kryn and Lahy (1928) Ltd. are makers of steel castings and particularly of magnet steels, while they also do general machining and assembly work. Their works cover 26 acres and employ over 1,500 men. The Company also has a subsidiary, the Browett-Lindley Co., who make large compressors.

Letchworth Castings Co., are a small firm making non-ferrous castings; and Furnston and Lawlor are engineers' pattern and model makers.

Two well-known specialist engineering firms are Ewart and Son, Ltd., who, besides doing general sheet metal work and brass founding, are makers of geysers, water-heaters, ventilators, etc., and were among the early arrivals at Letchworth in 1910; and Shelvoke and Drewry Ltd., who make petrol motors for refuse collection and municipal transport equipment of many kinds. The Chater-Lea Manufacturing Co., Ltd., are well-known makers of motor cycles and components, and the British Tabulating Machine Co. of Hollerith electrical tabulating and card-sorting machines. The Fus-Arc Welding Co. makes welding plant, the Hoy-Whitley Co. mining plant, the British Bundy Tubing Co. copper tubes, the Victaulic Co., Ltd., patent pipe joints, and Jigs (Letchworth), Ltd., machine tools.

Marmet Ltd. make baby carriages and invalid chairs, and have more recently branched out into tubular furniture; Lloyds & Co. (Letchworth) Ltd. make hand and motor lawn mowers; the Morse Chain Co., make a variety of chains, including timing chains for motor cars; Shirtliff Bros., Ltd., make presses; and Sullivan Machinery Co. mining machinery, besides which there are several other firms coming into the engineering group, the total employment roll of which is about 5,000.

The third group consists of makers of scientific instruments and allied products, represented by the Sigma Instrument Co., who make gas calorimeters, meters and governors, pressure and specific gravity recorders, etc.; the Foster Instrument Co., makers of pyrometers and automatic control gear; the Scientific Apparatus Co., W. J. Brooks & Co., and Kryptok Ltd., makers of invisible fused bifocals, may also be placed in this group.

The fourth group consists of clothing and soft goods makers such as the Spirella Co. of Great Britain Ltd., the well-known makers of corsets and lingerie; M. and J. Herz and Falk Ltd., embroidery and lace manufacturers; and R. Haworth, who make knitted goods, etc.

Finally, there is a miscellaneous group, consisting of a match company, the Anglia Match Co.; a company making a wide range of rubber articles, the Hertfordshire Rubber Co.; a company making parachutes, the Irving Air Chute of Great Britain Ltd.; Oiled Silk Fabrics Ltd.; a laundry and a large number of smaller works.

There is a large Government Training Centre at Letchworth where over 10,000 men from the Depressed Areas have been trained in a variety of trades, and fitted for employment in local and other industries.

Financial Position

First Garden City Ltd. has an authorised, issued and paid-up capital of £400,000 in 5 per cent cumulative preference shares of £5 each (£150,000) and cumulative 5 per cent ordinary shares, £8,000 in £1 shares and £247,000 in £5 shares. Any excess of profit beyond 5 per cent is applied to the benefit of the town of Letchworth or its inhabitants. There is, at present, a total outstanding debenture of £664,123.

The Company reached the dividend-paying stage in 1918, and has paid its full dividend of 5 per cent since 1923.

In 1938 (year ending September 30, 1938) the total profit of £62,747 was derived from the estate, gas, water and electricity sections in the proportions of 31.8 per cent, 10.8 per cent, 10.8 per cent, and 46.5 per cent respectively. In 1929 the profits from the estate section and the electricity section were approximately equal, at £16,250 and £16,779 respectively, but in 1938, while the former had risen only to £19,349, the latter had almost doubled at £29,915.

As already stated, however, the electricity undertaking distributes over an area of about 38 square miles, so that its increased profit does not result entirely from the growth of the garden city of Letchworth, and increased use of electricity there.

The gross revenue from the estate section is the best guide to the growth of Letchworth. It increased from £23,942 in 1929 to £30,469 in 1938.

WELWYN

Welwyn, like Letchworth, can justly claim that it combines a sound economic location with amenities unobtainable in the older industrial areas. Started in 1920 it has been carefully planned, and for this reason alone has a great advantage over industrial districts which have had to evolve unguided, and in which results of lack of foresight are always interfering with the present.

Situated on the main line of the L.N.E.R. from King's Cross, it is within half-an-hour of central London by train, and, owing to its proximity to the Great North Road, deliveries by road both in the London area and South of England and in the Midlands are quick and convenient. The L.N.E.R. goods station has been specially laid out to deal with industrial traffic, and there is easy access by rail, for instance, to the Thames Docks and the Midlands. About half the population of England and Wales live within a 100 miles of Welwyn.

As rail charges on manufactured goods are usually higher than those on raw materials, it is advantageous for many industries to determine their location mainly from the point of view of the geographical situation of their customers. An interesting illustration of this is the case of Welwyn Foundry Ltd. (a branch of Allied Ironfounders Ltd.), which was "budded off" from a Midland Foundry to cater for the South-East England market in castings, as the savings in distribution costs outweighed the extra haulage on materials and fuel.

Welwyn provides both industrial amenities, such as proximity to market, convenient sites and quick transport, and social amenities for employees, access to the country, well-planned streets, and general healthy working and living conditions. The most recent developments in this direction are the provision of a hostel for boys working in the town, and a large hall and community centre in the most recent area of working-class housing.

Sites Held Under Lease

Factory sites at Welwyn are available on 999-year leases in order to combine the maintenance of town planning control with the security of permanent tenure.

Sites are provided with complete services—water, gas, electricity, sewers and roads, while rail sidings connections are available for many of the larger sites. In addition, standard factories can be rented on short leases. A number of these have been built, ranging from 1,500 square feet to 85,000 square feet floor space. These are brick buildings of steel-frame construction, roofed with asbestos tiles laid on boarding, and with granolithic floors laid on concrete.

Great importance is attached to the careful design of factories and to the technical co-operation of the production engineer and the factory architect in order to secure maximum economies. It is considered that a well-planned building has good publicity value and also exercises an important influence on workmanship. Welwyn has a technical organisation equipped to advise on all matters of factory design, and a number of well-known architects have designed factories there.

Services

As regards the utility services and their cost, water of high quality can be obtained for charges ranging from 2s. to 9d. per 1,000 gallons, according to consumption, while a large user may sink his own well if he wishes. Gas and electricity supplies for industrial uses are available at special low charges.

There is a plentiful supply of labour, and apart from the town itself, which has a population of about 14,000, and the three adjoining rural districts which have a population of over 80,000, there are a further 75,000 people within a short cycle ride, and in neighbouring towns, within a short 'bus or workmen's train journey, a further 200,000. Most workers at Welwyn live within walking distance of their work, which, of course, saves the expense and fatigue of travelling usually experienced in London and other large centres of population. The rents of artisan houses at Welwyn range from 11s. 6d. to 21s. per week inclusive. Each house has a private garden. Sports clubs, amusements, educational and general amenities are very highly developed.

Industries at Welwyn

There is a wide range of industries already established at Welwyn, which may broadly be grouped as follows: There are two printers, Broadwater Press Ltd. and Alcuin Press Ltd.; and a wide range of companies in the building, contracting, and building materials field, namely, Welwyn Builders Ltd., who have carried out many important contracts in Welwyn and elsewhere; Dawnays Ltd., constructional engineers; the Herts Gravel and Brick Works Ltd.; British Lead Mills Ltd., makers of sheet lead for gutters, flashing, etc.; Skarsten Manufacturing Co., Ltd., and General Stampers (Welwyn) Ltd., makers of door furniture; Wellinlith Ltd., manufacturers of partition blocks, building slabs and sound-proofing material; and Akis Chemical Co., makers of cement waterproofing compounds.

In the foodstuffs field, one of the early settlers in Welwyn was the Shredded Wheat Co., while Bickiepegs Ltd. make nursery foods, and F. W. Amend & Co. and A. Buchanan and Sons confectionery and toffees. Atomised Food Products Ltd.

make coffee powder, Vegidine Ltd. make cattle and poultry foods, and the Vigormilk Co., Ltd., dog foods.

Electrical engineering is represented by Unity Heating Ltd., makers of electric tubular and other heating appliances; Murphy Radio Ltd., radio set manufacturers, who started at Welwyn in 1929, with a small staff, and now employ about 1,000; and Neosid Ltd., makers of radio and television accessories.

In the textile and clothing field there are Cresta Silks Ltd., Barclay Corsets Ltd., British Braids and Bootlaces Ltd., Fedden and Bond Ltd., silk stocking manufacturers, etc. W. D. Earnshaw (Welwyn), Ltd., Gerald Carter & Co., Ltd., and Silexore Ltd. make paints; Ferramic Industries Ltd. make raw enamels; and Welwyn Enamelling Co., Ltd., carry out vitreous enamelling. Barnet Comb Co., Ltd., make combs and various vulcanite products.

Several firms of manufacturing chemists have been established at Welwyn, including Beiersdorf Ltd., Carnegie Chemicals (Welwyn) Ltd., while the most recent development is the completion of the first pharmacological laboratories in England for Roche Products Ltd., a branch of the Hoffmann La Roche international organisation. Celtis Ltd. make chemical preparations for the motor trade, while Francis Newbery (Charterhouse) Ltd. make cosmetics, medicinal products and lemonade powders, etc.

Companies connected with general engineering include Regent Laboratories Ltd. (electrical components), Lacre Lorries Ltd. (makers of municipal road sweepers, etc.), Pocklington and Johnson (coil and helical springs), and The Lincoln Electric Co., Ltd. (welding electrodes).

Various specialities are being produced by Skarsten Manufacturing Co. (scrapers), Simplex Seed Sorters Ltd. (seed-sorting machinery), Frank Coleman (Luton) Ltd. (cardboard boxes), Welwyn Electrical Laboratories Ltd. (electrical resistances), Welwyn Metal Products Ltd. (sheet metal work, office furniture, etc.), The Haurand Castor Manufacturing Co., Ltd. (castors), Catomance Ltd. (water-proofing and stain-proofing textiles), and B.C.R. Factories Ltd. (sandpaper, etc.).

Finally, Welwyn has a film studio (Welwyn Studios Ltd.); a manufacturer of silk violin and tennis racquet strings (Alfa Strings Ltd.); a grinding wheel and abrasive plant (Norton Grinding Wheel Co., Ltd.); and a works belonging to I.C.I. (Plastics) Ltd., for the manufacture of moulding powders.

Practically all the land in the Urban District of Welwyn Garden City—about 3,000 acres—is owned by Welwyn Garden City Ltd., who, in order to retain ultimate control, do not sell any freeholds. For the sake of tenants' security of tenure, however, they grant leases up to 999 years.

The parent company, which has an authorised capital of £537,000 (£536,300 issued), has a controlling interest in numerous subsidiaries. For present purposes

the most important of these is Welwyn Commercial Buildings Ltd., which originated in 1926 and was converted to a public company with a nominal capital of £500,000 (£240,000 issued and paid up) in 1938.

This company leases land from the parent concern, and erects factory buildings thereon for letting. In most cases buildings are constructed to tenants' requirements, but some small sectional factories are constructed in advance.

TEAM VALLEY

The experience of Trafford Park, Slough and other trading estates has shown their power in attracting light industrial undertakings. For this reason, several new trading estates have been established by the government as part of its measures to rehabilitate the Special Areas. The total financial commitments of the Government in connection with the establishment of these trading estates were just over £5 million on September 30, 1938. Of this sum over £4 millions have already been spent. Limited liability companies have been formed to operate these estates, but they are non-profit-making concerns.

The first of these was the Team Valley estate, started in October 1936 near Gateshead-on-Tyne. Funds were provided by the government, through the Commissioner for the Special Areas, and North-Eastern Trading Estates Ltd. was incorporated as a public company in May 1936 to manage the estate on a non-profit-making basis.

Situated in the valley of the small river Team (a tributary of the Tyne), the estate occupies a total area of some 700 acres, about a third of which, however, is liable to colliery subsidence and will not be developed for 20 years. Alongside the estate is the main line of the L.N.E.R., beyond and close to which is the Great North Road. Both the railway and the road are connected to the estate, which has a system of sidings and private roads. Considerable development work has been necessary on the site, and the diversion of the River Team for about a mile in an underground or covered channel was a considerable work of civil engineering.

Factories, either of standard type, or built to tenants' own requirements, are let on long or short leases, and are fully equipped with offices, heating, lighting, power, water, lavatories, access roads and, at tenants' request, rail sidings. Room for future expansion is, at present, allowed at the rate of at least 50 per cent of the land taken, but, of course, further expansion beyond this limit could be accommodated in another factory on the estate. The estate insists on supervising elevations, but the management appear to attach considerably less importance to standardisation, except in the smaller factories, than some other trading estates.

While the Company still has plenty of land, it allows liberally for expansion, and undertakes to inform tenants if it is considering building on land surrounding their works. Tenants thus have the first option to negotiate a long reservation, generally without cost, at any rate in the early years.

The factories are built in groups, and each group has its own canteens, cycle sheds, kiosks, etc., and a set of "nursery" factories. These correspond to the "Bijou"

factories at Slough, for example, and consist of a single room of about 1,500 square feet. The rental is £1 per week, including heating and lighting, but this type of factory is only let to small industrialists considered to be in need of special assistance.

All or any of the services provided by the Estate Company are available at the tenant's option, and the leases contain no restrictive terms other than those which are necessary to preserve the amenities of the estate.

Electricity, gas and water are supplied to tenants at preferential charges, respectively by the North-Eastern Electric Supply Co.; the Newcastle-upon-Tyne and Gateshead Gas Co., and the Newcastle and Gateshead Water Co. A large quantity of water is also available from nearby coal-mines, from which it has hitherto been pumped to waste.

As the management company has assumed responsibility for many of the services usually provided by local authorities, a low rating assessment has been agreed with the County Borough of Gateshead.

The estate is within easy reach of plentiful supplies of labour and of a doorstep market of 2.7 millions. By the end of January 1939, 115 tenants had definitely arranged to take factories, and negotiations were in progress for another thirty factories. Tenants already in occupation included manufacturers of clothing, confectionery, concrete reinforcement, fibre board, furniture, motor bodies, potato crisps, and mining machinery. In addition, I.C.I., Cadbury Bros., and the Air Raid Precautions authorities have established distribution depots on the estate.

It is estimated that when all the factories so far let come into reasonable production, employment will be provided for 10,000 persons. At the end of January 1939, 2,150 were already employed in estate factories.

TREFOREST

The Treforest Estate, just under seven miles from Cardiff on the road to Pontypridd and Merthyr Tydfil, is planned to accommodate 150 factories when completed. The land was purchased with funds provided by the State through the Commissioner for the Special Areas, and South Wales and Monmouthshire Trading Estates Ltd. was registered, as a private company without share capital, in June 1936, to own and manage the estate. Work was started on the estate at the end of 1936.

The Treforest site lies between two railways, one of them being the Taff Valley line of the G.W.R., in the valley of the river Taff. The main road from Cardiff to Merthyr Tydfil runs through the estate. At present about 160 acres are being developed, but this may be extended later.

Factories are built by the estate company to the requirements of individual manufacturers, and are let, in whole or in part, on very favourable terms. Small factories, with 1,500 square feet of floor space, are available at £1 per week, but the normal-sized factories have a floor area of 5,000 to 12,000 square feet.

Factory rentals range from 6½d. per square foot upwards, including standard type of factory, land, paved yards, and estate roads. Tenants' special requirements within reason are met on a rental basis—for example, wood-block flooring or special heating would involve no capital cost, but would involve a percentage addition to the rent. For the standard factories the rental includes an option for a reasonable period on the land adjoining the factory, and also covers the installation of wiring and piping for all usual services, including central heating.

Coal is available from adjacent coalfields, and gas is obtainable from local municipal authorities at very low charges. Electricity is supplied exceptionally cheaply from the generating station of the South Wales Power Co., which adjoins the estate. There is also a special arrangement with the station for the supply of process steam at high temperature and pressure. A steam main a mile long serves the various factories on the estate.

A plentiful supply of soft water from the river Taff is available through the filter system and reservoirs of the estate for steam raising, condensing and general purposes. Partly treated water can be delivered from intermediate stages of the filter system for appropriate purposes at very low cost.

Thirty-two factories with 1,040 workers were already in production, while a further 18 were under construction in February 1939. Tenants include manufacturers of dry ice, confectionery, moulded toys, steel mesh for reinforced concrete, coated cardboard and paper, mouldings, electrical products, fine leather, fancy and toilet goods, lock-knit fabrics, wrist watch straps, electric storage batteries, pistons, roller skates, abrasives, typewriter ribbons, refractories, electrical switchgear, hair-dressing appliances, plastics, pencils, paint and varnish, leather belting, shoes, flexible tubing, aircraft accessories, printed silks and gloves. The British Thomson-Houston Co., E. Taylor & Co., Holborn Construction Co. and Edison Swan Electric Co. have taken buildings for use as distributing centres for South Wales, while T. F. Howells & Co. have taken a building for use as an office. The Ministry of Labour has established a training centre on the estate.

NORTH HILLINGTON

At North Hillington, on the outskirts of Glasgow, the third trading estate set up under the provisions of the Special Areas Acts, was started in June 1937. It is conveniently situated for access by road and rail (two sidings run out to the estate) and is only half a mile from the Clyde Docks.

Of a total area of 820 acres, 100 are now being developed, and 150 factories have been completed or are under construction. In January 1939, it was announced that 77 leases had been signed, while arrangements had been made for another 26 factories. Of the 77 leases signed, 61 were for factories already in operation, which employed 1,257 people. Since the first tenant only moved in in November 1937, the development of the estate has been very rapid. Within fifteen months of taking possession the company had actually erected more than a hundred factories.

The main factories are built on a unit system, with three or four units to a block. The standard units are of 5,000 square feet floor area, but this figure has had to be modified in certain cases, for example, to 6,400 square feet or 7,500 square feet.

In addition to the standard factories, six blocks, usually comprising seven so-called "nest" factories, have also been constructed. These small factories, with a floor area of 1,200 square feet, are intended for the same purpose as the "Bijou" factories at Slough, namely, for small enterprises and for the experimental and development stages of new products. Forty-one have been let and a dozen more are to be built shortly.

Electric wiring, in conduit, is provided for a standard lay-out of lighting, but not (without extra charge) to any special requirements of the tenant. Electric power, gas, and water fittings, to standard specification, are also provided, and cheap supplies are available. Electricity for all purposes is charged at 0.72d. per unit, while for power there is a special rate of 0.56d. per unit. Gas is 8d. per therm. The water is soft, and does not require treatment before use in steam-raising and other plant.

A supply of live steam at a pressure of 100 lbs. per square inch is available in each factory, and is charged for by meter on the basis of 2s. 3d. per 1,000 lbs.

The "nest" factories are let to tenants at an annual rental of £60, which includes heating. This works out, for a 1,200 square feet factory, at 10d. per square foot, excluding heating.

The main factory rentals work out at about 11d. per square foot, not including heating—for example, a 5,000 square feet factory costs £230 per annum.

The rental includes payment of insurance on the factory, upkeep of the exterior, the proprietor's share of local rates, and the maintenance of access roads. It is therefore estimated that 11d. per square foot corresponds to about 9d. in England.

A fairly wide diversity of industries is already represented among present and prospective tenants on the estate. There are manufacturers of non-ferrous tubes, oxygen and acetylene, artificial stone and pre-cast concrete slabs, etc., precision castings, felt, golf-club heads, road and quarry plant, furniture, paint and varnish, pipes, ships' fittings, machine tools, metal wool, filling and wrapping machines, neon signs, ceramic filters, stationery, chemicals, cycles, cardboard boxes, bandages, aeronautical instruments and a variety of food and clothing.

The first two on the above list (Scottish Non-Ferrous Tube Industries Ltd. and British Industrial Gases Ltd.) are among the few tenants who have needed non-standard factories.

The estate is well situated with regard to markets, having the Glasgow population of over a million at its doorstep, and 75 per cent of the population of Scotland within 100 miles.

OTHER TRADING ESTATES

In addition to the three foregoing trading estates, several other smaller schemes are in existence, in the Special Areas and elsewhere. Some of these are government-sponsored, and are administered as subsidiaries of the three large estates just

described. Others are independent enterprises. Generally speaking, however, they are not trading estates in the same sense as those already described (some of them are no more than sites for industry) as they do not provide communal facilities, nor, in many cases, factories for rental.

Two subsidiaries of the Team Valley Estate are being developed, at Pallion, near Sunderland, and at St. Helen's Auckland, though these would be more accurately described as group factory sites than as trading estates, since they are not equipped with communal facilities. Four factories have been completed or are being built at Pallion, four more at St. Helens and another at Tynemouth. In addition sites for three more factories are under negotiation. At St. Helens the industries are leather goods, buttons, engraving, cabinet making and men's clothing, while at Pallion women's clothing, oxygen and acetylene are being manufactured.

In Scotland, three small estates have been bought as subsidiaries to that at North Hillington. They are at Carfin (near Holytown), Chapelhall (near Airdrie), and Larkhall, and it is estimated that they will give employment to about 3,000 persons. A company, Lanarkshire Industrial Estates Co., has been formed to manage them, and it will have the same Board of Directors as the North Hillington company (Scottish Industrial Estates Ltd.).

At Dowlais an industrial estate has been started on the 90-acre site of an old works of Guest, Keen and Baldwins Iron and Steel Co., which, when complete, is expected to provide employment for 4,000 people. It is being developed by South Wales and Monmouthshire Trading Estates Ltd., but, like Pallion and St. Helen's Auckland, it is not strictly a trading estate, as there are to be no communal facilities. The first factory there began work in March 1988, on a precision engineering contract for the Air Ministry. A small estate has also been started at Cyfarthfa, while a policy of acquiring a number of independent sites in South Wales for single factories is also being considered.

In the West Cumberland Special Area, the West Cumberland Industrial Development Co. has acquired 17 acres near Maryport to be developed as a factory estate and has built some standard factories on it. The company is also developing other small sites.

Examples of independent trading estates are the 500-acre estate owned by the Ford Motor Co. at Dagenham, the estate of the North Metropolitan Electric Power Supply Co. at Brimsdown, and the 600-acre site at Bromborough Port on the Wirral peninsula.

At the first-named, which does not include the land occupied by the Ford Motor Works, the Company has laid down roads, railway sidings, sewers, electricity and gas mains, and a water supply. Electricity and gas are produced by the Company at its own works, gas being obtained as a by-product from the coke-ovens which serve the Company's blast furnaces.

The Brimsdown estate, at which no further factories are now available, can be classed as a complete trading estate, for factories can be rented, on a basis of 1s. per square foot of floor area per annum, and communal services are provided. The estate, which adjoins the works of the Enfield Cable Co., Ltd., is about 8 miles from Liverpool Street Station. It has rail sidings connected with the London-Cambridge line of the L.N.E.R., and has a frontage to the river Lea navigation, which accommodates barges of 60-80 tons.

Other estates in the London area are, for example, the Chase estate at Park Royal, and the new industrial and residential estate at West Thurrock, on the north bank of the Thames estuary, 4 miles above Tilbury Docks, and 10 miles below the Royal Victoria and Albert Docks. The estate is operated by a company, and the usual facilities are provided. Access for sea transport is good, and the estate company has jetties which are available for the use of those tenants who have not their own.

In other parts of the country there are estates, for example, at Low Moor in Yorkshire, and in South Lancashire. The latter is being organised by the Lancashire Industrial Sites Co., under the terms of the Special Areas (Amendment) Act, 1937, which provides for assistance to areas, other than the Special Areas, which are nevertheless depressed. The Low Moor Estate adjoins the old Low Moor blast furnaces, which are now being dismantled. When cleared, the furnace site will be absorbed in the trading estate.

An extremely interesting trading estate scheme has been projected for some time at Port Talbot, near Swansea. This is in most respects like the government-sponsored estates in the Special Areas, but its principal feature is that the output of both electricity and waste heat from a generating station on the estate is to be made available as a communal service. Not only is a considerable saving thus effected in electricity distribution costs, but the use of a large proportion of the waste heat from the station would enable low charges to be made.

Steam would be drawn off at an intermediate pressure of about 150 lbs. per square inch between the high-pressure and low-pressure sets, and would be circulated in a ring main running round the estate. Branch mains would run from this to each factory road.

It is also proposed to make available the low-pressure steam from the second stage in part of the estate for heating glasshouses.

It is estimated that at the intermediate pressure of 150 lbs. per square inch, 23 lbs. of steam will be available per kwh. generated. It is obvious, therefore, that if the estate is to be self-contained, the average amount of heat required by each factory must bear the same proportion to the number of kwh. required. As it is unlikely that this proportion will always be maintained, arrangements are necessary to effect balance. In the case of the abortive scheme at Worksop, which was the forerunner of the present scheme, balance was to be attained by means of a heat accumulator, but at Port Talbot it is hoped to conclude a contract with the Central Electricity Board, whereby the electricity output of the generating station would be

accepted by the Grid, so that problems of storage would not arise. The station would generate electricity in proportion to the demand for heat from its steam main. A possible alternative is to arrange for a basic load to be taken by an electro-metallurgical works.

The object is to have on the estate industries which use heat, such as laundries, brewing, dyeing, tanning, and the manufacture of glue, potato syrup, artificial silk, paper, soap, matches, and cellulose.

Steam would be supplied at a price lower than that at which manufacturers could generate it for themselves—the price charged would depend on the load factor, but would be generally about 40 per cent lower than the cost of generating steam in a large and efficient boiler plant.

The supply of steam on a communal basis is not, of course, entirely novel, as it has been done at Treforest, for example, in co-operation with the Upper Boat generating station of the South Wales Electric Power Co. In Germany the waste heat from a large power station has been used for heating glasshouses.

A scheme for combining on an industrial estate the advantages of low cost of electricity distribution and of waste heat utilisation has not, however, so far been put into effect.

V. EFFECTS OF THE LOCATION OF INDUSTRY

Possible Classifications—Effects on Land—Wide Differences in Land Values—Land Withdrawn from Agriculture—Derelict Industrial and other Buildings—Effect of Smoke—Dumps of Industrial Waste—Social Effects—Different Kinds of Employment—Variations in Numbers Gainfully Occupied in Proportion to Population—Light Industries give Balanced Employment—Effect of Industry on Mental Outlook of the Population—Some Industries More Susceptible to Depression than Others—Effects of Unemployment—Unemployment is Detrimental to Health—Differential Incidence of Prosperity and Depression causes Movements of Population—Effects in Areas which are Losing Population—Effects in Areas which are Gaining Population—Conclusion

In Chapter II the present location of industry and the changes which have taken place in recent years were described, and there followed in Chapter III a review of the various causes which affect or determine location in individual cases.

This chapter deals with certain consequences of the location of industry, not so much from the point of view of industry as from that of the population engaged, the land occupied, and, in fact, the nation as a whole. Although many of the effects of the location of industry considered here are adverse it should not be forgotten that many large and flourishing communities owe their existence to the enterprise of the industrialist. If location is decided solely by the views of the industrialist concerned some of its effects on industry and the community in general are apt to be unsatisfactory. It is, however, impossible to distinguish sharply between the effects on the community and the effects on industry. For example, although the cost of dereliction in an area does not fall on individual industrialists, it probably affects the running costs of industry as a whole in the area concerned.

Industry has, for instance, brought in its train the wastage of land by subsidence, slag heaps and colliery tips, and by slimes from mining and chemical works, and also the pollution of rivers and canals by effluents. It has brought the dereliction of factories which have ceased to operate, and in some cases also the dereliction of housing no longer required by those who worked at the factories. It has greatly affected the relative local incidence of depression and unemployment. It has been partly responsible for the social consequences of intense industrial specialisation, of living in very large communities, and of depopulation which has often followed when local industries have declined or moved elsewhere. And it has played a part in creating regions of strategic weakness from a military standpoint, such as Greater London.

The resulting burdens, though directly or indirectly attributable to industry and to the previous decisions of individual industrialists, are, in practice, often thrown on to local communities, and eventually perhaps have to be shouldered

by the nation as a whole. The Special Areas have become familiar examples of this process. In fact, the industrialist has, in most cases, called the tune, but has left the community to pay the piper.

Possible Classifications

The various direct and indirect consequences of the location of industry can be classified as:

- (1) due to the everyday operations of industries of certain kinds, wherever they may be—for example, the deposit of dust from cement works and the smell from a linoleum factory are due merely to the presence of those works;
- (2) due to industry moving from one location to another, or to the decline of existing industries in one district while new industries spring up elsewhere;
- (3) due to misjudgments or mistakes by industrialists—thus works have been set up in certain places, but have either failed or have actually never started production.) This has happened, for example, to a motor works at Dumfries, to a low temperature carbonisation plant at Glenboig and to an iron works in Wiltshire. The resulting waste of site and building, and possible dislocation of labour, may be directly attributable to mistaken location.

Again, the effects can be classified as social, economic and strategic, or as physical and psychological; or by almost any combination of these systems.

For the present purpose, the consequences of location of industry have been broadly divided into effects on land, and effects on population, and convenient subdivisions have been used under each.

Effects on Land

In the national economy land can be considered firstly as providing sites for various purposes, and secondly as yielding raw materials. The second group can be further divided according as the raw materials are minerals, such as coal, stones, gravel, or brick-earth, which involve actual removal of part of the land, or product, of the soil, such as timber, farm crops, meat, dairy produce, and so forth. It is evident that some land will be more suitable for site purposes, and some for agriculture. Some will be suitable for both, and some for neither.

In Great Britain there is relatively little land which falls into the last group and is physically suitable neither for site nor raw-material production. There are no deserts of sand, no very large barren, rocky, mountainous areas, and little entirely unproductive swamp. But sometimes land which is physically suitable for certain purposes cannot be economically used for them. Thus, large tracts of the Highlands could be developed for agricultural purposes, though it would not necessarily be economic to do so. Even as it is, however, that land has its value in its scenic attraction for the tourist and its provision of game and fish for the sportsman. Again, the relatively barren breckland in parts of East Anglia might

be used for site purposes, for which it would be physically quite suitable, but the location might, for reasons such as remoteness from other industry, be uneconomic. The breckland is, however, the location of what is probably the oldest surviving British manufacture, namely, flintknapping, an industry whose prospects may have been somewhat marred by the recent conquest of Abyssinia, where flintlocks are still used. It has also proved to have considerable value for sporting purposes and more recently for afforestation.

As the land of Great Britain is nearly all potentially, if not actually, productive, its use for site purposes, either for buildings and roads or for recreation grounds and parks, therefore usually entails the sacrifice of its other potentialities—a fact which has received much emphasis in recent controversies over War Office and Air Ministry schemes. Cricket grounds, golf links and aerodromes may produce a saleable grass crop. Sections of large parks are sometimes used for grazing. The suburban garden may reduce the family vegetable bill. But this production from what has really become site land cannot be compared with what it could be if the same land were in full and efficient agricultural use.

Wide Differences in Land Values

Nevertheless, the sacrifice of its agricultural potentialities rarely causes any sorrow to the owner of the land if he can sell it for site purposes. Land which is suitable, in character and situation, for building usually commands a far higher price than land which, as far as can be foreseen, is only usable for agriculture. Hill sheep farms can be purchased for about £1 per acre. Land for afforestation is bought by the Forestry Commission for about £3 per acre. Good agricultural land can be bought for £30 per acre. But if land is wanted for building, it will command anything from £300 to £50,000 per acre, according to its situation. In a Middlesex County Council debate in 1930 it was estimated that the building of 70 miles of roads in the county in the previous decade, at a total cost of £6 millions, largely spent on land acquisition, had presented local landowners with an enhanced value of some £15 millions. The Great West Road, constructed for traffic and not for building purposes, caused land appreciation at its London end from about £500 to £5,000 an acre in the first decade of its existence. Again, land round Golders Green Station has risen from a few pounds to £7,000 an acre within the last generation. The Westminster Hospital site, sold by the Treasury in 1881 for £6,000, was resold in 1936 for about £350,000.

It is, therefore, only to be expected that owners of agricultural land will be ready enough to sell it for building if the opportunity occurs, and to sacrifice its potentialities for stock-rearing and similar purposes. Moreover, speculators will do all in their power to foster and encourage the conversion of agricultural land into sites for factories and urban development. For example, speculators bought, at agricultural prices, land near sections of the Southern Railway, which they expected to be electrified, and resold at enhanced building prices when the electrification was either announced or accomplished. Again, speculators bought, at agricultural prices, much of the land surrounding the Team Valley Trading Estate, and are

now reselling it for housing. The profits which they have made are directly attributable to the large sums of public money which have been spent in developing the trading estate. For certain central sites much higher prices are paid. Compensation for land compulsorily acquired in 1980 for the Post Office in Houndsditch worked out at £159,000 an acre and a strategic site in Oxford Street has been sold (subject to a ground rent) on the basis of £8½ millions an acre, while even in Leeds a site in Commercial Street has fetched a rate of almost £1 million per acre.

It is, of course, inevitable that land must be used for building, and increases in industry and population, combined with the present trend towards the occupation of more land per person (brought about by decentralisation through motor transport, town planning, slum clearance and rehousing) have absorbed an increasing amount of land each year. In practice, however, far more land is withdrawn annually from agriculture than could be accounted for by these increases.

Land Withdrawn from Agriculture

Figures obtained by the Ministry of Agriculture from occupiers of agricultural land in England and Wales during the ten years 1927-28 to 1936-37, and given in evidence before the Royal Commission, show that the following approximate amounts of land were withdrawn from agriculture for use in various other ways:

LAND WITHDRAWN FROM AGRICULTURE IN ENGLAND AND WALES (000 acres)

	Building and Development	Sports Grounds	War Office and Air Ministry	For other Purposes	Total
1927-28 .	39	11	—	31	81
1928-29 .	40	8	—	36	84
1929-30 .	41	12	—	30	83
1930-31 .	43	11	1	44	99
1931-32 .	37	8	1	26	72
1932-33 .	41	12	2	36	91
1933-34 .	51	11	2	24	88
1934-35 .	57	11	8	37	108
1935-36 .	55	13	11	28	107
1936-37 .	56	11	18	53	138
Total	460	108	38	345	946

These approximate figures are the gross amounts. In order to find the net loss to agriculture each year it is necessary to subtract from them the amounts returned to agriculture. These comprise "land not previously returned," "land reclaimed," and land which has been taken for building, has stood idle for a time, and has then been returned, at any rate temporarily, to agriculture. Land returned to agriculture in this way amounts to about 15,000 acres per annum in England and Wales, but no analysis is available as to the sources of this land except for the year 1936-37,

when nearly 20 per cent came from "building and development." Assuming that proportion to have been approximately constant, the average net amount of land absorbed by building and development during the last ten years was about 43,000 acres annually.*

This total is accounted for only in part by the normal expansion mentioned above. Of the remainder, some is land which has been bought by speculators and others, but while not immediately built upon, is no longer used for agriculture. Some is land taken, in excess of immediate requirements, by industrialists and others, usually with a view to expansion, which, however, does not always take place. The rest must be accounted for largely by the movement of industry, of which newer branches tend to occupy new sites while the declining branches elsewhere leave disused buildings and land. These are, in many cases, useless without heavy expenditure on reconditioning, although old industrial and other buildings have sometimes been pressed into use for livestock. There is an example of a derelict railway engine shed which has been used for piggeries.

Apart from the establishment of new works on new sites, concurrently with the decline of older works elsewhere, factories tend to move out of towns into suburbs or country, where land is cheaper—a movement which is further encouraged by the advantages of a new factory and the amenities of the country. Sometimes factories which have been placed in rural settings have remained more or less isolated—for example, paper mills at Loudwater, near High Wycombe, and a board mills at Thatcham, Berkshire. More often, however, except for extractive works such as stone quarries and gravel pits, which are ordinarily found in rural surroundings, they form the nucleus for further development not only of other factories, but also of an ill-conceived, unplanned and poorly executed urbanisation. These, in due course, nullify most of the original attractions of the place. In this way more and more country is spoilt.

Derelict Industrial and other Buildings

Apart from the annual returns of the Ministry of Agriculture and the maps and reports of the unofficial Land Utilisation Survey, information concerning the use which is being made of land is scanty. Nevertheless, the existence of relatively large tracts of derelict industrial areas and scattered derelict factory sites shows that land is being laid waste by industry. That is to say, land which might be used for other purposes has been occupied by industrial buildings, and has subsequently been left in a condition in which it can serve no immediate useful purpose. This process, which has been termed "industrial erosion," consists chiefly in the use for industrial purposes of fresh land in some parts of the country, while elsewhere other industries become extinct and leave derelict factory buildings and often superfluous housing, roads, and other services.

* Professor Stapledon, working on a different basis in 'The Land Now and To-morrow,' estimated that some 37,000 acres a year were urbanised and lost to agriculture in England and Wales during the decade 1921-31. Even on this low estimate he showed that the rate of absorption would, if continued, lead to the last farm in England and Wales being closed down within 700 years, while in areas such as Surrey the process would be complete within a couple of generations.

The sites occupied by these unwanted buildings, so far from being an asset, are a heavy liability to the regions which contain them. They are not likely to be usable until they have been cleared of existing buildings and plant, since it is seldom that old works are really suitable for any new purpose. In some cases attempts have been made to establish new industries in old works, possibly after minor modifications, but except where both the old and the new works have been of an unspecialised character, it has usually been found that it would have been better to start afresh. Even if old works can be adapted to the immediate needs of a new industry, they frequently turn out to be incapable of satisfactory expansion later. For example a large part of the south bank of the Tyne to the east of Gateshead has been rendered entirely useless for industrial sites by the enormous waste dumps from the old Allhusen alkali works and by the fact that, mainly owing to the dumps, there is no proper road along the South Bank of the river. Recently arrangements have been made to clear and redevelop the area with Government money at a cost which is unlikely to be less than £850,000.

There has been a considerable amount of dispute as to the responsibility for clearing disused and derelict industrial sites, but as this is a question of policy rather than statement of fact, it is treated in a later part of this Report (Chapter X).

The trail of derelict factory sites is not by any means the only effect of industry on land. Flourishing industry has certain direct effects, not only on the land which it occupies, but also, in some cases, on large surrounding areas.

Effect of Smoke

The smoke-stack effluent (it cannot strictly be called smoke, for in many cases, with modern boiler plant, it is invisible) has a harmful effect on the fertility of land. Actually the soot deposited from black smoke is probably less harmful in this respect than the acids which are formed by the combination of atmospheric moisture with the gaseous products of combustion. These eventually acidify the soil to such an extent that it ceases to be suitable for most forms of vegetation. The bare character of the land between Birmingham and Wolverhampton, for example, or to the north-east of Sheffield, or around St. Helens, is probably due largely to this cause. It is well known that in most London gardens large quantities of lime have to be used in order to neutralise the acid deposited, while pieces of gypsum used for rockeries are kept white by the continual washing of their surface with acid. In other surroundings the rock tones down.

The blame for atmospheric pollution cannot be laid by any means entirely at the door of industry. In fact, it has been established that the domestic grate is responsible, in many cases, for well over half the smoke pall which hangs over industrial towns. Of the annual soot fall of about 75,000 tons in London, it is estimated that over two thirds is attributable to the domestic grate. With the increasing use of smokeless fuel for domestic heating, and improved combustion methods in industry, black smoke may become much less familiar—indeed, in some areas suppression is being considered or tried. Invisible products of combustion can, however, also be harmful, unless sulphur is absent from the fuel.

The effluent from the smoke stacks of Battersea Power Station, for instance, is specially treated for the removal of sulphur compounds. Although industry is not responsible for the major proportion of atmospheric pollution by smoke, it is obvious that little can be done to check smoke emission from domestic chimneys unless similar measures are taken in the more conspicuous case of industry.

Another example of damage to surrounding country is that caused by the fine dust which emanates from cement works. Hitherto it has been found difficult to prevent the escape of this dust, although, at considerable expense, the use of electrostatic precipitation can greatly reduce the amount emitted. As a result, the area surrounding a cement works is liable to become a no-man's-land.

Dumps of Industrial Waste

Again, industries such as coal mining, iron ore smelting, and certain chemical manufactures, which give rise to much solid waste material, greatly injure the land which they occupy. Waste tips are not only unsightly, but are also sterile—at any rate for many years. The extensive waste beds around alkali works in Cheshire form a good example, besides the Allhusen dump at Gateshead which has already been mentioned. Finally, there is the direct effect of the extractive industries—mining and quarrying—on the land where they operate. Surface quarries (including the extraction of gravel, brick-earth and surface soil) spoil the appearance and fertility of land, unless the surface soil is replaced, (as it is at Corby, for example), while underground mines frequently interfere with the natural drainage of the land and also render it liable to subsidence.

All the foregoing effects of industry have one result, in common: they not only make the land useless for many other purposes, but also make it less attractive or even repellent to new industry, and thereby accentuate the tendency for new industries to break new ground. The Black Country provides many examples of the devastation wrought not only upon land which is actually in use by industry, but also upon large surrounding areas. On Tees-side and the Cumberland coast, disused iron works and their accompanying slag heaps stand as monuments on land which their presence renders economically unusable. A large area in South Lancashire was for a long time rendered repugnant by an evil-smelling dump of chemical waste. To some extent the processes of nature tend eventually to restore usefulness of some kind, but at present industrial erosion is working much more rapidly than the restorative forces of nature. The result must therefore be a continual loss to agriculture in particular and to the community in general.

As some types of industry—notably mining, quarrying, and the “offensive” trades—cannot economically be carried on at present without more or less injuring their environment, the questions arise whether these industries are being situated and conducted so as to cause the least possible nuisance and damage to other interests and whether adequate steps are being taken to see that damage done by these industries is made good after they cease operation, either out of their own profits or otherwise. The answer to both questions is almost certainly negative, though in some cases the benefit to employment may justify the disadvantages to

the community. Some of the areas which most need new sources of employment are seriously hindered in attracting them by the smoke or other nuisances, or the unsightliness caused by the existing or former local industries. These, unable themselves adequately to sustain local economic activity, make it difficult to persuade others to do so. Often, in fact, the industries which give rise to the worst problems from an employment standpoint also have the most serious disadvantages as neighbours for new factory industries, for agriculture, or for residential and recreational development. It would be unwise to start manufacturing confectionery next to a steel plant. In many cases it appears that the injury would be largely avoidable if the industries in question were run with greater regard for other interests. In fact, pressure from local authorities, neighbouring owners and others has resulted in nuisances, once taken as inevitable, being quickly eliminated. Such pressure is more often forthcoming in the new industrial areas than in the old, where nuisances and uglinesses are often tolerated or even regarded with satisfaction as a sign of activity. Thus the gulf between rising new areas and old industrial centres is widened by the existence of different standards of amenity.

Steps to see that damage done to amenities by industry is afterwards made good have only lately been seriously considered and existing examples are rare though there are some instances where compensation is provided for damage to the value or productivity of the land. In the case of subsidence there is considerable provision for compensation which may console those affected, but does not restore the condition of the land. In the special instance of iron ore working in Northamptonshire and neighbouring counties the Minister of Health recently set up a Committee on the Restoration of Land affected by Iron Ore Working. A few other examples are available in the fields of atmospheric and water pollution.

There are many types of industry which are readily capable of being carried on without significant injury to other interests and amenities, but which do in practice, often cause such injury owing to lack of comprehensive planning. Trouble arises perhaps most often from unsuitable juxtapositions—a factory with tall chimneys next to an airport, a noisy or smelly works in a largely residential area, a large plant placed where housing and transport facilities are inadequate and can only be made adequate by introducing serious distortions or incurring excessive costs.

The injury done to the educational, tourist, residential and traffic interests of Oxford by the location there of a huge motor manufacturing plant, which could have been developed with at least equal economic advantage in several other Midland towns, is one obvious instance of clashing claims. A similar but smaller example in the same industry occurs at Guildford.

SOCIAL EFFECTS

The physical damage caused by industry to the soil and to its environment is probably a less important factor than the distortions introduced by industry into the development of human settlements.

The industries which provide employment for the population of an area play a very large part in determining not only the standard and manner of living, but

also the mental outlook and general character of the people concerned. In fact, the whole social life is to-day largely bound up with the location of industry.

The industrialist can, and often does, arbitrarily decide to place a factory or depot at a certain point where it will almost certainly create a human settlement. However carefully considered and well justified the choice may be from the industrial standpoint the questions still remain whether the injury to other possible uses, or the disadvantages to which the resulting settlement will be exposed, will be such as to cancel out the advantages measurable in the balance sheets of the firm concerned. Some industrialists do make some effort to take other interests into account; for instance, a director of a large steel undertaking who is also an ornithologist, examined the extent of disturbance likely to be caused to territories of small birds by a large new plant when the site was under consideration, and made sure that no rare species would be disturbed. With such picturesque exceptions those responsible for establishing or enlarging plants appear often to take little account even of such immediate needs as workers' housing. As a result haphazard building and development often take forms detrimental in the long run not only to the community, but even to the industry itself, which finds the health of its workers injured by poor housing at long distances, the use of its vehicles impaired by inadequate highways and even its expansion rendered more difficult and expensive by the use for other building of land required for additional premises. At the same time the presence or growth of the industry may impair pre-existing values either for other industries, including agriculture, or for amenities, some of which have a considerable economic importance for tourist traffic or for sport.

Different Kinds of Employment

Industries vary greatly in the type of employment which they provide, some employing almost exclusively male workers, while others employ a preponderance of females. It can be seen from the last column of Table 1, Appendix I, that in coal mining 99.48 per cent of the workers are males, while in the manufacture of dresses, blouses and shirts, only 7.23 per cent of the workers are males. Again, 98.07 of persons occupied in the manufacture of galvanised sheets are males, while 62.64 per cent of workers in the manufacture of cigarettes, tobacco and snuff are females. Industries involving work of a light repetitive character tend to employ more females, while those requiring physical strength or mechanical craftsmanship usually employ more males.

In Great Britain as a whole, the proportions of males and females occupied in all industries do not, of course, approach equality. In fact, the 1981 Census shows that 70.8 per cent of all persons given as fully occupied at that time were males. The Ministry of Labour figures for insured workpeople in 1938 show roughly 73 per cent males and 27 per cent females or approximately 10 million insured male workpeople and 4 million females (*see* Chapter III, page 68). The close agreement of these proportions for 1938 with those of the 1981 Census is to some extent a coincidence. The Census figures include domestic servants, professional men, managers, clerks and others who do not appear in the Ministry of Labour returns.

Clearly the relative proportions of gainfully occupied males and females in any area will depend on its industries. For instance, in the cotton districts of Lancashire the proportion of occupied females is above, and in the mining valleys of South Wales considerably below, the national average.

To some extent, also, variations occur between different industries in the relative number of adults and juveniles employed. If a particular area lacks industries which will provide adequate juvenile employment there is likely to be pressure for boys and girls above school age to migrate to districts where juvenile labour is short. The balance of male and female labour is not so easily adjusted, and where industries which employ females are weak the usual result is a lower ratio of gainfully occupied to total population. In other words, there is a lower average number of wage-earners in proportion to total population than in areas where the local industries provide employment for females.

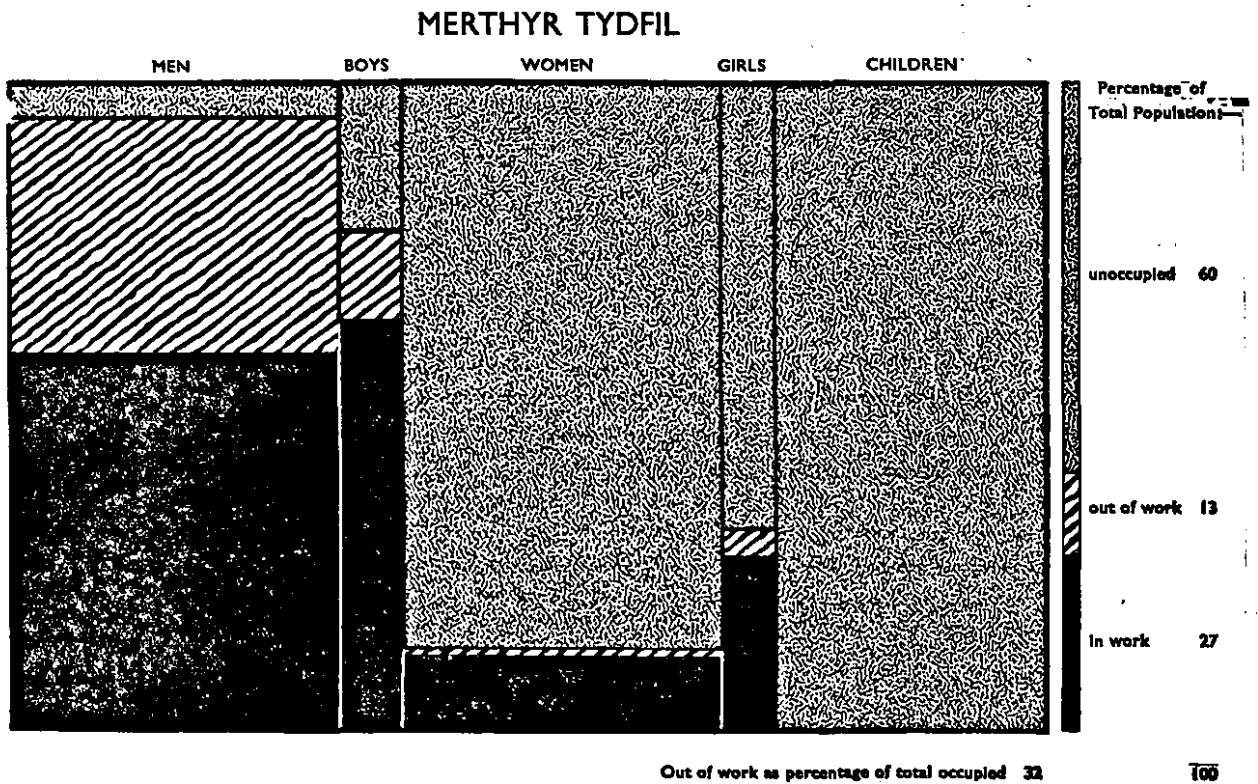
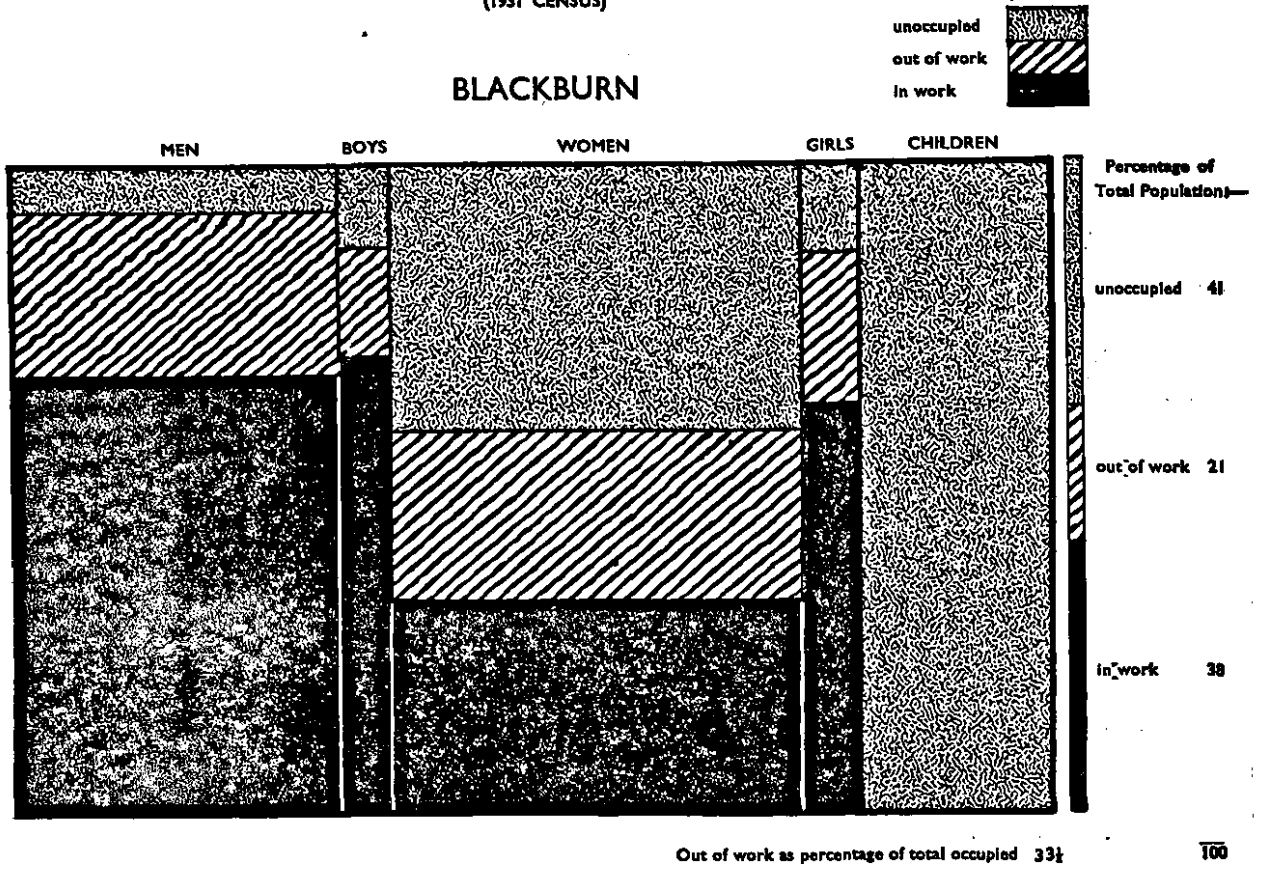
Variations in Numbers Gainfully Occupied in Proportion to Population

There is, in fact, a remarkable variation in the ratio of gainfully occupied to total population in different towns. For instance, according to the 1931 Census, Oldham and the Rhondda had approximately equal populations of about 140,000, but Oldham had 81,000 gainfully occupied (including unemployed), while the Rhondda had only 56,000. The numbers unemployed were 18,500 and 13,600 respectively, or 23.1 and 24.4 per cent of the gainfully occupied. Thus, judged by the actual numbers of unemployed, Oldham appeared to be in the worse plight, and judged by the proportion of workers unemployed, there was very little to choose. But Oldham still had nearly 63,000 workers in employment, while the Rhondda had only just over 42,000. If, therefore, the average earnings per employed worker were the same in both places the standard of living would have been about 50 per cent higher in Oldham—since the earnings of 63,000 people in Oldham, and of 42,000 people in the Rhondda had to support approximately equal total populations. Or taking account of unemployment pay, if the average receipts of all workers, employed or otherwise, were the same in both places, the standard of living would still be 45 per cent higher in Oldham.

Again, according to the 1931 Census, East Ham (another town with approximately the same population) had 1.7 persons per family in employment, while the Rhondda had only 1.22. But even if all the registered unemployed in the Rhondda had found jobs immediately, the resulting number of employed workers per family (1.67) would still have been less than the actual figure for East Ham, in spite of its 6,000 unemployed. This means that if other factors (such as average cost of living and average earnings per worker) had been equal, East Ham with 6,000 unemployed could still have enjoyed a higher standard of living than the Rhondda with no unemployed.

Evidently, therefore, the percentage of unemployed is no direct measure of the extent of depression in a locality (judged by standards of living). But it is very often used as a criterion.

Figure 9—CONTRASTS IN OCCUPATIONAL COMPOSITION OF TWO TOWNS
(1931 CENSUS)



ANALYSIS OF EMPLOYMENT IN FIVE TOWNS OF APPROXIMATELY EQUAL SIZE (1931 CENSUS)

	Rhondda		East Ham		Derby		Oldham		Middlesbrough	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
Population	74,087	67,809	68,923	78,471	68,893	78,510	66,141	74,178	69,765	68,509
Total Population	141,846		142,394		142,408		140,814		138,274	
Working	87,868	4,960	45,054	18,682	40,787	17,460	87,714	24,991	88,899	11,072
Out of Work	18,093	524	4,751	1,220	6,801	1,697	11,908	6,685	12,807	1,408
Mining	27,753	81	18	5	84	8	714	5	185	5
Chemicals	1	—	528	282	90	288	55	19	1,289	56
Metals—										
Smelting and Rolling	—	—	2	2	16	1	13	—	7,791	189
Founding, etc.	42	—	287	16	1,480	182	857	16	3,015	58
General Engineering	14	2	978	156	5,440^a	256	5,592^b	161	187	18
Electrical Apparatus	40	2	1,108	495	959	804	1,278	592	162	15
Vehicles	99	1	885	25	5,473	419	825	8	149	6
Textiles—										
Cotton	—	—	8	8	46	188	11,903	15,506	4	2
Silk and Artificial Silk	—	—	20	14	1,798	1,351	6	81	—	—
Hosiery	—	2	24	82	842	1,550	6	21	1	7
Food	805	57	1,870	699	506	268	570	509	488	475
Printing, etc.	74	19	1,642	665	992	490	802	182	872	150
Building and Decorating	460	4	4,256	49	2,178	88	1,756	88	1,745	84
Gasworks	122	8	1,727	88	470	18	454	7	175	2
Railway Transport	700	2	1,287	40	4,179	501	588	18	1,848	41
Road Transport	694	8	2,162	68	1,874	48	1,126	16	788	82
Water Transport	7	1	2,762	101	6	—	9	4	1,764	41
Docks, etc.	1	—	1,808	50	5	—	7	—	1,540	9
Government—										
National	251	84	1,818	524	588	115	422	189	462	188
Local	1,618	1,049	2,059	789	2,525	972	1,670	948	1,570	978
Domestic Service	46	1,504	64	1,497	119	2,086	72	1,448	67	2,518
Commerce and Finance	8,462	1,278	10,719	4,682	5,955	2,688	5,095	2,527	4,891	8,091
Others	1,684	928	10,587	8,455	6,172	5,814	5,899	2,856	5,561	8,217
No. of Families	84,485		87,775		85,949		86,768		82,570	
Nos. Living in Families	140,075		140,082		186,145		184,628		182,048	
WORKERS PER FAMILY (in employment)	1.08	0.14	1.19	0.49	1.18	0.49	1.08	0.68	1.08	0.84
Principal Industries (heavy type)	27,800	—	—	—	15,000	2,900	17,500	15,500	10,800	—
As per cent of all Employed	74	—	—	—	87	17	46	62	82	—

NOTE: The principal occupations in each town are shown in heavy type.

^a Mainly railway.

^b Mainly textile machinery.

Figure 10—EMPLOYMENT BY INDUSTRIES IN FIVE TOWNS OF APPROXIMATELY EQUAL POPULATION, 1931 CENSUS

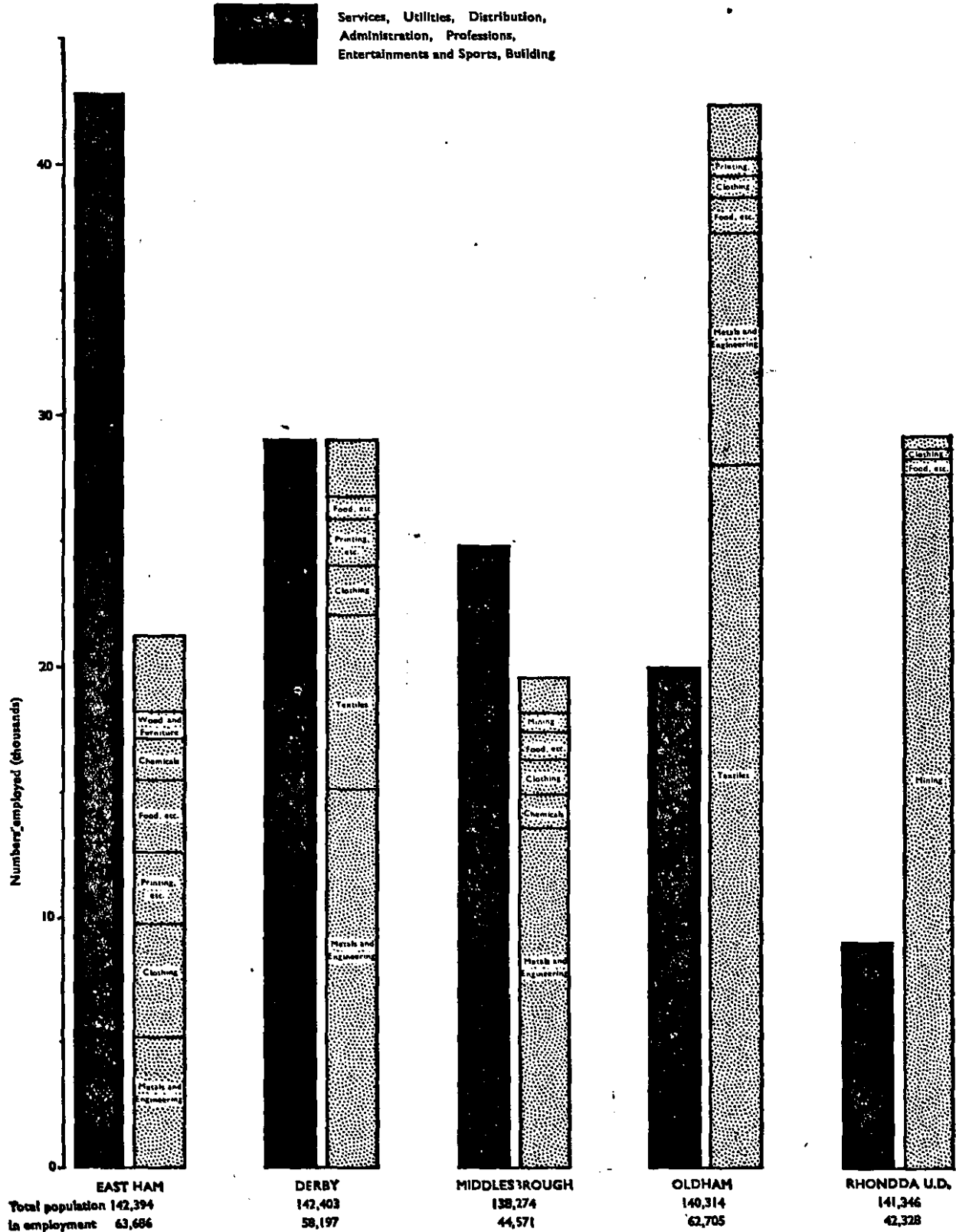
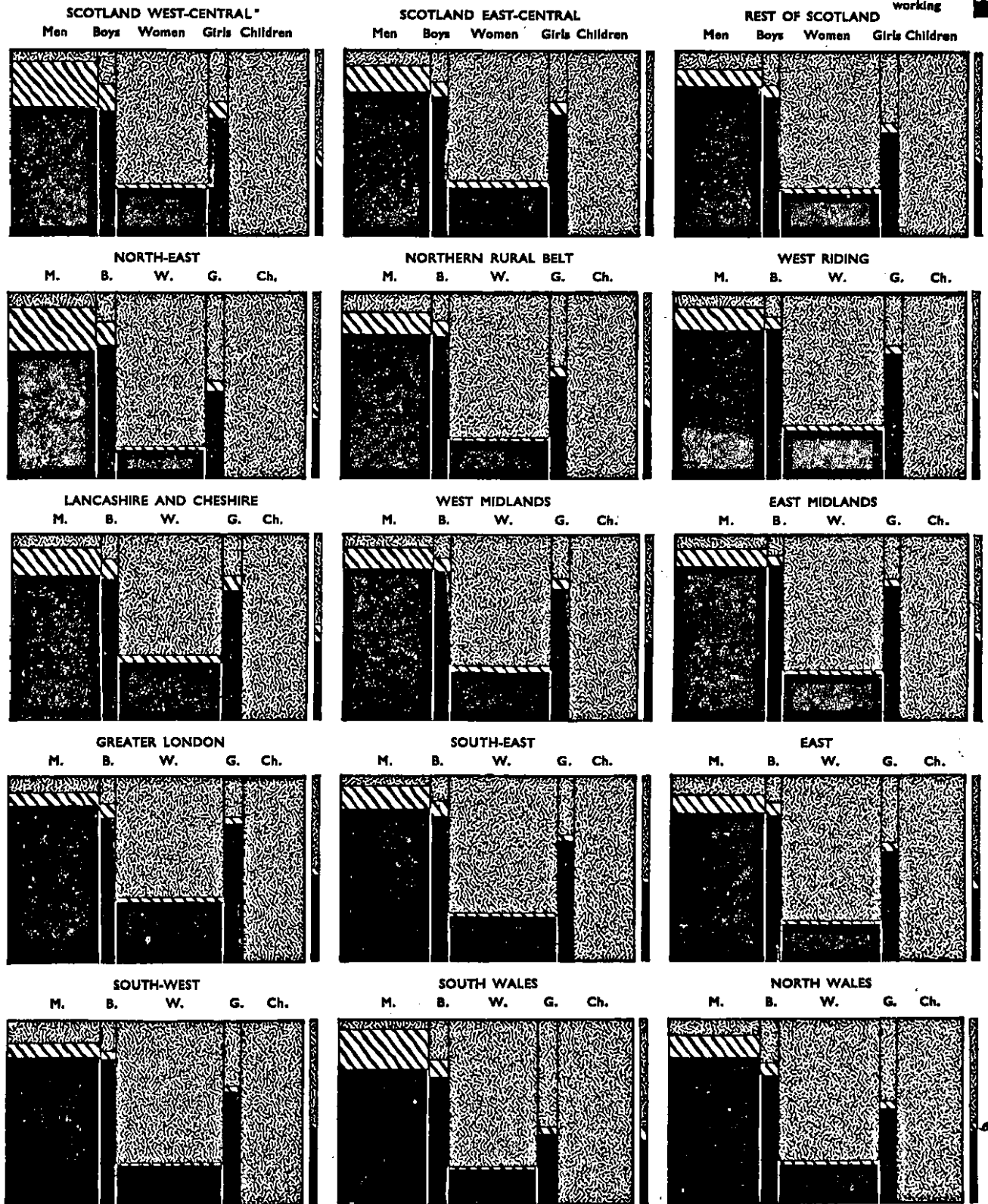


Figure 11—COMPOSITION OF THE POPULATION IN THE CENSUS REGIONS, 1931

unoccupied
out of work
working



Since the relative local incidence of depression depends on the proportion which the gainfully occupied population bears to the whole, and since this proportion in turn depends on the character and composition of local industry, these are clearly subjects of great importance to local communities.

The industrial composition of the sixteen census regions of Great Britain is illustrated by Fig. 11 and shows some remarkable variations, but still greater variations can frequently be seen by taking smaller areas. Figure 10 and its accompanying table have been compiled from the 1931 Census for five selected towns of approximately equal size, and show the effect of their industrial composition on their labour balance. This figure also draws a rough distinction between manufacturing and other occupations. It will be seen that the latter (shown in black) play a much smaller part in the less prosperous towns.

COMPOSITION OF THE POPULATION IN THE CENSUS REGIONS 1931

The diagram on the opposite page shows the composition of the population in the census regions. The map in Appendix IV shows how these regions are made up. Each block represents a region, and is divided into columns representing, from left to right, the total number of men, boys, women, girls and children in the population.

It will be seen that the proportion of children (right hand, grey column) is very high in the North-East, in the Glasgow region and in South Wales, and the proportion of women in these regions is low.

Each column is shaded to show the numbers returned as working (black) "out of work" (hatched) and "unoccupied" (grey). The right hand column, which represents children under 14, is, of course, all grey.

It will be seen that the number of women and juveniles who are in paid employment varies considerably in different regions, and thus the percentage of unemployed to employed (the figure most usually quoted as an index of prosperity) gives very little guide to the total volume of employment.

The relative numbers of employed, unemployed and unoccupied in the total population may be gauged by comparing the total area of black, hatched and grey in each block. To make the comparison easier the proportions are shown on a vertical column besides each block. They may also be seen in the following table. The figures corresponding to those usually quoted as the percentage unemployment are added for comparison.

COMPOSITION OF POPULATION 1931 CENSUS

Region	population	working	out of work	unoccupied	total	out of work as per cent of occupied
Scotland:		per cent	per cent	per cent	per cent	
West Central	2,307,594	36.1	9.5	54.4	100	20.9
East Central	1,305,413	40.4	6.6	53.0	100	14.1
Rest	1,229,973	39.4	4.2	56.4	100	9.6
North-East	2,242,957	32.6	8.6	58.8	100	21.1
Northern rural belt	1,280,870	38.2	5.8	56.0	100	12.8
West Riding	3,437,368	42.6	6.0	51.4	100	12.2
Lancashire, etc.	6,127,110	42.6	8.3	49.1	100	16.1
West Midlands	4,527,345	42.3	5.5	52.2	100	11.7
East Midlands	2,373,279	43.5	4.5	52.0	100	9.8
Greater London	8,203,942	45.7	4.3	50.0	100	8.3
Rest of South-East	5,274,419	42.0	3.2	55.8	100	7.0
East	1,821,952	39.6	4.1	56.3	100	9.7
South-West	2,068,803	40.6	3.2	56.2	100	7.1
South Wales	1,897,550	33.5	7.7	58.8	100	18.7
North Wales	695,782	38.2	4.7	57.1	100	10.8

It will be seen that the Lancashire region, which had the third highest percentage of its population out of work, also had the third highest percentage of its population in work.

It can be seen from the table that the industrial compositions of the five towns (in so far as the Rhondda, which is really a group of mining villages under single administration, can be called a town) are very different. An examination of the numbers of persons (male and female) employed in the various local industries seems to show that the lighter industries, by employing a larger proportion of female labour, produce a higher average number of gainfully occupied (including employed and unemployed) persons per family than the heavy industries. It has already been shown that a high proportion of gainfully occupied persons per family minimises the effects of general depression. (Hence it follows that a good insurance against the occurrence of local patches of heavy depression is to have as high a proportion as possible of varied light industries. This, however, is looking at the problem simply from a family income standpoint and should not be taken as a general endorsement of high proportions of female labour, which have other disadvantages. For instance, where the percentage of women in industry is high, families are reduced and maternal mortality rates are inflated.)

Light Industries give Balanced Employment

While light industry provides employment in sufficiently balanced proportions to raise no serious problems for the three principal classes of labour, male, female and juvenile, labour balance could, theoretically, be obtained by suitable combinations of particular industries. Thus if the cotton spinning and weaving industry (employing a high proportion of females) could be situated alongside coal mining and iron smelting (employing a preponderance of males), a good labour balance might be obtained. Usually, however, there are strong causes tending to localise such industries (*see* Chapter III), and the probability is against such causes operating in such a way as to result in a good labour balance in every area.

Nevertheless, it is possible, in certain cases, to find particular industries which would redress the labour balance in particular places, without involving economic drawbacks such as distance from raw material sources or markets. For instance, the factory of Prices Tailors Ltd. at Middlesbrough, already mentioned in Chapter III (page 64), has absorbed a large quantity of female labour, and will have increased the number of gainfully occupied workers per family in that town, which has hitherto been dominated largely by heavy industries such as the Dorman Long steel works.

It may be possible to effect balance in this way in particular cases, but the best balance will usually result from a varied industrial composition. For other reasons, moreover, a varied industrial composition is preferable to a combination of two particular industries which happen to be complementary as regards labour. This question of balance is more fully discussed on page 205.

Effect of Industry on Mental Outlook of the Population

Owing to the fact that industries play a large part in framing the mental outlook of a community, dependence on a single industry or group of closely related industries tends to narrow the field of thought of the people, simply because all minds are being influenced by the same environment. With several different local industries, however, it is quite likely that members of the same family, or of the

same circle of friends, will be employed in different industries, and the conversation of each will open fresh channels of thought in the others. Such circumstances are far more likely to give birth to the ideas which often form the basis of new industrial processes. Again, some industries, by their nature, are more prone than others to produce offshoots, and a certain admixture of industries of this character would be a valuable element. From the point of view of industry, this has already been discussed in Chapter III.

Apart from this, with a wide range of local industry, there are more varied openings for young people with the result that there is a better chance that they will be well suited to their trade. In a mining village, for example, the mine is, to a large extent, the life of the village, and there is a strong tendency for the boys, knowingly or unknowingly, to be forced into mining as their occupation. It is the only idea which immediately suggests itself and, more important, it is often almost the only occupation which will not necessitate leaving home.

Sons, however, do not invariably take after their fathers in their preference or aptitude for particular kinds of work. If, therefore, the local industries offer a relatively wide range of choice, it is more than likely that the younger generation will go into work for which they are really suited. Since unsuitable occupation is one of the important causes of psychological strain and industrial unrest, it is evident that the industrial composition of a locality can have far-reaching effects on the local population. It may be partly for this reason that some of the bitterest industrial disputes occur in areas dominated by one industry.

Some Industries More Susceptible to Depression than Others

Finally, the industrial composition of an area has a direct bearing on unemployment. In the first place, trade fluctuations affect different industries differently. Manufacturers of non-durable consumer goods experience much narrower variations between maximum and minimum output than manufacturers of capital goods. Areas making mainly consumer goods have therefore a more stable income. Again, technical progress, changes of fashion, and world economic conditions are constantly causing some industries to expand relatively to others; for example, the change which has occurred during the present century in the relative employment provided by the light and heavy industries. If the expanding and contracting industries are situated in different areas, the incidence of unemployment will be affected accordingly.

The effects of these two factors on a particular town or region will depend on its industries. In the worst case, the local industries would be adversely affected by both factors—the Special Areas are the obvious example. In the most favourable case, the growth of certain industries might provide sufficient new employment to balance or even outweigh unemployment caused by the down grade of the trade cycle. In every case, however, the relative severity of the incidence of depression is again a direct function of the character of local industry.)

It so happens that the light industries which most often produce a good labour balance are also the least susceptible to the effects of the trade cycle. Their presence, therefore, is a safeguard against the excessive incidence of depression.

Effects of Unemployment

As far as most workers are concerned, the principal result of trade depression is increased unemployment. To the extent that local unemployment is affected by the location of industry, the effects of unemployment can be regarded as effects of the location of industry.

The first and most obvious effect of unemployment is a reduction of the purchasing power and standard of living of the community concerned. While a given rate of unemployment (persons unemployed as a percentage of the insured population) does not correspond to a definite level of poverty, increased unemployment almost always means increased poverty (or reduced prosperity) for the community as a whole. It is, however, well known that for those still in full employment, a time of general depression can be accompanied by a higher standard of living, since falling prices mean an increase in real wages. Against this is the fact that in areas with heavy unemployment, local rates tend to rise to a high level, despite block grant contributions from the central government, while there is also generally a downward pressure on wages.

Secondly, there is the psychological effect on the people who are unemployed. They feel purposeless, unwanted in the economic scheme, and that somebody has, somehow, played them false. Meanwhile, their capacity for work is impaired; they tend to lose their skill through lack of practice; and in general they tend to become less suitable for employment if and when it becomes available. These effects are, of course, associated principally with long-term unemployment. They take time to develop, and the main causes which give rise to them are largely absent in conditions of short-term unemployment, which is due partly to normal labour turnover and seasonal fluctuations.

Unemployment is Detrimental to Health

Both the poverty and the mental stress which result from long unemployment adversely affect the general health of local communities. It is well known that the less prosperous regions of Wales and the North of England are less healthy than the South, but this must be attributed, at least in part, to climatic conditions, and possibly to other factors quite unconnected with industry. In a recent memorandum* the Ministry of Health has made a special study of the effects of trade depression on national health. The method adopted was to study the trends of mortality in England and Wales as a whole, and the relative position in certain "depressed areas," namely Lancashire and Cheshire, Northumberland, Durham and South Wales. It is recognised that mortality is an imperfect index of ill-health, but there are no suitable measurements of morbidity. It was found that mortality was markedly above the national average in what are now the "depressed areas," but that this had been the case more or less continuously during the last 25 years, and that if anything the divergence from the average had become slightly less in the North of England during the years of the depression, 1930-34. In South Wales the relative position had deteriorated, and the decline had started about 1922.

*A Study of the Trend of Mortality Rates in Urban Communities in England and Wales. Reports on Public Health and Medical Subjects, No. 86, H.M.S.O. 1938.

A somewhat similar technique was employed in a study made for the Pilgrim Trust on the effects of unemployment on health. The examination was concentrated on changes which had occurred between the relatively prosperous years, 1927-28, and the depression years, 1930-34, with the object of determining whether the towns where the incidence of the depression had been relatively severe had suffered a relative set-back in health compared with the rest of the country. This method is designed to eliminate climatic and other non-industrial factors.

The towns which suffered most additional unemployment in the depression of 1930-34 did not correspond closely with the "depressed areas" considered in the Ministry of Health memorandum. Indeed, Merthyr Tydfil had less unemployment than in 1927-28, and in Newcastle and Gateshead, Manchester, Warrington, Leeds and Huddersfield the rise was less than the national average.

The health indices used were:

Infant Mortality.

Maternal Mortality (*not* due to puerperal sepsis).

Deaths from Pulmonary Tuberculosis.

Deaths from Diphtheria.

Mortality of Children under 2 years from Enteritis.

Notifications of (not deaths from) Scarlet Fever.

For each of these the statistical trend in the individual county boroughs was compared with the average trend of all the county boroughs. The following table summarises the results:

COMPARISON OF HEALTH AND UNEMPLOYMENT STATISTICS IN COUNTY BOROUGHS

	Boroughs with Less than Average Depression Unemployment			Boroughs with More than Average Depression Unemployment		
	No. of Boroughs Considered	No. in which Trend was Worse than the Mean	No. in which Trend was Better than the Mean	No. of Boroughs Considered	No. in which Trend was Worse than the Mean	No. in which Trend was Better than the Mean
Infantile mortality	43	18	25	88	22	11
Maternal mortality*	43	21	22	88	21	12
Deaths from consumption . . .	43	17	26	88	21	12
Deaths from Diphtheria . . .	43	16(a)	26	88	14(b)	15
Mortality from Enteritis and Diarrhoea† . . .	43	17	26	88	18(a)	14
Notifications of (<i>not</i> deaths from) Scarlet Fever‡ . . .	42	18(a)	23	80	19(a)	10

(a) One county borough unchanged, or equal to the mean.

(b) Four county boroughs unchanged, or equal to the mean.

* From causes other than puerperal sepsis.

† Children under 2 years old.

‡ For technical reasons the four Welsh county boroughs have been omitted in this case.

While in some cases the indications given by the foregoing figures are not strong enough to be conclusive, the fact that all the figures have a tendency in the same direction is very significant. It should be noted that the examination compares the effects of different changes in the level of unemployment, not of different levels of unemployment.

It is, of course, reasonable to expect that unemployment will affect health, for not only does the resultant poverty have its direct physical effect in the form of malnutrition, but there are also the mental stress and anxiety, and the fact that impoverished local authorities are unable to provide the best medical facilities and services.

Although unemployment is, perhaps, the principal form in which the effects of depression make themselves apparent, at any rate as far as the working population is concerned, there are, of course, others, which are due not so much to depression as to the existence of different levels of depression and prosperity in different areas.

Differential Incidence of Prosperity and Depression causes Movements of Population

Areas which are enjoying more than the average level of prosperity, or suffering less than average depression, offer to the industrialist a "prosperity-minded" community, generally lower poundages of local rates (though this does not have much direct effect on industry on account of derating), and other attractions, including, for the manufacturer of consumer goods, a market of relatively high purchasing power. To the worker they usually offer better prospects of better employment. Consequently, the relatively prosperous town tends to grow, and the relatively depressed to shrink, in relation to the population as a whole.

It is commonly assumed that a movement of population from the more depressed to the more prosperous areas is a natural corrective, since it reduces the competition for posts where unemployment is heavy, and increases the supply of labour where the demand is most likely to be found. This argument, however, ignores certain other results of migration which go far to annul any advantages gained. These effects can be most conveniently considered with respect to the areas to which and from which migration takes place.

Effects in Areas which are Losing Population

Migration usually occurs chiefly among the juvenile and young adult member of the population. The loss of young adults reduces the proportion of persons of child-producing age in the local community, and thereby reduces its crude birth-rate. As migration has largely affected mining areas, where crude birth-rates are high and elderly people are rather scarce, the effect of this has been less apparent than it would have been elsewhere, since the loss of population by migration has been largely offset by the increase of population through excess of births over deaths. Thus, between 1921 and 1986 four counties of South Wales lost over 17 per cent of their (1921) population by migration, but the net decrease of population was only 6 per cent. In Northumberland and Durham a migration loss of 12 per cent caused less than 1 per cent net decrease of population.

Nevertheless, the effect of continually losing the young adult population is cumulative, since a reduction of the birth-rate now means a reduced number of persons of child-producing age in years to come. If migration continues, the remaining proportion of persons of child-producing age will become inadequate to maintain the local population, which will begin to decline. At first the net decrease will be less than the loss by migration, as in the examples cited above. Later, the decrease of population will equal the number of migrants, as has been the case at Merthyr Tydfil since 1931. Finally, if migration still continues, the fall in population will become precipitous, and even if migration ceases before that stage is reached, the population will still decline, as the proportion of aged people will have greatly increased, and the number of deaths will exceed the number of births. (The loss of the juveniles and young adults through migration must obviously affect the age structure of the population.)

It is estimated that of the net outward balance of migrants from South Wales between 1921 and 1931, 66 per cent were under 30 years old, and 87 per cent under 45. In Northumberland and Durham the respective proportions were 69 per cent and 87 per cent.

The age structure of the population affects not only the birth-rate, but also the relative proportions of persons in the industrially active and other age groups. The following table shows the alteration of age structure in the Rhondda between 1921 and 1931, compared with the nation as a whole.

Age Group	Rhondda U.D.		Average for England and Wales	
	1921	1931	1921	1931
	Per cent of Population		Per cent of Population	
Ages 0—14 years	84.9	29.4	27.7	28.8
Ages 15—49 years	51.9	51.4	58.3	58.5
Ages 50 years and over	18.2	19.2	19.0	22.7
	100	100	100	100

These figures show that between 1921 and 1931 there has been no great change in the proportion of persons in the active age group 15—49 years, either in the Rhondda or in England and Wales as a whole. There has, however, been a great change in the ratio of juveniles to elderly persons. In 1921 the ratio of these groups in the Rhondda was 2.64 to 1, while in 1931 it was only 1.58 to 1. (The corresponding national average figures were 1.46 to 1 and 1.05 to 1.)

The importance of this is that the age group which will in future replenish the industrially active group, has declined, while the proportion of elderly persons has increased, and will increase further.

There is thus a cumulative effect resulting in an increased proportion of older persons. In the Rhondda in 1921 the number of persons in the third age group (50 and over) was only 25 per cent of the number in the second group. In 1931 the proportion had increased to 38 per cent, and it is estimated that it will reach 61 per cent by 1941.

The employability of a local population is largely a function of its age structure, and it is evident that a preponderance of middle-aged and elderly persons is a severe handicap to industrial revival.

Migration is a selective process not only in the matter of age but also in quality. In the first place, many of those who leave a town which is showing signs of incipient depression, are from among the more active and adventurous elements—those who, dissatisfied with conditions at home, decide to seek their fortunes elsewhere. This group probably contains many of the potential local leaders of men, and initiators of new enterprises, so that their departure robs the town of one of its main hopes of recovery. On the other hand, the more conservative and unenterprising tend to remain behind. It must not, however, be inferred from this that all those who do not leave are of the less worthy sections of the community. On the contrary, some of those who suffer worst are, for example, those who have been thrifty and have bought their houses. Their only hope of obtaining value for their money is to remain, for the sale of their houses under conditions of imminent or actual depression would involve substantial loss. Others who remain behind include those who are prevented from moving by special family circumstances, or by a close attachment to some local cause, and some good workers return to their home towns because, after some experience, they are disappointed with labour conditions, wages, and lack of unionism in the South.

Secondly, any transfers made under the Ministry of Labour scheme, for example, usually apply to the more intelligent individuals, since they are more likely to take easily to new kinds of employment. Further, deficiencies of health and physique—whether or not arising from unemployment—are likely to count against candidates for transference. The general result in both cases is a deterioration in the average quality of the remaining population, quite apart from any question of age structure.

Again, while the transfer of unskilled workers reduces local stagnant pools of labour and involves little loss to the community, the removal of the skilled workers, or of the most promising boys and girls may actually increase unemployment by impeding the development of new industries, or hindering the progress of those existing. In some cases the introduction of new industries into Special Areas has involved the importation of skilled labour from elsewhere. While this may not be surprising when industries entirely new to an area are introduced, it has happened that the reopening of coal mines has been hindered by lack of adaptable miners, usually in places where unemployment among miners as a whole is severe. On the other hand, the adaptable workers can hardly be blamed for moving if they can get work elsewhere, rather than waiting, as they frequently do, in hope of mines reopening.

While the immediate effect of the migration of unemployed from a town is a reduction in the number of unemployed, the longer term effect is often to make depression worse.¹ The unemployment enquiry of the Pilgrim Trust showed that between 1929 and 1936, areas which were initially depressed became more so, while, on the other hand, relatively prosperous areas increased their prosperity. One reason for this is that the migration of a section of the population causes

secondary unemployment in various public services and in the distributive and building trades by reducing local purchasing power and in other ways. Thus, depression tends to be cumulative. While the loss may be mitigated by transferees sending home remittances, this practice is by no means general, and probably tends to fall off as the transferee settles into his new surroundings. In any case, the average amount remitted cannot be large.

Loss of population eventually causes more or less waste of local public capital and services, in the form of street lighting, drainage, hospitals, transport and police services, and so on. While the pressure on some of the services is reduced, the cost of running them does not decrease in proportion, and may even increase through obsolescence, and a general reluctance to spend money on replacement. Meanwhile, many houses will have fallen empty, thus reducing receipts from local rates. This tends to increase the rate burden per head of population, though it may be largely offset by an increased block grant from the central government.

The loss of population—especially of the more intelligent and enterprising—means serious loss to local corporate and institutional life. In fact, it may, in some cases, rob a local club or institution of the very members who bind it together, and look after its organisation. This is only offset to some extent by the fact that the principal members are sometimes beyond the migration age, but even so, the stock from which their successors would be drawn is depleted.

Finally, when people leave an area they take with them the education and training which have been provided partly at the expense of their local communities. The average cost of elementary education per child is £108, of which £54 is borne by the local ratepayers, so that, in effect, every young person who moves from one area to another takes with him an endowment of the latter amount from the community of his upbringing, even before reckoning his share of health and other expenditure.

Thus, the area from which people migrate fails to reap benefit from the education and other services which it has provided for them. Meanwhile, the area which receives them obtains the benefits of an increased productive population without having to educate it.

The effect of this is especially unfortunate in Wales, where the proportion of children who are given a secondary education is about twice as high as in England. On the other hand, it may be argued that if the migrants had not migrated, it would have cost their local community still more to maintain them in unemployment, although since the Unemployment Assistance Board came into full operation most of the burden has been transferred to the State.

As far as the State is concerned, the advantages of migration are, on the whole, probably sufficient to justify the costs of State-aided transference schemes. Young people, especially, have been saved from the demoralising effect of long unemployment, and have in many cases worked up into good positions in the areas to which they have been transferred. Moreover, migration has assisted much of the industrial expansion of recent years, which might otherwise have been handicapped by local labour shortage.

Equal advantages, without some of the attendant difficulties, might, however, have been obtained at the same or less expense by creating new employment within access of the areas which needed it—that is, by taking work to the workless rather than adopting the opposite course. This would, at least, have done much to counteract the cumulative effect of prosperity in the prosperous regions and of depression in the depressed. Attempts to attract new industries to the Special Areas are much more recent than population movements away from them.

Effects in Areas which are Gaining Population

To some extent the effects in prosperous areas are the converse of those in areas which lose population, but there are in addition certain special problems which arise in expanding areas.

Since it is usually the younger people who move, the effect on the community which receives them is a lowering of the average age. It is estimated that over a million persons between the ages of 15 and 45 have migrated into the south-east of England during the last fifteen years, while a fairly large influx has also taken place into the midlands and south-west. The proportionate increase in the young adult population at least provides the basis for an increased crude birth-rate, though this may, in some cases, be partly offset by a reduced rate of reproduction owing to changed circumstances and environment. Thus transference sometimes means moving people from a place where their rate of reproduction would be high to a place where it is lower.

The arrival of these people who are mostly of working age (exceptions occurring when whole families migrate) increases the ratio of productive to non-productive population. In 1928, the insured persons between 16 and 64 years formed 23.8 per cent of the total population in London and the Home Counties; in 1937 the corresponding figure was 29.5 per cent. Between mid-1921 and December 1937 the percentage increase of total population in the London Transport Area, which covers a large proportion of the Home Counties, was 16.9—an actual increase of 1,490,000. Of this increase, at least 677,000 were migrants.

In London and the Home Counties, between July 1928 and July 1937, the estimated numbers of insured persons aged 16-64 in industries and services increased by 42.7 per cent. It is interesting (though not of very great importance because of the relatively small total number employed) that the largest individual percentage increase in this area was in coal mining. The expansion, amounting to over 250 per cent would, of course, be accounted for mainly by the Kent coal mines. Other large increases occurred in the various sections of the electrical industry, brick manufacture, motor vehicles and aircraft, and the distributive trades. The increase of 42.7 per cent in the numbers of insured persons in all industries and services would, of course, be accounted for partly by the natural increase of the population and proportionate entry into employment, and partly by workers previously uninsured coming into insurance, but the influx of population from elsewhere is probably the most important cause.

The rapid increase of population through migration gives rise to many problems for local authorities. Housing has to be provided, together with corresponding services such as road making and maintenance, street lighting, scavenging, sewerage, hospitals and schools. Meanwhile, existing provisions of this kind are to some extent being wasted in areas which have lost population.

It is sometimes argued that much of the public capital of declining communities is, in any case, obsolete, and that the replacement might as well be installed elsewhere. As far as it goes this may be true, but a large proportion of the public works in many depressed areas are still good for many years' service, and to abandon them is waste, whether or not it may be justified by other considerations.

Houses frequently have to be, or are, built in a hurry, to the detriment of design and sound construction. They are built on any land which can be quickly obtained for the purpose, often without view to future development, though town planning now places some restriction at least on haphazard development.

Migration has important psychological and other effects, both on the migrants themselves and on the people among whom they go to live. While the introduction of new workers and their families may in some cases act as a social stimulant, it frequently happens that the migrants do not take to their new surroundings and social friction follows. Traditional modes of living are very hard to alter, and the difficulty increases with age.) For this reason a transferred family frequently finds more difficulty in adapting itself than a single young individual. The members of the family tend to keep alive in each other their old ways of life, while a single individual who settles down forgets them through lack of usage, and adopts those of his new home.

Migrants who fail to become assimilated into their new surroundings necessarily suffer much unhappiness and tend, at an early opportunity, to go home. For example, of 90,000 men transferred from the depressed areas under the Ministry of Labour transference scheme, between 1930 and the middle of 1937, over 49,000 are known to have returned home for this or other reasons.

In the case of organised transference the Ministry of Labour assists transferees to settle down in their new surroundings by putting them into touch with lodgings and providing advances, if necessary, pending receipt of the first week's wages. There has, however, been severe criticism in some cases regarding the lodgings suggested. Transferees are also eligible for special allowances to save them from having to return home on account of short spells of unemployment. In some places there are independent voluntary organisations—for instance, the Birmingham Association for the Relief of Distressed Areas—which assist transferees and also spontaneous migrants from depressed areas. Another example of assistance to transferees is the Boys' Residential Club at Welwyn Garden City. This building, which cost £7,000, provides living accommodation and a club for forty boys. It is intended to help boys who have been transferred from the Special Areas and have found difficulty in settling down. Nevertheless, home ties, or a prospect of re-entering a post previously held, frequently cause men to return home, especially

when conditions in the depressed areas are improving. Moreover, transferees are sometimes unpopular with their fellow-workers on the grounds that they are said to deprive local men of jobs and depress wages.

On the other hand, a rather larger number of migrants enables a colony to be formed which, while permitting the migrants to retain some of their own customs, also enables them more gradually to be absorbed into their new environment. Colonies of Scots in London, Welsh in Birmingham and Irish in Liverpool and Glasgow are well known, while in Slough, for example, there is a substantial Welsh-speaking community. In an extreme case the migration of large groups of population, for instance, from Glasgow to Corby or from Manchester to the neighbourhood of Dagenham, may result in imposing some of the customs of the migrants on the existing local population.

The influx of migrants to a town creates problems of housing and recreation, and imposes further demands upon local services. Frequently adjustments have to be made in a hurry, and lack of opportunity for adequate forethought results in mistaken policies, the consequences of which do not appear until it is too late to remedy them.

New housing usually has to be built at the periphery of a town not only because space is lacking at the centre, but also because of the price of available land there.

This growth at the fringe of a town usually imposes a number of strains both on the organisation of the town itself and on the people. In the first place, the time and money spent by workers on their daily journey to and from work is increased. The time taken by the journey is not only at the expense of recreation, but the conditions in crowded trains and buses themselves impose nervous strain and cause further physical fatigue.

Money spent on travelling obviously increases the workers' cost of living, and may in some cases be quite out of proportion to the amounts spent on other items. In fact, in the case of juveniles, the cost of travel has sometimes been so high in relation to wages as to make it uneconomic to accept a post. In London this has led to the simultaneous existence of a shortage of juvenile labour on the western fringe and juvenile unemployment in the east, simply because the cost of travel makes it impossible for the two to balance out. Despite this outlay in travelling, rents are often much higher in the newly-developed areas and, in some, houses to let are unobtainable. In some cases at least the higher wages of the prosperous areas are more than offset by increased cost of living, as compared with some older industrial towns.

Again, while growth must usually take place at the fringe of the town, the central part remains almost unchanged. The hub, however, has to carry increased traffic resulting from the growth of the town, and becomes overloaded. Meanwhile, it becomes more and more difficult for the inhabitants to get out into open country. These matters are more fully discussed in the next chapter, but are mentioned here as consequences of industrial growth.

The movement of industry and population into a particular area by creating a demand for new factories and housing, stimulates the building and numerous ancillary trades. In this way it produces prosperity. Since prosperous areas attract more industries the cumulative effect is obvious.

The recent and present prosperity in the Midlands and South-East is, no doubt, largely due to the large amount of house and factory building necessitated by the influx of industry and population.

In addition to the foregoing cases of areas which are losing or gaining population, there are certain places which have a large turnover of population. For example, people move out from Shoreditch to West Ham or Leyton and subsequently move again to places further out such as Chingford and Chigwell, the total population of the intermediate places remaining approximately constant or fluctuating slightly about a mean. This turnover of population produces some instability and necessitates higher charges, for example, by electricity supply companies who put out appliances or plant on hire or hire purchase.

Conclusion

It is evident, then, that industrial development in the aggregate has been directly or indirectly responsible for much of the social distress and distortion, the wastage of land, and the destruction of amenity to be seen in Great Britain to-day. Factories located without sufficient forethought, or at best, with insufficient knowledge, have formed the nuclei of further unsound industrial development, and in extreme cases the structure has collapsed, leaving dereliction. Meanwhile other growths, probably no less malignant, have started elsewhere.

Local communities, with their housing, schools, and other equipment, have grown up to serve industries, the subsequent decline of which has left them high and dry. The new industry which replaces the old has developed elsewhere and in some cases in a location governed not by economic considerations, but by fortuitous circumstances or the personal preferences of an individual. Similar results have been brought about by changes in economic conditions, which in many cases could not have been foreseen. Nevertheless, the experience which has now been gained should enable adequate measures to be taken to prevent a repetition of the history of the Special Areas.

VI. TOWNS AND INDUSTRY

Population of Great Britain Lives Mainly in Towns—Urbanisation Raises Land Values—Local Travel—Atmospheric Pollution—Urban Life less healthy than Rural—Urbanisation Makes Possible a Higher Standard of Living—Certain Advantages, formerly Urban, are becoming More General—Patterns of Town Development—Types of Town—Size, Cost and Function—Problems Arising from Rapid Development—Forecasting Local Population Changes—Policies of Towns—Conclusion

Towns are among the oldest social organisms of civilisation and have developed a complex life, many aspects of which are only remotely relevant to the problems of location of industry. Nevertheless, the town is, in most cases, the background of industry and is, to a large extent, moulded by the particular nature of its contact with industry, past and present. On the one hand industries, especially those with low location factors, have been established in towns in order to obtain services, labour and markets. On the other hand, towns have grown up round industries, especially those such as coal or cotton with high location factors. It is difficult, therefore, to say to what extent the present distribution of population is the result of, or the reason for, the present pattern of the location of industry. The industrial population and industry have, at any rate, to live side by side, if not intermingled, and it is therefore important to consider their interrelations. These interrelations are both social and economic. There are towns, notably London, in which families from many other areas are eager to live and there are other towns which not only fail to attract outsiders, but fail to hold a number of their own most enterprising inhabitants. The success or otherwise of an industry may depend on the social vitality, the general planning, and the efficiency of the services of the town in which it is established. It is easy in considering the location of industry to underrate the importance of this relationship, or even to omit all reference to it. Apart from those costs directly incurred by the individual business there are social costs and social consequences arising out of its operations which have to be borne by the community as a whole. No comprehensive and balanced view of the industrial location problem can be obtained without considering these other factors, one of the best ways of assessing which is by analysing more fully the characteristics of towns, as they affect and are affected by industry.

There has been surprisingly little study of or interest in the problems of the town. This neglect appears to have been partly due to the general apathy towards social research, partly to the tendency to consider problems functionally—for instance, in terms of traffic or health—rather than as aspects of the life of an organic community, and partly to the mistaken assumption that discussion of urban local authorities is discussion of the problems of the town, with many of which existing local authorities are prevented from dealing, either because their powers are too limited or because their boundaries are too narrow, or both.

This chapter, therefore, will attempt to review some of the main facts of contemporary urban life, so far as they have been studied by geographers, town planners and others, and to relate them to problems of the location of industry. It begins with an account of the scale of town development and proceeds to discuss some general characteristics of towns in the present phase of British civilisation. Next follows an analysis of types of towns and of their respective advantages and problems. The chapter concludes with a discussion of the main weaknesses which may be considered to call for remedy.

Population of Great Britain Lives Mainly in Towns

According to the Census, 80 per cent of the 1931 population of England and Wales lived in local government areas classed as urban—that is, in county and municipal boroughs and in urban districts. Up to 1901 there was a rapid rise in the urban percentage, and this was followed by thirty years of relative stability, but, according to the 1936 estimates, the rise has now been resumed. In Scotland the 1931 proportion was almost identical—80.1 per cent, against only 57.7 per cent in 1861. The figures, however, are not comparable for the two countries as the Scottish ones count any local government area as urban if it has a population of 1,000 or over, whereas the England and Wales urban figures exclude the areas termed Rural Districts, many of which are, in fact, considerably urbanised. For example, the 44,000 inhabitants of Hendon (Middlesex) Rural District in 1931 do not count in the Census as an urban population, although nearly 30,000 of them—that is, two-thirds—were additional to the 1921 total, and their presence was clearly due to suburbanisation.

While, therefore, the real rural population of Scotland may be as high as one-fifth, in England it is probably much less. Thus at least four out of every five people in Great Britain are town dwellers. Moreover, areas which are for local government purposes distinct are often in practice parts of one large town. The population is, in fact, much more urbanised and much more concentrated in a relatively few large towns than the figures suggest. The evidence of the Garden Cities and Town Planning Association before the Royal Commission on the Geographical Distribution of the Industrial Population shows that in 1934 more than 20 million persons out of the 45.4 million in Great Britain lived in or very near the fourteen chief urban centres, 15½ millions living in the six largest towns.

In view of these figures it is rather remarkable that hardly more than 12 per cent of the area of England and Wales is urban (1931), and much of this is not yet built up, although as an offset substantial tracts of land classed as "rural" are more or less built up. Towns from their very nature show a high density of population in relation to their area, but the actual density varies a great deal. Census measurements, although partly confused by the arbitrary nature of local boundaries, reflect these differences. In such county boroughs as Brighton and Reading the population per acre is 10-12, while in Shoreditch in 1931 it reached 147.5, in Southwark 151.7, and in Woodside (Glasgow) 189. The consequences of these high densities are varied. Shoreditch, for example, has no public open spaces, and the general con-

centration in large towns is associated with severe shortage of accessible open space for recreation. The National Playing Fields Association considers seven acres of open space necessary for the recreation needs of every 1,000 of the population; the existing proportion is only 1 per 1,000. London County has less than half an acre of public playing fields for 1,000 persons.

Urbanisation Raises Land Values

Another consequence of this congestion is that land values in the central areas of the largest towns rise to remarkable levels. It was estimated by the President of the Surveyors' Institution in November, 1935, that properties occupying the best position in the City of London had about doubled in value during the previous fifty years, and Sir Charles Bressey, who quotes this in his "Greater London Highway Development Survey, 1937," states that the cost of comparatively insignificant street widenings sometimes works out at a rate exceeding £2 million per mile. As regards effects on housing, the Garden Cities Association shows that in Manchester the cost of land for the Hulme working-class rehousing scheme is over £7,000 per acre, and the total cost per flat, including site, is over £800; while in central London, with land at up to £20,000 an acre, figures in excess of £900 per flat are reached, compared with an average of about £400 for cottage houses with gardens in small towns. The natural result is that long-needed road facilities are not provided, and housing replacement has been either neglected or provided at a low standard of space per person in order to keep down rents plus subsidies to a not quite intolerable level.

Local Travel

The effects on traffic and health respectively are clearly traceable. An investigation for the Bressey Report showed that the average speed of a well-driven powerful private motor car on main routes through London during working hours in 1936 was not more than $12\frac{1}{2}$ m.p.h., and on considerable stretches in the centre was forced as low as $8\frac{1}{2}$ -8 m.p.h., with frequent hold-ups lasting 1-2 minutes at points of intersection. On the North Circular Road, a suburban highway generally considered very inadequate for traffic needs, the average speed was 23.6 m.p.h., and it seems safe to say that in typical modern street conditions in the British large town, journeys by private car take at least four times as long as they would on unobstructed roads. The growth of towns and of traffic without corresponding improvements in facilities has now, in fact, more than offset in the central areas any speed advantage due to the invention of the internal combustion engine. A powerful car now takes longer to do many journeys than an average cab-horse of forty years ago.

Recent urban growth has meant that large and continually increasing numbers of people are forced by lack of accommodation, high rents, and unsuitable living conditions near their work to live at a distance and travel back and forth twice or in some cases four times every working day. In 1921, the latest year for which such figures are available, at least 800,000 persons were travelling daily to work in central

London. The movement, however, includes many opposite currents. Thus Stretford, near Manchester, sent nearly a quarter of its population out to work in other areas, but imported in their place other day-time workers equal to almost half its population. There were already nearly twenty years ago many similar but less extreme cases not only in Greater London, but in most of the chief urban areas. According to the Garden Cities Association "in the year up to June 1937, the people of London made 4,250 million journeys in the London Transport area—436 per head or 2,340 per family. They paid in fares over £41 million or £16 3s. per family. The average journey cost 2.347 pence. In Birmingham in 1936 the journeys were 378 per head and the fares 1½d. per journey, or £8 17s. per family for the year," not counting in either case journeys by taxi or private car. In a small town the corresponding figure is estimated at only £2-£3, and in many cases it is less.

The time taken in such travel for many persons averages 1½-2 hours a day, and on a number of lines a majority of the passengers who travel at peak hours have to stand. The problem of excessive journey time and fares takes different forms in different areas, but is common to the mining valleys of South Wales and the newest industrial belts. A case is known of a large factory outside London, one-quarter of whose workers live an hour or more away from it. On the other hand, there are towns even in the 100,000 size-range, where almost all the workers can still easily walk or cycle to work and go home for their midday meal. According to 'The People's Food,' by Sir. W. Crawford and H. Broadley, the proportion of husbands having their midday meal at home is between 50 and 60 per cent in the larger British towns, the proportion being lowest in London (30 to 50 per cent).

The effect of running very heavy traffic in narrow channels between tall buildings, or underground, is greatly to increase exposure to noise, which is very fatiguing and harmful to the nerves. In the carriage of a City tube train travelling at 30 m.p.h. the noise ranges from about 90 to 106 phons—a level at which an adult lion continuously roaring to capacity (105 phons at 18 ft.) would scarcely be audible. Many city streets produce continuous traffic noise reaching 80-90 phons, which is about the level of thunder 1-3 miles away and louder than church bells at 400 yards. The noisiest position by Niagara Falls is stated to yield an average of 105 phons.

Atmospheric Pollution

Another effect of urban congestion is the very heavy atmospheric pollution already mentioned. An investigation by the Department of Scientific and Industrial Research (summarised in Cmd. 3989, 1931) showed that over a complete year atmospheric pollution from Norwich, a town about two miles in diameter, with relatively very clean air, was significant for a distance of five to six miles down wind from the centre of the city. With a town twenty-four miles in diameter, or a group of neighbouring urban areas twenty-four miles in diameter, pollution would be significant up to about sixty to seventy miles, or more in those cases where the air of the town concerned was dirtier than at Norwich. Smoke is annually responsible for damage measurable in money to the extent of about £40-£50 million—not to

speak of an enormous amount of damage on which no money value can be placed. Here is an avoidable national waste equivalent to about 9d. on the income tax. The distorting effect of atmospheric pollution on town development is seen in the emergence of suburbs to windward of the worst affected areas as segregated communities of the richer local inhabitants. Thus smoke plays its part in aggravating class divisions.

A further problem particularly acute in large towns is public cleansing, which is described by the Ministry of Health in its 1936-37 Report as "one of the most costly services provided out of the rates," involving an annual total charge on England and Wales of some £11 million. The towns contribute the overwhelming majority of the 15 million tons per annum of solid waste matter which has to be disposed of in such a way as to avoid nuisance, including about 1 ton of household refuse from every house and about 8 million tons of debris (excluding snow) from 26,500 miles of streets in towns with over 20,000 population.

Urban Life less healthy than Rural

It is hardly surprising that in spite of modern improvements in sanitation and preventive medicine one of the characteristics of large towns is their unhealthiness. Care must be taken in interpreting statistics on this subject, because there is no standard of measurement for health, and such indirect indices as death-rates present pitfalls. The Registrar-General's Decennial Supplement for England and Wales, issued in 1936, offers something like a reliable yardstick, and shows that taking the national "expected" rate as 100, the actual male death-rate for all county boroughs is 111, and for all rural districts 86. That is, male death-rates in county boroughs are 30 per cent above those in rural districts. The northern large towns show relatively higher death-rates than the southern, and in Greater London the Outer Ring is conspicuous for the lightness of its death-rates as compared not only with inner London, but with other urban areas.

Large towns have usually proved a type of habitat in which the human species can live, but is unable to reproduce itself adequately to maintain its numbers. In the past this has been due mainly to comparatively heavy death-rates: now the same result is brought about largely by the towns' very low birth-rates. In England and Wales, however, there is much less contrast between town and country in this respect than in certain continental nations. In the past the deficiency of the towns has been made good out of the surplus of the country, but this is obviously difficult when the country is producing very little surplus and when its population is reduced to less than one-fourth that of the towns. The period in which it was frequent to find a very large proportion of country-bred people living in large towns has definitely ended, and the towns have increasingly to face replacing their own populations. Yet in many respects recent changes have made urban areas more unsuited than ever to the bearing and rearing of children—as a large number of the drawbacks already described are particularly unfavourable to family life. The large city tends to become a suitable environment only for the able-bodied and unencumbered adult.

Enough has been said to indicate that there are certain disadvantages in concentrating populations in large towns. What are the benefits of the practice and how far do they offset the disadvantages?

Urbanisation Makes Possible a Higher Standard of Living

The most evident advantage of the town is that it brings large numbers of people, many at a high standard of living, closely enough together for the use of elaborate services and equipment in common. A rich enough family can maintain in an isolated country house its own electric light plant, its own access by metalled roads, its own passenger and goods transport, and its own extensive library, picture gallery, and even zoo, but for the vast majority of families such services have only been brought within reach by devices for their collective provision. The town enables a collection of families grouped together to enjoy a great number of services in common at a low cost.

There is an inherent economy, often of immense importance, in such collective provision, but the nature and extent of this economy is affected by technical changes. In two respects such changes have recently had an important influence. In the first place the old limitations on the size of an efficient town, which were imposed by the limits of walking distance and by difficulties of regular provisioning and water supply, have disappeared. Motor vehicles, steam trains, electric trains, trams and trolley buses, and even bicycles, greatly widen the built-up area which one centre can serve. Telephones, quick efficient mails, and extensive delivery services can help to minimise the effects of distance. Methods of organisation in business and government make it possible to serve, police, and administer much larger aggregations without conditions becoming absolutely intolerable.

But it must be noted that the same developments which enable the large town to become larger also enable it to be more easily dispensed with. Science increases urban facilities and the size of group which can afford them, and also makes it possible to give the inhabitants of small towns and even of rural areas services formerly restricted to large towns. Electricity, road transport, telephones, wireless, piped water supply, retail delivery and other services are to a large and increasing extent available in rural as well as urban areas, although the cost is sometimes higher and the convenience or range of choice reduced. In a number of cases it is a deliberate policy to even out differences in cost and facilities as between town, suburb and country by making the consumer in the town subsidise the consumer outside it. The result has been not only greatly to enlarge the size of towns, but to blur, sometimes to a surprising extent, the distinction between town and country. It is no accident that "rurban" development, or the creation in country surroundings of scattered settlements dependent on urban incomes and retaining urban outlooks and ways of life, has lately gone ahead as fast as, or perhaps faster than, the growth of towns. Examples range from well-to-do residential districts such as Hindhead-Grayshott and Sunninghill-Wentworth in Surrey to the shack development found in several parts of South Essex. In some parts, towns in any clear-cut sense of the word can hardly still be said to exist: so far has the degeneration into built-up areas gone.

The same trend has led to other consequences. The old-fashioned town offered a relatively meagre range of services, whose effective enjoyment was confined to a small minority of its inhabitants. Lately there has been a progressive expansion, not only of the range of services, but of the proportion of the population which can enjoy them. This has involved in turn a great increase in the number of persons engaged in collective urban services, and has tended at the same time to reduce considerably the size of population needed to sustain a given unit of service. Certain services, such as electricity supply, tend to become available at lower cost the more densely their consumers are concentrated, but others, such as highways, increase in cost per unit of population beyond a certain density. Many of these, however, cannot be supported adequately by thinly scattered communities, and they therefore become relatively more costly to provide both above and below certain densities. As the scale of use often varies directly with standards of living, a rise in standard of living may bring a small community up to the appropriate level for supporting a given service, or may push a large town into the zone of higher costs or increasing congestion.

A town which has an appropriate size of population for providing certain services to a privileged minority of its inhabitants may have a much larger population than is necessary or convenient for giving the same services to the whole or even a majority of its inhabitants. If, for example, two-thirds of the inhabitants of many of our large towns suddenly adopted the upper income-group practice of having a bath every morning, it would very seriously increase the difficulties and costs of the existing water supply, based on the assumption that most people have their bath, if any, not oftener than weekly, and on competitive exploitation of remote sources by rival water undertakings. Again, owing to the higher standard of living and the much greater use of road passenger transport, routes which could never have supported a service thirty years ago now do so comfortably, while services which were well used thirty years ago are in many cases hopelessly congested. Our urban street system, already chronically jammed with traffic when one person in twenty owns a car, would in most towns at once become virtually unusable if even three out of twenty started using cars, as in New Zealand. In fact, the economics of our towns would be fundamentally altered by even a moderate change in a single factor such as the attainment of the New Zealand level in motor car ownership relative to population.

Much of the confusion in contemporary urban life becomes explicable if it is borne in mind that the town represents, with considerable accretions and with only minor alterations, an organism created to serve a range of technical needs which has long since been outgrown, and a degree of privilege and differentiation in opportunity between sections of the community which no longer exists.

Certain Advantages, formerly Urban, are becoming More General

It is important in considering urban advantages to distinguish between those which are now, or shortly will be, shared by non-urban communities, such as telephones and electricity, and those which are likely permanently or for a long time

to remain confined wholly or mainly to the town, such as department stores, art galleries, technical schools, and sewage disposal plants. One of the greatest material advantages of the large town is its capacity for low-cost, high-speed delivery of an immense range of goods, and its capacity to make instantly available a great variety of services, from permanent waving to advice on how to start manufacturing ball-bearings. For social purposes, again, towns have advantages which increase probably in direct ratio to their size, as between communities of similar character. There appears to be a tendency in small towns and in country districts for social groups either to cling to an excessively narrow range of interests, or to split up into fragments too small to follow out varying interests without a sense of frustration. In the large town a man can be, and often is, a member of several different social groups for several different purposes, but in the small town or the country there is an inevitable tendency, where different groups exist, for their memberships to overlap so heavily as to reduce their independent impetus and the sense of freshness gained from belonging to them. The advantage of the large town in this respect is, however, immensely increased by the smallness of the minority at present having the leisure, the education, and the will to take part in many significant activities, and by the overwhelming attraction which it can exert on people with minority interests owing to this and to economic factors.

With this general introduction it becomes desirable to analyse in more detail the general pattern of town life and the different types of contemporary town.

Patterns of Town Development

The sites of towns occupy considerable tracts of ground, ranging from a few hundred acres to upwards of a hundred square miles in the largest examples. By no means all this area is, however, built up. Even the most densely developed quarters contain a considerable acreage of unbuilt ground in the form not only of streets and railways, but often of vacant sites, yards, gardens or open spaces, and open water.

The buildings in different towns and in different parts of a large town also vary greatly in size and character, and in the nature of their arrangement on the land. The simplest town plan is a row of buildings along both sides of one main street with few and unimportant side streets. This lineal plan is found not only in many villages, but in quite large communities occupying cramped sites such as the Rhondda, where 140,000 persons living in a narrow mining valley are grouped under one local authority. The same plan has reappeared in the modern ribbon developments along arterial roads, where the cost of road construction in conjunction with the operations of land speculators and utility services have canalised population as effectively as mountain slopes.

Another very common type of plan is the radial, which is essentially a series of lineal developments intersecting at a common centre. This is the natural pattern for a town site which has road connections in several directions. The village on a cross-roads is the simplest example. Where there is some special site feature the plan is modified accordingly: thus a seaside resort or a port fronting a wide arm of the sea is typically semi-radial in pattern.

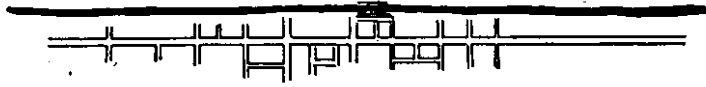
The obvious weakness of the radial town is the excessive congestion of its centre which may be offset by elaborating it into a spider-web pattern. This has occurred naturally in many continental cities formerly girdled by fortifications, whose demolition has provided sites for wide ring roads. By-passes for large towns tend to become ring roads, and one of the main proposals for relieving London traffic congestion is by means of further circular roads to keep through traffic away from the centre.

While the lineal and radial patterns emerge almost unconsciously, and the spider-web pattern represents a primitive and partial planning, there are several other patterns which have been conceived and imposed in advance of development. Probably the simplest of these is the chequer-board or gridiron plan, used by the Romans and in certain medieval experiments, and in modern times common in North America and other new countries. There are relatively few British towns on this pattern: Barrow-in-Furness, laid out in mid-Victorian times, is one of the chief examples. Other mathematical or geometric patterns such as the hexagon, octagon or star are hardly represented in Great Britain and the monumental or formal lay-outs, favoured in Rome, Paris and Berlin are also uncommon in the British towns with the outstanding exceptions of Bath and of Edinburgh New Town. On the other hand, England is the home of formalised informality, which is conspicuous in the winding roads and closes of the modern garden city and of many suburbs and housing estates.

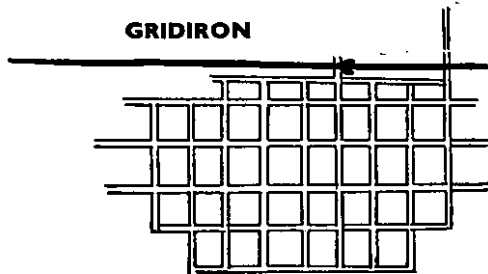
Towns may develop either by ribboning, by continuous spread, by more or less open scattering, or by satellite growth with artificially preserved free zones between the groups of buildings. There is a tendency as a town grows for the main functions to become segregated in distinct areas and one of the main tasks of town planning is to anticipate, guide, and make provision for this segregation. Thus in London, finance and commerce gradually displaced other functions in the City, while theatres, restaurants, cinemas and certain types of shop gathered largely in a relatively small part of the West End. In both cases the process occurred in such a way as to cause extreme congestion and inconvenience to the large crowds brought in from other areas at the peak hours. The same problem occurs where factory industry is concentrated, as at Trafford Park, in large aggregations remote from the homes of many of the workers. The siting of industry in relation to other functions of the town takes many different forms, each raising its own difficulties. Some towns have grown up round old established industries or mines, whose modernisation is thereby hindered, while they in turn make it difficult if not impossible to improve the centre of the town. In other cases factories are mixed indiscriminately with dwellings and other buildings, sometimes in large numbers, or sometimes as isolated freaks or survivors of an earlier phase. The result usually is to lower the residential amenities and rateable value of the neighbourhood, and to create a good deal of friction. It is said that Queen Victoria strongly objected to the large brewery which still remains close by Buckingham Palace, and which can be smelt in favourable conditions for upwards of a quarter of a mile. "Borderline" industries, such as laundries, bakeries and garages or vehicle service stations, have a more legitimate

Figure 12—TYPES OF TOWN DEVELOPMENT

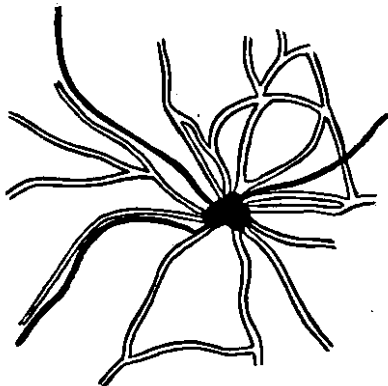
LINEAL



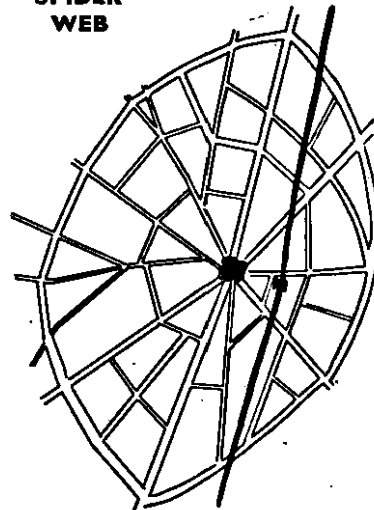
GRIDIRON



RADIAL



SPIDER WEB



place among dwellings, but often cause friction, especially on account of night use. On the other hand, industries which go right outside the town into undeveloped areas, and which usually raise local rateable values, often cause a different set of difficulties by injuring rural amenities, by requiring uneconomic development of services and by competing with agriculture for limited land and labour supplies.

Perhaps the most successful solutions have been found where industry has been segregated in units large enough to permit planning for its special requirements, but not so large as to involve long journeys to homes and places of recreation. Examples of this are found in some of the newer garden cities and satellite towns where provision is made for both living and industry, in some medium-sized older towns where a separate industrial zone has naturally developed, and in some light industry zones on the borders of larger towns, where adequate workers' housing is available close at hand and where development has not become excessive.

Types of Town

Differences in function lead not only to the emergence of distinct quarters serving different functions within a given town, but also to the emergence of distinct and specialised types of town.

Only in extreme cases is the character of a town so clearly marked that it can be classed without reservation as, say, a pleasure resort or a mining centre, and nothing more. Most towns are of mixed composition and function, and impressions of dominant local characteristics formed from observation often prove to be over-emphasised when checked against surveys and statistics. Moreover, towns may change their character very rapidly—the university town or fishing port of a few years ago may already have become primarily a manufacturing centre or a seaside resort before the extent of the transformation is appreciated even locally. It is, nevertheless, useful to attempt an outline classification of some of the contemporary types of community in Great Britain, bearing in mind that most towns fall into at least two of the categories, and that some embrace nearly all of them, although in varying degrees and often in geographically separate quarters. Strictly speaking, the following analysis is of broad elements in towns, but it is more convenient and pictorial to speak, for example, of a town in which the season-ticket holder is the most pronounced element as a dormitory town than to describe it in more abstract terms. Moreover, so long as it is used with discretion and a sense of proportion, the pictorial approach may give at least as true a picture as that based strictly on statistical analysis, for different towns have different atmospheres which often influence largely even such matters as the location of industry. It by no means follows that the importance of the various elements in determining the direction and rate of development is truly indicated by, for example, the numerical proportion of the persons engaged in different occupations.

It should therefore be borne in mind that the following categories are only distinguished as a basis of analysis, and that in practice they frequently overlap. Many who are familiar with some of the actual towns named will no doubt disagree

at times not only with the classification, but with the putting of certain towns in certain categories. Very often a good case could be made out for placing a single town in any or all of several categories, but this does not necessarily indicate either that the classification or the method of using it is misleading. One of the main characteristics of modern towns is that they try to serve several different and often incompatible purposes. On the other hand, almost all towns specialise to a marked degree, and their specialisms conform more or less closely to a fairly small number of distinguishable types. Some specialisms, such as the military and the mining specialisms, often dominate the towns where they are found, while others, such as the cathedral or the school and the university specialisms, habitually exist side by side with other substantial activities.

The analysis begins with the simplest current types of community and ends with the most complex. In each case there is a description of some salient characteristics of the type, followed by a discussion of some of its principal advantages and drawbacks, with special reference to economic and social vitality and attractiveness.

The village, the simplest form of group settlement with division of labour, still flourishes. It provides elementary essential services such as a meeting place for worship and often also for social activities, a public house, a general shop or shops, a petrol-filling station, and a post office. The modern village often possesses communications in the form of a telephone box, and often such utilities as a bus service and an electricity supply. The housing of the farm population may either be concentrated in the village or scattered, but in any case the typical village is concerned wholly or almost wholly with the everyday needs of people living within walking distance—it does not serve the population of any other grouped community, but simply provides for the needs of individuals in its immediate neighbourhood. Among the professions, clergy and teachers are distributed in the great majority of villages. Services of doctors and nurses, banks, hairdressers, and some others are usually shared between a group of villages or supplied, like all the more specialised services, from a neighbouring country town. Local recreations, such as cricket, football and the hunt, almost inevitably involve co-operation over an area including several villages, although for the popular games each village will have its own team. The normal size of a village is between about 100 and 1,000 inhabitants.

The village typically benefits from a strong community sense and excellent integration with its surroundings. On the other hand, close personal contact may easily degenerate into lasting feuds, and the leadership of the community is almost inevitably identified with the local employing class, possibly eked out by some workers on their own account such as small farmers. There is no focus in the village for upper and middle class social life outside private houses: its typical meeting place, the "pub," is a working class institution. While responsibility for leadership is clear and is not easily evaded, and while the risk of unemployment is light, such stability as exists tends to be bought at the price of economic and political domination by a small minority, and of a material standard of life so low that by urban tests almost every village is a depressed area. Collective services and community centres, although increasing, are still in most cases relatively meagre.

The country town, in addition to serving the everyday needs of its own population rather more elaborately than the village, typically provides for the weekly or occasional needs of the inhabitants of a number of surrounding villages and parishes. The most obvious of these needs are buying and selling of supplies, and the country town therefore tends to have a high proportion of shops, some of them specialised for various crafts and regular markets.* It also has one or more representatives of such professions and services as auctioneers, estate agents, veterinary surgeons, solicitors, banks, and cinemas, which are absent or rare in villages. Moreover, it is a point of transshipment for passengers and goods between the main railway and road network and the surrounding district. It is very frequently the headquarters of one of the smaller units of local government, such as a rural district council or a drainage authority. The typical country town, unless its size is inflated by other factors, usually has between 1,000 and 5,000 inhabitants.

The country town possesses, like the village, a fairly deep-rooted community sense and effective integration with its surrounding district, without suffering to anything like the same extent from the disadvantages outlined above. It enjoys very much fuller services, but these often operate on much too small a scale for full efficiency and many which are taken for granted in larger towns are absent or very poor. There is less of a pronounced class barrier, and a much larger share of leadership falls to professional and business men.

Factory industries are sometimes attracted to or develop in relatively small country towns. The danger, where these are too successful, is that they may come to dominate local life and turn the area into something resembling the "mining camp" type described later.

The traffic town possesses to a high degree what geographers term nodality—that is, it commands a number of routes of some importance, and thus enjoys relatively good transport services and road access from a fairly wide area. All towns are to some extent traffic towns, but it seems convenient to distinguish those which owe their location and their growth primarily to this factor, even though most of them also have a claim to a place in one or more other categories.

Railway junctions and depots, or ports, are often prominent features of a traffic town, but the mere existence of such facilities does not constitute a traffic town in the sense here described, unless there is sufficient servicing of the passengers or handling of the goods to provide something more than transit business.

The most characteristic locations for a traffic town are at the limit of tide-water navigable for seagoing vessels or at the lowest suitable bridge position on a river or inlet, near the entry to a convenient route through or round some major natural obstacle such as a range of mountains or hills, or a chain of lakes, or at a rail-head serving a considerable area. London is one of the chief examples, and others which have always had importance on this account are Exeter, Norwich, Gloucester, York, Carlisle, and Stirling. As the factors on which a traffic town

* Under the new Livestock Industry Act a number of the smaller country towns are likely to lose their livestock markets.

bases its importance are natural and strategic it is rare for a new site to become of first-rate importance or for an old one to shrink into obscurity. Manchester is perhaps the most striking example of a rise and Cirencester of a fall in importance as traffic towns since Roman times. There is no visible upper limit to the size of a traffic town, and the development of this type has been enormously stimulated by the modern possibility of provisioning economically and supplying with water any size of population, and by the tendency not only for the growing services to develop in such towns, but for the growing light industries to be attracted by the rich market they offer.

Traffic towns are often administratively important as capitals of counties, assize towns, and divisional headquarters of national services. The employment and income arising out of these activities are of growing importance to them as the range of public services expands.

The traffic town, as it varies greatly in size, is a peculiarly difficult subject for generalisation on advantages and drawbacks. Typically it shows a high development of professions and services, including commerce, banking, transport and communications, and public administration. Therefore it can support a fairly lively and progressive intellectual life, and has rarely an acute problem of leadership. It has a much richer growth of voluntary associations than the country town, such bodies as rotary clubs being characteristic. In many cases, despite recent growth, a fairly strong civic sense and effective contact with the life of surrounding districts persists from the time when the town was smaller and more closely knit. It also tends to show a relatively good balance: towns of this type, until they grow immensely large, are rarely divided crudely into great tracts inhabited by members of a single social or income group. On the other hand, the very nature of its basic functions gives it a serious obsolescence problem over street and parking space, terminal and exchange facilities and general layout. Wastes at this point can often be successfully passed on to the consumer, but this is not true for export trades and may not be true indefinitely even of home market activities.

The port is a special type of traffic town, and many of the largest traffic towns owe a good deal of their importance to the possession of a port, although they would not be classed here as traffic towns if they had not considerable importance on other grounds as well. The general freight and passenger port for ocean-going vessels is most often combined with a large traffic town, as in the case of London and New York, but a number of important general ports such as Hull and Liverpool, and, to a less extent, Southampton, occupy sites which would have little importance for traffic if the port facilities did not exist. Four more specialised categories of port may be distinguished. The cross-channel ports, serving as terminals for frequent express short-distance services to one or more other ports, tend to be in a class by themselves, and unless combined with a major general port or a seaside resort are often quite small—thus, in 1981, Newhaven had a population of less than 7,000, Harwich 12,000, Holyhead 11,000 and Fishguard-Goodwick 5,000. Coastwise and inland shipping ports are also often small even when combined, as they naturally are, with country towns. King's Lynn and Boston, two of the chief of this class have, however, populations of more than 20,000.

Fishing ports, again, have special characteristics. The largest, such as Great Yarmouth, Grimsby, and Tynemouth, reach a size-range of 50-100,000 inhabitants, but have important other interests besides fishing. There are, however, many far smaller fishing ports, such as Stonehaven and Stornoway (4,000) and Brixham (8,000). Finally, there are ports, particularly on the Clyde and Tyne, where ship-building and ship-repairing predominate, causing a "mining-camp" development.

The port combines a very stable and often traditionally-minded nucleus and a highly unstable floating element of transients and of temporary activities. Few types of town suffer so much from long-run insecurity, and history is full of examples of once great ports reduced to insignificance, not only by silting or erosion, but by geographical and other changes in the balance of industry, by labour disputes, and by political action. Although there is no recent case of the decay of a major British port, the position of the port of Liverpool, for example, has recently been much reduced relatively to Southampton, and the docks of Penarth have actually been closed. Apart from long-run insecurity, ports are particularly susceptible to short-run fluctuations, especially when, as is often the case, they are closely concerned with shipbuilding, ship-repairing, or other export industries. From its nature the port tends to be rather weakly integrated with the life of its surrounding territory except where, as in the case of London, Bristol, and Manchester, it is also an important traffic town for its region. Ports have frequently acute social problems, due to mixed populations, often without local roots, security of income, or an adequate standard of life. The growth of amalgamations and combines in road and rail transport, shipping, shipbuilding, flour milling, sugar and oil refining, and other characteristic port industries gives rise to a problem of absentee ownership and control of the main economic assets, which is only beginning to be offset by a growing awareness, in flour-milling and one or two other industries, of their local social responsibilities. Community sense is encouraged by the sharp fluctuations in prosperity to which ports are subject, but the social balance is often one-sided, and in the absence of one or two exceptional and wealthy families leadership tends to be weak.

The mining camp town is a convenient expression not only for all towns based on an extractive industry, but in a wider sense for towns whose chief reason for existence is or has been a single factory industry or works. Most but not all such towns are products of the past century or so, and they are still being created—Billingham with Norton-on-Tees, Corby, and Kinlochleven are recent additions—while towns such as Scunthorpe, Fort William and Northwich have been so enlarged and altered in character as to approximate to this type. Railway locomotive and rolling stock workshops have given rise to similar settlements at Swindon, Crewe, Eastleigh, Ashford (Kent), Wolverton (Bucks), and elsewhere. Towns of this type are mainly of small or medium size, among the largest clear examples being Middlesbrough (iron and steel) of 140,000 population, and Merthyr Tydfil, now reduced to 63,000. Swindon had just over 60,000, and Crewe under 50,000 in 1931. Although some towns in this class have become county boroughs, they tend to be unimportant as administrative and commercial centres in relation to their size, and their amenities are not such as to encourage development into resorts or residential areas.

The mining camp town has had the opportunity of a new plan, free from medieval street-lines, but this opportunity has in many cases been very poorly used. Towns based on one industry are often also inhabited very largely by one income and social group over large areas, and show a tendency to excessive class segregation even where many different occupational grades are present. Integration with the life of the surrounding district is typically weak, and there may be downright hostility between "natives" and "immigrants" persisting for remarkably long periods. Community sense may be very strong, owing to ties of common occupation, or very weak, but in either case there appears to be a characteristic "garrison" atmosphere extending to all social grades. The identification of local leadership with economic power is often pronounced, reaching its climax in the "company town." Short-run fluctuations in prosperity may be negligible or severe, but no town of this character can be considered immune from long-run risk of dereliction and many of the worst depressed areas are in this category—Merthyr Tydfil and the Rhondda, Brynmawr, and other South Wales mining and iron towns, Cleator Moor and Jarrow. It is hardly surprising that towns of this type share with certain ports the chief part in returning to Parliament and to local councils candidates of extreme Left Wing political views. The proportion of males is often exceptionally high.

The military town dependent largely on a garrison, dockyard, R.A.F. station, arsenal or other military establishment is a variant of the last type, with certain peculiarities. In Great Britain the naval centres are much the largest and the aviation centres the smallest, partly because some of the naval ones happen also to have other important interests. The outstanding examples are:

Navy: Portsmouth (250,000), Plymouth (204,000), and the three towns at the mouth of the Medway (140,000).

Army: Aldershot, with Farnham, Farnborough, Frimley and Camberley (95,000).

R.A.F.: Andover (11,000).

The military town has little to distinguish it from the mining camp town, except that it enjoys rather greater security as many of its workers are entitled to State pensions, and if it is injuriously affected the matter can be pressed in Parliament. The limitations of this security are, however, visible in the case of Pembroke, where the docks were completely closed by the Government some years ago, leaving a depressed area ever since. Owing to the extent to which military service transfers able-bodied men, with their dependants, to different parts of the country where some of them take root, and to the pensioner element, military towns tend to develop a residential character, which is assisted by their class composition and their peculiar amenities, for instance, in recreation facilities and parades.

The cathedral city also has its "garrison," but it has proved of a much more enduring character and is much more intimately bound up with the social life of the region. In many cases the cathedral town is also conspicuously a traffic town and a residential town, while several have had a substantial "mining camp" element grafted on at a late state in their development. The purest examples of cathedral cities appear to be: Canterbury (25,000), Chichester (16,000), Winchester (25,000), Wells (5,000), Durham (18,000), Lichfield (9,000), and Ely (8,000).

The cathedral city has typically great stability, a strong community sense, considerable intellectual resources and leadership within somewhat narrow limits, and close relations with its surrounding district. The classes are often well mixed geographically, but differences in income and status are substantial and sharply defined. Partly owing to residential attractions the average age of the population is apt to be high, and its outlook unprogressive.

The school and university town is only found in anything approaching a pure form in very small examples, such as St. Andrews, Fife (8,000), Sedbergh, Yorks (2,000), and Oundle, Northants (3,000). This element is, however, conspicuous in association with others in medium-sized towns such as Oxford (88,000), Cambridge (75,000), Cheltenham (49,000), and Bedford (41,000).

The school and university town is worth distinguishing owing to the peculiar difficulties arising from the marked seasonal fluctuations in numbers of persons in its upper income group according to school and university terms. In a number of cases this is partly offset by a different seasonal peak for tourist visits, and by a relatively large resident population of well-to-do retired people, or persons with unearned incomes. Towns in this category and the next are the chief competitors for the entertainment of annual and other conferences—an industry which in the United States has reached enormous proportions, and has led to intense rivalry between cities seeking to attract lucrative bodies of guests.

The resort. The most conspicuous form of resort is the seaside town, which in the largest examples (Brighton, Bournemouth, Blackpool) reaches over 100,000 population. Many seaside resorts are of quite recent growth, and share a number of the characteristics of the "mining camp" town: Others are grafted on older ports. Of inland resorts the most clearly marked are the Spas: Bath 69,000, Cheltenham 49,000, Harrogate 40,000, Tunbridge Wells 35,000, Leamington Spa 30,000, Malvern 16,000, Buxton 15,000, Droitwich 5,000, Llandrindod Wells 8,000. There are, however, a few other inland towns clearly defined as resorts, such as Keswick (5,000).

The resort typically suffers from a conspicuous seasonal fluctuation between "rush" and "slack" periods, and in the small and extreme examples may be virtually closed down and left to caretakers at certain times of the year. The growth of indoor attractions, provision of extensive equipment such as all-weather promenades, concert and dance halls, and swimming baths, the development of the conference industry and the increasing numbers of pensioners retiring on small incomes to resorts have helped to overcome this disadvantage, especially where the resort is large and the climate favourable, but the problem remains. From its nature the resort is almost inevitably involved in large municipal expenditure, while the average size of its private businesses, measured in terms of persons regularly employed, is relatively small, partly owing to the absence of large productive plants or transport depots and partly because of the migratory nature of much of the labour. Labour standards tend, therefore, to be low, and in spite of the development of municipal enterprise, politics are usually well to the Right. The average age of the population

is high. Most resorts show signs of suffering from too rapid unplanned growth, and this problem threatens to become accentuated as a result of the increase of holidays with pay.

The residential town from its nature almost invariably develops by using a resort, a school or university town, a military town, or some other type as a nucleus. Thus Buxton, Bournemouth, Oxford and other towns have added a strong residential element to their earlier functions. A few examples such as Haslemere (9,000), and Crowborough (6,000), are almost purely residential.

The importance of this type is likely to grow as the population becomes more elderly, and as the effect of superannuation schemes becomes more substantial. It develops most readily out of the last three categories, and many which were once classed under these heads appear destined to become predominantly residential. One feature of the residential town is a high proportion of relatively large incomes, and unless other factors, such as schools, provide an offset, it usually has a high average age and a large percentage of females.

The dormitory town is a fairly recent development. In most cases it is physically attached as a suburb to the town for which it serves as a dormitory, but there are numbers of detached towns which serve to a substantial extent as dormitories for towns at some distance, such as, e.g. Southend-on-Sea for London, Chester for Liverpool, Ilkley and Harrogate for Leeds-Bradford, and some of the Clyde resorts for Glasgow. Dormitory towns are essentially residential towns, but differ in depending mainly not upon unearned incomes, but on profits, salaries and wages, which have to be obtained by a daily journey of their earners into a metropolitan centre or other large urban area. Towns of this type have gradually spread downwards through the income grades, but still tend to be dominated by the middle and upper groups who can most easily afford the luxury of spending an hour or more a day and a considerable sum of money in travel in overcrowded vehicles.

The dormitory town is distinguished by a daily and weekly rather than a seasonal rhythm, the number of adult males being strikingly low in working hours as compared with the night and week-end population. The average age of the population tends to be low and the proportion of children higher than anywhere else except in mining areas. Dormitory towns are frequently of recent growth, and often consist largely of small houses "owned" by their occupants through building society payments. They are therefore in process of acquiring expensive social equipment, and of meeting liabilities to which they have been in effect committed by the developers. Local politics are therefore liable to be dominated by "rate-payers'" questions. There is no incentive to take an interest in the affairs of the surrounding neighbourhood, which may even be hostile to the newcomers, as in the case of the "mining camp" town. The inhabitants of some of these areas have been aptly described as being refugees who do not realise that they are refugees.

The planned town needs a category of its own. Most English towns developed during the long interval in which planning was neglected, but Salisbury (1220), and the fragment of Winchelsea (c. 1290), Letchworth (1908), and Welwyn Garden

City (1920), are examples of towns whose sites were deliberately chosen and planned from the outset, with results clearly visible to-day. There is no modern British instance of the site of a town having been abandoned and a new one planned and developed to replace it: this was done in the thirteenth century with Old Sarum on account of general obsolescence, and with Winchelsea on account of inundation by the sea, but such a process would now be considered too revolutionary. Apart from these general-purpose towns a number of resorts, notably Bath and Eastbourne, industrial satellites, such as Saltaire, Silver End, Bournville, and Port Sunlight, and large housing estates such as Wythenshawe and Becontree, have been more or less completely planned within narrower limits. There have also been important planning schemes executed for parts of pre-existing towns, notably the New Town at Edinburgh. The majority of these examples are still young and of small or medium size.

The planned town has in its early stages peculiar problems in the advance provision of equipment and amenities, the purchase and control of land, and the enforcement of regulations which in other towns would only arise gradually when the need for action became apparent to all, and when, incidentally, the benefit to be obtained from it had been sharply cut down. The fact that so much has to be done at once and that the whole population for some years consists of immigrants from elsewhere, raises difficulties over finance, leadership, and the community spirit which older towns do not have to face. The age of the population naturally tends to be low during the early stages, and its outlook progressive or "advanced," although uneven rates of growth may later lead to unusual age compositions.

The metropolitan centre is almost invariably a very large example of a traffic town or port, and is usually also part of an urban cluster, its main distinguishing characteristic being that it provides or controls governmental, professional, technical, financial, distributive, communications, and other specialised services over a considerable area, including other substantial towns which come within its orbit for these purposes. Metropolitan centres are the largest type of town, often reaching populations of a million or more. The largest British examples are London, Glasgow, Greater Manchester, and Birmingham, but a number of smaller cities such as Edinburgh (440,000) fall in this class.

The metropolitan centre enjoys naturally an exceptional range of services and facilities, but is apt to pay the penalty in congestion and in rapid obsolescence of equipment and layout. It is relatively well provided with amusements and with social and cultural facilities, but owing to the extent and variety of its interests it is liable to be poorly integrated as a community and with its surrounding districts. There are enormous potential resources in leadership, but these are often largely diverted owing to the concentration on national and international affairs, characteristic of a metropolis.

The urban cluster, often described as the "conurbation," is a group of several or many towns or built-up areas growing from different centres, but with fringes merging into one another and sometimes giving place to new common centres. The seven greatest British urban clusters are Greater London, Greater Manchester,

Greater Birmingham, Leeds-Bradford and surrounding West Riding towns, Merseyside, Glasgow and its neighbours, and Tyneside. The populations of these range between one and ten millions each. There are many smaller urban clusters such as Tees-side, Stoke-on-Trent and Newcastle-under-Lyme, and Brighton and Hove and their satellites. The characteristic of an urban cluster is a growing confusion of function and interchange of population between different parts of the urban area. The main nuclei tend to become metropolitan centres with commercial, administrative and amusement quarters, displacing householders and industrialists, who shift to the subordinate centres or to cheaper land on the fringe. Typically the central area of an urban cluster ultimately finds itself with a small night population consisting mainly of caretakers and a huge day population of adult or juvenile wage-earners and salary-earners mostly in commerce, distribution and services. This stage has actually been reached in the City of London, and to a smaller extent elsewhere.

The urban cluster is composed mainly of types of town whose problems have been reviewed under other heads, the most characteristic pattern being a metropolitan centre surrounded by dormitory towns, "mining camp" towns, and often a port, and other types. Its most pronounced problems are obstinate housing troubles, both from slums and overcrowding, expensive and congested transport, lack of open-air recreation facilities and access to open country, and polluted air and rivers. As the various centres are usually separate local government units, often in two or more counties, waste, overlapping, and friction in local government are pronounced.

The urban region may be distinguished from the urban cluster by the fact that the various towns concerned, although fairly close and intimately linked by daily interchange traffic, are not physically merged in a single built-up area, either on account of geographical obstacles, as in the case of the towns of the South Wales mining valleys, or because urban growth has not yet gone quite that far, as in the case of the Nottingham-Derby-Ilkeston or the Llandudno-Rhyl-Flint, or the mid-Durham urban region.

The urban region suffers in a slightly different form from the same problems as the last type. It often contains a peculiar category of urban development, consisting, say, of a works or a mine and a few rows of typical town houses set down in isolation from other built-up areas, and enjoying neither the services and amenities of the town nor the advantages of the country.

The object of this analysis is to stimulate discussion regarding the town as a background of industry and as a social organism whose development can be, and is being, shaped by human wills. The question before the nation now is whether to accept the types of town resulting from the blind play of economic and social decisions, all taken regardless of the type of town they will produce, or whether to examine the different possible types of town, to agree on the merits and demerits of each, and to make economic and social decisions within a framework which will ensure that the towns of the future combine the maximum advantages and the

minimum drawbacks of their various types. The time has passed when the patterns and sizes of our towns can be accepted as Acts of God. It is no more necessary to put up with towns growing together into one congested and characterless urban cluster than to put up with leprosy or bubonic plague. By any reputable standard our towns are, with few exceptions, deformed and diseased organisms. When public opinion begins to regard them dispassionately the demand for a national fitness campaign for our towns will become irresistible. While there is scope for endless diversity of opinion it appears to be fairly widely accepted that the least successful types of towns are at one extreme those dominated by a very narrow range of interests, especially industrial interests and at the other extreme those which attempt a little of everything without giving scope for any one aspect to achieve anything like full development. These two extremes are both being created in Great Britain at the present time. ✓

Size, Cost and Function

Previous sections have shown that there are very considerable advantages and drawbacks attached to contemporary town life, and that for industry in particular these advantages and drawbacks vary widely according to the pattern or layout of the particular town and to its general type in terms of function. It has also been shown that size is intimately related to function. The very rapid recent growth of towns has produced many new problems of development and spread, while simultaneously many new functions have emerged which only towns could serve. Naturally in the absence of planning these new functions have usually been grafted on to pre-existing towns, often with the result of making them inconvenient and wasteful both for their older and their newer functions.) It is true that a change of function is normal and healthy in the long life of a town and, for example, many of the most pleasant resorts and residential towns began their careers in the the Middle Ages as military towns clustered round a castle, now frequently in ruins. But recent changes of function have been of outstanding speed and complexity and have, moreover, been permitted by modern transport to involve areas so large as to raise in an acute form the question of scale of development and of the apportionment of land as between different conflicting uses. At the same time modern civilisation involves enormously heavy capital expenditure on common services, and this renders it difficult either to modify the layout of a town once developed or to cut the loss on one which has ceased to have any economic justification for its existence.

According to the Report of the Marley Committee the total cost of a new town, Letchworth, with a population of over 15,000 amounted to more than £5 million. The land (4,500 acres) cost £160,000; development costs to 1934 were over £200,000, and cost of water, gas, and electricity services £530,000 (more than £80 a head on this group alone). The Urban District Council had spent more than £1 million on capital account in the initial fifteen years and the public had spent another £3-£4 million on building. Some of this expenditure no doubt would be providing in advance for a larger population, the actual number of houses and cottages in the town being just below 4,000. It also contained 119 factories, 168 shops, five public elementary schools, a public secondary school and 49 public

buildings, including a museum, a cinema and a private theatre. Letchworth is an exceptionally well-equipped town, constructed partly at a period of relatively high prices and although at this rate a town of 100,000 inhabitants would represent a capital of over £80 million it cannot safely be assumed that the costs of existing towns of older development were on the same scale. Nevertheless, it is evident that the capital investment involved in towns is enormous. A single service—electricity supply—accounts for an investment of nearly £500 million sterling, the vast majority of it for the benefit of the towns. This alone is more than £10 per head of population.

Problems Arising from Rapid Development

There is scope for very great economic waste if mistakes are made in planning urban investment. Loss may be caused by either uneconomic combinations of functions in towns, or by operating at an uneconomic size or by uneconomic rates of change in the quantity or composition of the population. It has already been shown how the attempt to combine incompatible functions leads to friction and waste. There is no instance of a large town seriously aspiring to be a coal mining centre and a seaside resort simultaneously, but there are plenty of cases of almost equally hopeless combinations, such as a residential suburb built round a busy airport, or a large manufacturing centre grafted on a smallish university city.*

It has often been suggested that certain sizes of town are more efficient than others, and that costs per head of certain services are greater in large towns than in small ones. In 'Social Characteristics of Cities' Professor W. F. Ogburn shows, on the basis of a comprehensive statistical analysis, that, for example, the costs per head of public health and recreation vary markedly in American cities of different sizes. Public health averages half a dollar a head in cities of 30-50,000 against one and a half dollars in cities of over a million. Cities of 100,000-300,000 spend most of all. For recreation the city of 30-50,000 again comes out lowest in cost with ninety cents, and the city of 600,000-1,000,000 comes out highest with two dollars and thirty cents. Costs of government, police, schools and libraries show broadly similar tendencies. In the 'Survey of the Social Services of Oxford and District,' Vol. I, p. 214, it is suggested on the basis of comparative expenditures per head in English county boroughs that those between 100,000 and 200,000 population are the cheapest to govern.

In some cases there is clearly an inherent economy in the small town which, for instance, can find accessible playing fields and recreation areas at much lower cost, because land values are lower and there is more unbuilt land within reach. It is, however, dangerous to carry this argument too far. To some extent the service given by the large town, although nominally similar, is of so much higher quality and so much more comprehensive as to be hardly comparable with that provided in the small town. Again, much depends on local conditions, on fortune or misfortune in incurring capital expenditure at a suitable price-level, or in factors of personal efficiency and co-operation which may not be connected with the size of

* Oxford has lately been described by the Warden of New College as the "Latin Quarter" of Cowley.

town. Making all allowance, however, it seems that the larger towns are, relatively to their populations, more expensive to operate. The questions therefore arise, whether the added expense is worth while, and whether it is borne by those benefiting or is passed on through differences in taxation and grants or through waste in distribution to the main body of taxpayers or consumers. Neither question can be conclusively answered, but there is reason to believe that both are to the point. Moreover in considering relative costs it must not be forgotten that part of the ultimate cost to the community of a given type of town—for example, the economic effect of its failure to reproduce its population—is extremely difficult to express in money, but is none the less real.

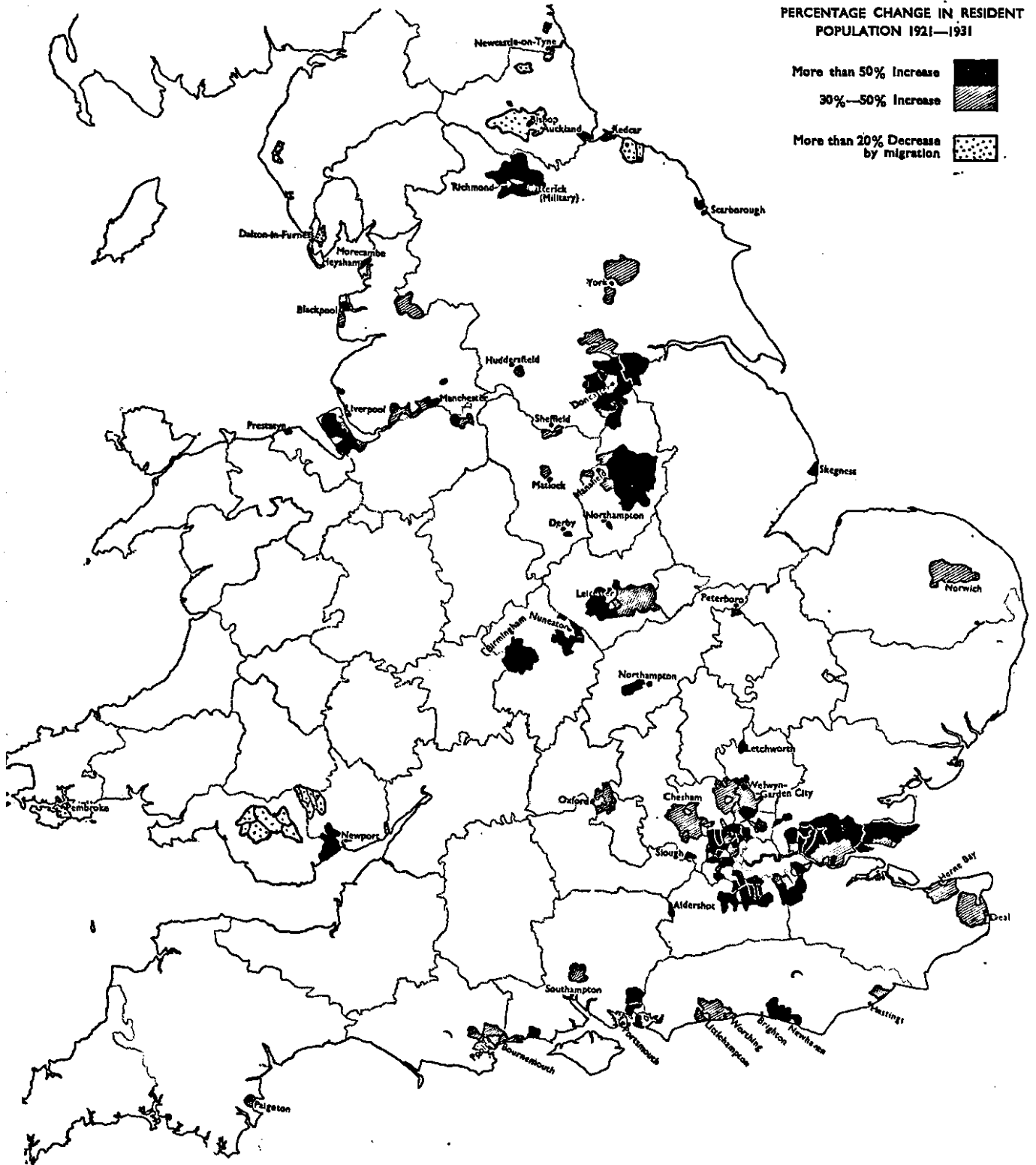
It is often overlooked that the question of the best size for a town is bound up with the question of population trends. Even if a town of 50,000 inhabitants is on balance no better and no worse as a unit of organisation than a town of 250,000, there may be a great difference in relative costs and efficiency of services between a town of 50,000 which has stood at about that level for twenty years, another which has shot up from 30,000 in the previous decade, and another which has fallen from 60,000 owing to trade depression. Generally speaking, the fast-growing town is chronically in arrears with staff and with certain parts of its capital equipment; while at the same time the rate of growth forces the authorities to tax existing rate-payers and consumers for a wide margin of certain types of equipment (such as streets, mains, and sewers) which are not yet needed, but likely to be needed within ten or twenty years if growth continues. On the other hand, the dwindling town tends to be over-staffed and over-governed, while uncertainty about the future acts as a deterrent to forward-looking activities and equipment tends to be allowed to remain after it should be scrapped as obsolete. Even if a town is not growing or declining rapidly in size, similar problems may be created, notably in housing, by large changes in the composition of the population. The more elaborate services the community demands, the greater is the scope for waste in failing to relate the size and rate of growth of towns to an all-round plan of development.

Forecasting Local Population Changes

The maladjustment accompanying too rapid change in the numbers and composition of a town's population could be substantially modified if the direction and extent of these changes could be predicted. Past experience shows that the attempts at prediction made by interested parties have sometimes been extremely wide of the mark, and towns which never had, and almost certainly never will have, a population of as much as 100,000 have been officially planned for populations approaching or even exceeding one million persons. It is true that to some extent this over-budgeting has been done consciously in order to meet the claims of those who hoped to profit by building development, but there has been a very large element of ignorance of the extent and nature of population changes.

The size and age structure of a population are changed by births and deaths and by migration. Migration is brought about by a vast number of immeasurable

Figure 13—AREAS OF RAPID POPULATION CHANGES



or unmeasured forces, but the changes due to births and deaths can be predicted within a certain range of probable variation.) In England and Wales as a whole, apart from migration, the total population is expected to rise by about $3\frac{1}{2}$ per cent in 1931-41, $2\frac{1}{2}$ per cent in 1941-51, after that to remain stationary for a time, and then to begin to fall. The number of adults, however, may rise by about 8 per cent in 1931-41, and by as much as 8 per cent again in 1941-51.

Towns which have a large proportion of young married people may expect more than their share of the country's natural increase, whereas towns such as Bournemouth, with a large proportion of elderly retired people, may expect less than their share. If migration could be ignored, local forecasts could be worked out in detail with some accuracy; but in fact most towns owe at least as much of their growth or decline to migration as to natural increase or decrease, and it would be impracticable to analyse in detail the forces which determine the direction and extent of migration between localities.

Nevertheless, a useful indication of the order of magnitude of changes to be expected in any given locality may be gained by a study of the changes in resident populations which are recorded in the period 1921-31. During that time the total national increase was $5\frac{1}{2}$ per cent, as against a probable $3\frac{1}{2}$ per cent in 1931-41. The increase in adults was 11 per cent against a probable 8 per cent in 1931-41.

The number of young adults, who are the principal migrants, is already beginning to fall. Thus there is reason to suppose that the changes which were experienced in 1921-31 should indicate the maximum that is likely to occur spontaneously in the coming decades.

The Census figures are analysed by County and Municipal Boroughs, Urban and Rural Districts. Some of these are very large, and the total figures for a large area may not reveal a high rate of growth in one portion of it. In many cases, however, the County and larger Municipal Boroughs are well built up, and leave little scope for rapid growth on any site within their boundaries. Thus an analysis of the Census figures probably brings out nearly all cases of abnormal growth which extend over an area with a population of, say, 20,000. Many cases of much more localised growth are brought out, but some may be concealed.

The map on page 171 shows all districts which increased by more than 30 per cent in the decade. Those which rose by more than 50 per cent are shown in solid black. It will be seen that on the whole an increase of 30 per cent or more is to be regarded as abnormal. It occurred in less than one-twentieth of all districts outside Greater London. The districts where abnormal growth occurred can be divided fairly sharply into two classes—those on the edge of industrial or commercial centres, and resorts. Besides Greater London there was only one large cluster of districts affected, namely, those around Doncaster. Three of these districts rose by 100-200 per cent; but in all the rest of the country there were only three instances of rises greater than 100 per cent, and the highest was 122 per cent.

Growth of 50-100 per cent occurred in an almost continuous band round London, about 5-7 miles wide, a few miles beyond the boundaries of the administrative county. Along the Essex coast to Southend, to a depth of about 5 miles,

there was a similar development. The most concentrated suburban growth (100-200 per cent) was to the north-west of London, in the Hendon-Harrow district. In the centre of this area, in the small district of Kingsbury, covering 1,800 acres (about three times the size of Hyde Park and Kensington Gardens) the population rose from 1 to 9 per acre. This was more than three times as great as any other recorded suburban increase, the next highest being from $8\frac{1}{2}$ to 10 per acre, a rise of 205 per cent, in the adjoining district of Wembley, covering 4,564 acres.

It is not at all probable that (even in the absence of restrictive measures) London will ever spread faster than it did during 1921-31. The next ring is already becoming well covered, except where successful measures are being taken to prevent this, but the rate of growth may not be expected to exceed a doubling of density in 10 years, and that only in a band of few miles wide.

The London area affords two interesting examples of the order of growth which can occur when planned provision is made for both housing and employment. At Dagenham the density of population rose from 1.38 to 13.6 per acre, and at Welwyn Garden City from 0.31 to 3.5 per acre during the decade.

Outside Greater London there was only one instance of notable growth over a wide area. This was round Doncaster, on the eastern edge of the West Riding industrial region, where several rural districts, covering about 200 square miles, reached suburban densities of nearly 1 per acre, and experienced growth of 50-180 per cent. In Greater Manchester notable growth was confined to a small crescent round Stockport, and a strip down the river towards Warrington. The spread of Liverpool was over the Wirral peninsula, which experienced a growth of 30-60 per cent. The growth of Richmond Rural District in Yorkshire may be ascribed to military development at Catterick. A certain amount of rapid development probably occurred on the edge of most centres, but in general the surrounding rural districts are fairly large, and the suburban expansion was not enough to raise the total figure by as much as 30 per cent in more than one direction at most. The only exceptions were Leicester, Nuneaton and Mansfield, which were nearly encircled by fairly large districts showing a marked increase. The increase on the townward edges of these districts was probably around 100 per cent.

This growth round the edges of industrial centres is due not so much to the growth of the whole region as to a movement out from the centre. This may be expected to continue for some time, but it is unlikely that the pace will be accelerated. In general, only a narrow ring of country will be affected, but larger areas may be covered where a big urban cluster is prevented from spreading uniformly by some natural feature such as the Pennines.

The other type of notable growth was at resorts. At 14 seaside places and a spa (Matlock), either the town itself or one of the surrounding districts rose by 30-100 per cent. The most notable instance was Bournemouth, where the borough itself, with 85,000 inhabitants in 1921, rose by 30 per cent, and two adjoining districts, with 3,000 and 7,000 inhabitants, rose by 70 and 82 per cent. In all these cases the great bulk of the increase was by migration, and in Bournemouth, Hastings, Blackpool, and several smaller places, deaths actually exceed births. It is significant also that the female greatly exceeds the male population.

This type of migration may be expected to increase for many years, since the number of persons in the age groups affected will continue to rise till nearly the end of the century. The excess of deaths over births in such places will also steadily increase, but it is not likely to overtake the immigration rate for some little time.

At the other end of the scale, in areas with falling population, it is more profitable to examine the decrease by migration only. This will give a guide to maximum expectations, since loss by migration will be in excess of the net fall so long as the natural increase is positive, that is, so long as births exceed deaths. The natural increase in such areas tends to be above the average, since many people leave before they die, thus in most cases it may be expected to remain positive for some decades. The Census figures are less useful here, since a concentrated evacuation may well occur in a small district inside a county borough. The Census county volumes give the 1921 and 1981 population by wards of the larger boroughs, but the percentage fall is not calculated, and a very elaborate study would be required to extract any useful information from this source.

Nevertheless, it is remarkable that even in South Wales the Census reveals no decrease of more than 30 per cent, and outside South Wales and Durham there were only 6 districts which decreased more than 20 per cent. The districts which showed more than a 20 per cent decrease are stippled on the map. It appears that serious dislocation can be caused by a comparatively small proportionate loss, and the natural tendency is to under-estimate the importance of any given numerical loss. One reason for this is that the migrant tends to be either a young, active adult or an older person with means, both of which types play relatively important parts in social and economic life. Thus no very useful purpose is served by laying stress on the smallness of the numerical loss to be expected.

For practical purposes it can be assumed that a growth of 30 per cent or more in the course of a decade is highly improbable except in:

- (a) Areas with relatively small initial populations coming within the fringe of suburban development of a flourishing large town;
- (b) Areas of small or moderate population chosen as sites for large-scale public works—e.g. arsenals, military camps—or occasionally for very large private industrial plants (e.g. Billingham);
- (c) Seaside and health resorts attracting a considerable number of retired persons as residents.

For the great majority of areas not coming within these categories future population increases are likely to be very moderate. For example, a town of 50,000 population in 1981, if it increases at the same rate as the average for England and Wales as a whole, may expect to have a population of about 51,750 in 1941, and less than 58,000 in 1951 and 1961. If it falls in one of the specially fast-growing categories just mentioned and is so attractive to immigrants as to rank in the highest 5 per cent of all areas outside Greater London, it will, on the experience of 1921-81, still be very unlikely to reach a population of more than about 60,000 by 1941 and 70,000 by 1951 and 1961, after which its chances of even maintaining its peak popula-

tion appear relatively slight. For towns not coming now or subsequently within the three special categories listed above, there is at least a 50 to 1 chance against the population rising at any time this century by more than 30 per cent above its present level. If this were better appreciated by the authorities concerned, much waste might be prevented.

Policies of Towns

Towns cannot, therefore, be considered as static backgrounds for industry. They are constantly changing, and in changing they change the conditions of industry. Growing numbers of towns, moreover, are adopting a conscious policy of development. This may take the form not only of town planning, but of active stimulation of industry.

At March 31, 1938, the acreage covered by approved and operative* town and country planning schemes was only 236,780, but the 87 schemes concerned covered parts of such important urban areas as Birmingham, Leeds, Bristol, Nottingham, Derby, Preston, Hull, Luton, Cambridge, Stockton-on-Tees, Sunderland, Wembley, Willesden, Ilford, and Southend-on-Sea. (The effect of this town and country planning activity is to shepherd new industry very largely into certain predetermined parts of whatever town or other area is favoured by the industrialist, but not, of course, to influence in any way his choice as between one town and another.

This choice is, however, strongly and purposely influenced by certain towns as a matter of policy. Some, such as Birmingham, Bristol, and Leicester, have vigorous municipal development offices, which run propaganda and issue information designed to attract industrialists to the town. Others belong to regional development councils for the same purpose, such as those of Scotland, Wales and the North-east Coast of England.) (It is significant that these larger bodies are substantially supported by Exchequer funds through grants from the Commissioners for Special Areas.) In other cases municipalities have themselves erected a factory for a prospective industrial tenant, or bought a site on condition that a new plant was erected in the area, or have, under various euphemistic descriptions, given newcomers favourable terms over their rent and rates. Quite apart from such specific inducements certain towns have a reputation for being unusually well run, or possess a town clerk or other officer with imagination and the capacity to talk to industrialists in their own language and to smooth over their many initial difficulties. Such towns naturally prove attractive to new industries.

Conclusion

This chapter has barely outlined a problem which is immense and complex and which it would be inappropriate to discuss in greater detail from the standpoint of location of industry. It has been shown that the town, with all its shortcomings, is a remarkably vital and successful organism. No nation has taken to town life to the same extent as the British, and it might be added that none has given so little systematic thought to the many problems of towns, or taken so little trouble to make its towns pleasantly habitable.

* Planning resolutions, giving some measure of control, cover about two-thirds of England and Wales

The many problems arising for the P E P Location of Industry Report may be recapitulated in conclusion. In the first place, there is the group of problems touching the functions of the town, economic and social. To some extent specialisation, or concentration on certain activities to the exclusion of others, is inevitable, both in towns and as between different quarters of towns. This raises problems for industry, which has been a chief agent, on the one hand, in promoting urban specialisation and, on the other, in destroying it by introducing fresh and incompatible functions. New industries appear at present often to be attracted to towns on the ground that they possess types of specialisation which the advent of new industry on any large scale is bound to modify if not to spoil. The first questions that arise, therefore, concern the desirability and practicability of various types of specialisation and of segregation of function in towns. This involves the control of changes of user with a view to preventing unforeseen and unwanted types of development, and, conversely, to securing wanted types of development. Questions also arise of the relationships between neighbouring towns in a single urban cluster or urban region, and concerning the avoidable risks run by many existing types of town owing to gross lack of balance and lack of social integration.

A second group of problems, ancillary to the first, touches layout and town planning—in fact, the means of realising whatever objectives are decided on. The pattern of existing towns is in many respects wasteful and inefficient from the standpoint of transport and industry, not to mention health and amenities.

There is, therefore, a group of questions concerning

- (i) the clashing claims to land use, and the failure to review them by any impartial authority acting in the national interest;
- (ii) the inadequate mechanism for relating town and country planning to the needs of industry;
- (iii) ribbon development along roads, and the unrestricted placing of new factories on agricultural land outside or between towns;
- (iv) scattered development in rural areas; and
- (v) the merging of the fringes of towns so as to form continuous urban clusters.

A third group of problems touches the most convenient and economical sizes of towns, and the most desirable rates and types of change in their populations, in so far as these may be consciously influenced. It seems particularly necessary to set in hand adequate studies of the effects on municipal policy and finance and on employment of a local population declining in numbers and becoming more elderly, as this is a condition previously unfamiliar which seems certain to become frequent in the fairly near future.

A fourth group of problems touches municipal development—the mechanism for formulating and the technique for implementing a policy. This involves the structure of local administration and the persistence of independent and non-co-operative local authorities even in what have become inseparable parts of a single metropolitan area. It raises the question of co-ordination of policy between

towns—for example, as regards competitive expenditure and publicity in attracting new industry, the present tendency being to strengthen those towns which can afford to advertise widely, and to use big inducements, especially when they have enterprising officials, instead of those towns to which on grounds of national economic advantage the industry ought to go. Internally, it means investigating how to secure a coherently thought-out and administered policy for local public investment in municipal and utility services, with a view to ensuring that the various departments and agencies concerned have the same broad outlook about the future of the town and work in harmony to realise it.

Finally, there is a more general group of problems, involving the relation of each town to other towns, especially its neighbours, and to the surrounding countryside and region which serves it for recreation, water supply and fresh food supply, and which is served by it for administration, shopping, amusements and other purposes. Here we touch on the question what is the national policy as regards town and country, whether the nation wishes to continue to have any appreciable rural population living from the land, and if so how it proposes to realise that object.

Enough has been said to indicate the size of the problem and the extent to which it is being neglected both in study and in action. This neglect is such that it would be visionary to hope for any rapid transformation, but certain first steps towards a remedy are discussed in other parts of this Report. Other aspects of the problem are being studied in more detail by the Regionalism Group of P E P., and will be the subject of a later report.

VII. DEFENCE AND THE LOCATION OF INDUSTRY

Recent Growth of the Problem—General Measures of National Defence—Probable Range of Bombers—Measures of Air Defence—Other Forms of Attack—Means of Transport a Likely Object of Attack—Road Transport—Attacks on Industrial Plant—Vulnerability of Whole Industries—Vulnerability of Individual Factories—Vulnerability of Industry to Indirect Forms of Attack—Change in Location Factors—Cost Factors—Considerations Governing the Location of Industry—General Considerations

Recent Growth of the Problem

The possession of industries which are strategically well placed is worth large numbers of aircraft, warships, tanks and artillery when the balance of military preparedness is weighed up between the nations.) Adequate defence to-day requires not only the provision of arms in time of peace, but also the assurance that a continuous flow of food, equipment, clothing and munitions will be available in time of war. The capacity of industry to satisfy these demands, as well as supplying civilian demand and the export markets, depends very largely on its location, because some industrial sites are unduly vulnerable while others are likely to lead to the inflation of costs and to delay in the delivery of essential materials. Moreover, the military task of defending these sources of supplies is rendered very much simpler if industry has been located with some regard to strategic factors.

The creation of centres of heavy industry in the Urals and in the Kuznetsk area of Western Siberia are instances of the process of locating industry in accordance with strategy. In Yugo-Slavia the K.K.K. Triangle was selected as an industrial centre, its only particular merit being that of remoteness from Italy. In Poland, also, there is a central industrial quadrilateral, situated with similar strategic factors in mind.

The ramifications of the problem are extensive, and once the need for considering the strategic location of industry is accepted, numerous administrative, financial and technical problems have to be considered.) For example, much would depend on the proposed methods of financing a war, because on this would depend the provision made for keeping in operation factories which cater for foreign markets. Again, attention would have to be paid to such questions as the rate allowed for obsolescence of machinery diverted from normal uses and the effects of moving factories on the efficient working of public utilities. (In fact, considerable difficulties will arise if the delicate machinery of costs is abruptly disturbed on grounds of military necessity which in an emergency might have to disregard to some extent proximity to supplies of raw materials or upset the balance of complementary industrial processes.

Clearly, planning ahead is required to meet such difficulties satisfactorily, and more particularly to ensure that their solution is not accompanied by waste of public funds and the emergence of friction between the Government and industry, or between employers and workers. In this connection it is worth noting that some of the dangers inherent in attempting to carry out transformations overnight were shown on a small scale in the sphere of commercial organisation during the crisis of September 1938. When events became serious many large firms scattered their archives and part of their staffs in places in the Thames Valley, the south Midlands and Wiltshire, Dorset and Gloucestershire, and it appears that very little provision was made for assuring them adequate intercommunication which war conditions would have made more than usually necessary.

Before examining the ways in which industry might suffer in the event of hostilities, it is clearly necessary to assess the strategic situation and the forms of attack which may be expected.

Owing to its geographic position, the United Kingdom is fortunate in being able to regard attack from westerly directions as being unlikely, or, at the worst, of relatively small significance. It can be assumed, therefore, that attack, if it comes, may be looked for from the Continent towards the East Coast of Great Britain. The chief risk is of attacks from the air, though some shelling from the sea, such as took place at the Hartlepoons and Scarborough in the Great War, might be expected. In addition the possibility under certain conditions of invasion by sea-borne or air-borne troops cannot be entirely dismissed.

General Measures of National Defence

Although the national defence programme includes plans for defence by sea, land and air, it is the last which has the most direct bearing on the subject of this report. Large-scale attack from the air is something which Great Britain has not previously experienced, and which can be counted as a virtual certainty in any future war. Thus, while experience of war by sea and land may already have been applied as far as it is relevant to the protection of industry, the outcome of intensive air raids is still largely conjecture.

Probable Range of Bombers

The range of modern bombers with full load extends to about 600 miles from their base; but this is being continually extended, and there is, in addition, the possibility of attack by sea-borne aircraft. There is, therefore, probably no part of the country which is, from the point of view of distance alone, completely immune from air attack. There are, however, other considerations. For instance, while bombing planes from the Continent might raid Bristol or Manchester, their own risk would be greatly increased (by having to fly a long distance over British territory). Although Manchester might be reached as easily as, say, Newcastle, from the point of view of distance alone, the risk attaching to a raid on the former would be much greater and the target would have to be correspondingly more attractive to make the attack worth while.

Then, while buildings on or near the East Coast can be counted among the most likely objects of attack, it must be remembered that no enemy could carry out a simultaneous attack on the whole of the East Coast. Limitations of available aircraft would alone render such a course impossible.

It must, therefore, be assumed that an attacker would select his objects of attack with a view to obtaining the greatest return for the risk and expense incurred. His ultimate object would, of course, be to force his enemy into submission, which he could probably not achieve until a sensible proportion of the population had been brought face to face with starvation or annihilation by some other means. The damage which he would seek to inflict would, therefore, be of a kind which would jeopardise his enemy's sources of food, and prevent him from producing weapons of self-defence. As far as Great Britain is concerned, the first object would be achieved by disorganising seaports and means of transport, while the second would be achieved by destroying factories or demoralising the workers. London is obviously among the most vulnerable places in the country, and from an enemy's point of view a most desirable object of attack, because the density of population is high over a very wide area. Moreover, there is a great concentration of administrative organisations of national importance and a high proportion, though not, on the average, a high geographic concentration of industry. Finally, there are the docks, through which pass more than one-third of British imports, and numerous national distributive organisations such as the markets of Smithfield and Covent Garden.

Measures of Air Defence

During the last few years there has been reason to believe that on the whole the power of defence has increased in relation to the power of attack.) Although the efficiency of the individual bomber has probably increased in relation to that of the fighter, the efficiency of anti-aircraft guns and the instruments by which they are controlled has been enormously increased, while the balloon barrage, especially in conjunction with smoke screens, has important potentialities.

Thus the idea has been put forward of enveloping balloon barrages in a smoke screen, and having in addition other smoke screens, so as to mislead an attacker as to the exact position of the barrage. Provided weather conditions were favourable, this would exploit the airman's overriding fear of hitting anything while in flight.

Air defence, from the military point of view, can be divided into three main sections, namely:

- (1) Anti-aircraft guns and searchlights;
- (2) Interceptor-fighter aeroplanes;
- (3) Balloon barrage.

The effectiveness of these three in combination is, of course, far more than the sum of their individual effectiveness. In fact, a full complement of the three at any one place might, without undue optimism, be regarded as an almost impassable barrier to attacking bombers, though exception to this probably has to be made in the case of low bombing. It is clear, however, that to provide a full complement of these three forms of defence everywhere would be an impossible undertaking.

It would also be impossible to erect such a barrier over the whole east coast of Britain—just as it would be impossible for an attacker to attack on that scale.

Therefore, just as the attacker will select suitable objectives for attack, the location of industry has to be arranged in such a way that the objectives will, in conjunction with the provision of aircraft defence, be less attractive than they are at present.

Other Forms of Attack

While air attack is the form from which industry is most likely to suffer, some consideration must be given to the possibilities of submarine attack both on shipping as it collects near harbours for convoys (which will presumably be organised), and on the stream of coastwise traffic, some, at any rate, of which would not be covered by patrols. Industries whose supplies come through ports likely to be affected in this manner, must clearly be ready to have their location re-considered in relation to the needs of defence. Thus, industrial centres on the East Coast which are of especial importance to war requirements would obviously be included in this category, and in the war of 1914-18 examples may be found of the difficulties likely to be encountered. On one occasion, for instance, 7 ships, the bulk of whose cargoes were destined for Newcastle, arrived at Falmouth where few unloading facilities were available. The ships were accordingly re-directed to Newcastle, though, in fact, owing to submarine action, only one ever arrived there.

Means of Transport a Likely Object of Attack

Transport routes in Great Britain would, on the whole, be difficult to disorganise seriously by bombing, for there is a very highly-developed network of railways, so that alternative routes are nearly always available between any two places. Moreover, the determined attempts to bomb the Canton-Hankow railway and also the bridges across the Ebro during 1938 have shown that it is extraordinarily difficult for bombers to put either railways or roads effectively out of action for more than short periods. At the same time, there is, in some cases, a considerable difference in efficiency between the best and the next best routes. Thus there are three recognised routes between London and Manchester, and though the average journey times by them are by no means equal, they all have express passenger services. The fastest route, however, takes most of the traffic between London and Manchester, the other two routes being used to a large extent for traffic between intermediate towns. Many towns have only one railway leading into them. In other cases, certain main lines pass over viaducts, which could be seriously damaged by air attack.

In considering the question of the relative importance of different rail routes, it must be borne in mind that the relative importance of different areas may be altered considerably under conditions of war. For example, it is unlikely that the Port of London would continue (in time of war) to handle one-third of British imports, which means that other ports would have to share the burden. This would, of course, alter the relative importance of certain railway routes, and, indeed, the adequacy of transport must obviously play a large part in the final selection of relief ports.

Some experience in this direction was gained in the Great War, when consignments of food were unloaded at ports such as Hull and Plymouth. For example, six ships, carrying 27,000 tons of cargo, were on one occasion diverted from London to Plymouth. Unloading took three weeks (as against a normal one week at London), with a resultant loss of working time for the ships when every ton of carrying capacity was urgently needed. Moreover, it proved impossible to deliver the material from Plymouth to London owing to insufficient transport facilities, and only 7,000 tons eventually reached its destination, the remainder being disposed of locally. Official investigation showed that if London's supplies were to be imported through Bristol and other ports in that part of the country, the Great Western Railway would have had to increase its stock by 140 locomotives, 12,000 wagons, and 1,200 insulated containers.

This shows the scale on which the importance of a particular route and the demand made upon it can be altered by a change from the normal channels of distribution. The great development which has taken place in road transport since the Great War will to some extent modify the situation, but, even so, the combined resources of road and rail transport would be hard pressed to meet a similar situation in the future.

Road Transport

Road transport is probably less liable than rail transport to serious dislocation by bombing, since there are usually numerous byways which could be brought into service if sections of the main roads were damaged. In some cases, however, the byroads would not be suitable for heavy lorries, and this is, perhaps, worth bearing in mind when decisions are made on road improvement programmes. In other cases, road connections with certain places which might assume strategic importance are poor or inadequate. The government has already taken some action to remedy such defects, for instance, in giving encouragement to Bristol Corporation to build a broad road between Bristol and Avonmouth, largely for strategic purposes.

Road transport suffers to an even greater extent than the railways from the disability of having a low load per normal transport unit compared with that of a cargo boat. Thus, in order to move 30,000 tons of goods, which represents the load of seven cargo boats of medium size, a distance of 100 miles within a single week would require the constant use of 370 8-ton lorries during that period. This affords some indication of the difficulties of organisation and of the amount of equipment which would be locked-up in any large-scale diversion of transport owing to changed factors of location.

Attacks on Industrial Plant

While attacks on transport would probably come early on an enemy's list of priorities, there are obviously other objectives which can be regarded as almost certain to be attacked.

In the first place, armaments and munitions are produced almost entirely by certain sections of industry, chiefly the iron and steel, general engineering, and

chemical industries, and many of the factories in these industries are grouped together in constellations which offer easy targets for raiding bombers.

In any future European war, however, every section of industry and every unit of productive capacity would have to take part, either in producing direct or indirect military requirements or in meeting the essential and probably minimum needs of the civil population, or of export trade. For example, large clothing factories of the type found in Leeds and more recently in Middlesbrough and the Rhondda would probably be engaged in making uniforms; while a number of other industries, such as leather and rubber manufacture, would be making some of the numerous subsidiary clothing products.

The importance of maintaining the level of production in factories, which from the purely military point of view could be classed as subsidiary, must not be underestimated, because not only must the civilian population continue to receive at least a minimum of consumers' goods, but, in addition, exports will have to be maintained in order to provide some of the credit necessary for war needs. The latter is particularly important, as the position of British overseas investments in relation to imports is not so favourable to-day as at the beginning of the war of 1914-18. Moreover, a large proportion of the credits which do exist are either already frozen, or are likely to become so in the event of war. Thus, in so far as all industry would be playing an important part in the war machine, an attacker's choice of objectives might be the more bewildering. Nevertheless, it is not difficult to see that damage to some works would be proportionately much more serious than damage to others.

Vulnerability of Whole Industries

The risk of damage to whole industries—such as the nitrogen fertiliser industry or the jute industry—is distinct from the vulnerability of individual factories or plants. Such vulnerability may result from two causes. First, the manufacture of a particular product may take place either in a very small number of productive units or in several units confined within a relatively small geographical area. In either of these cases, the whole output of a particular product may be seriously disorganised by a successful attack on a small area.

Secondly, a particular industry, though not having its manufacturing units concentrated in a small area, may use raw material from a single source. The source might, of course, be a works making an intermediate product, such as bakelite moulding powder, in which case it would come into the group mentioned in the previous paragraph, or it might be a localised mineral supply (such as salt in Cheshire) or, in the case of an imported material, a particular seaport. As a general rule, industrial raw materials could be imported at almost any port within reason, although, of course, some ports could only handle a relatively small bulk. A survey of the west coast ports has been made with a view to ascertaining their ability to fit in with possible war-time requirements. Some imported materials, such as meat, however, require special facilities—in this case, cold storage—while other materials, brought from a certain part of the world by a particular shipping line, may come

into particular ports by reason of shipping agreements. The vessels of the Union Castle line, for example, call at Southampton and only one other British port. While such agreements would probably be abrogated in time of war, their existence in peace time may, nevertheless, bring about a concentration of certain facilities in certain places. In all these cases, damage to the source of supply or transit premises might paralyse all manufacturing plants using that material, wherever they might be situated.

Vulnerability of Individual Factories

As has already been pointed out, enemy bombers will usually attack large groups of factories, or mixtures of factories and dwellings, since, purely on grounds of probability, the damage done per bomb dropped is high. Not only is each bomb more likely to secure a direct hit, but surrounding buildings may also be damaged indirectly from a building which has actually been struck. A falling chimney stack or an exploded gas holder, for example, may do considerable secondary damage to buildings which happen to be near. It follows that a factory which forms part of a closely-packed group is more likely to be subject to attack than one in a more isolated position. On the other hand, a factory by itself in the country forms a landmark, and could very often be found and attacked if its destruction were of sufficient importance to the enemy. Recent experience, however, suggests that the accuracy of bombing, even when the target is well defined, is low, and the number of bombs required to demolish such a factory might, therefore, be large. Some mean course, therefore, seems to be advisable, so that an individual factory is neither conspicuous by its isolation nor yet within close range of other buildings. In connection particularly with isolated factories, but also with specific objectives in dense areas, such as gas holders, attention might be paid to the possibilities of camouflage.

A factory location, though satisfactory from the foregoing viewpoint, may be near some obvious landmark, such as a canal or river, and may for that reason be easily found by attacking aircraft. Any sizable expanse of water is easily seen from the air by night, and such features as well-marked bends in rivers would give a clear indication of the location of works known to be near them. It has been stated, in this connection, that Flamborough Head, Hornsea Mere and the Humber formed the guiding points for Zeppelin raiders on the West Riding in the last war.

Further, a factory may be especially vulnerable through its design. Apart from such obvious instances as liability to fire, the physical damage caused by a direct hit can vary greatly with the lay-out and method of construction of the building. For example, a large factory comprising several stages of manufacture under a single roof would suffer worse damage from a hit than a number of small buildings with the same total floor space. Obviously these would cost more than the single large building, apart from the likelihood that they would put up production costs; and the question arises as to how much additional expenditure can reasonably be incurred on grounds of defence. No definite answer can be given to this, as it depends on such a wide variety of factors. For example, more could justifiably be spent on defending a factory which must necessarily be located on the East

Coast than on another factory in, say, North Wales, while a factory making explosives would need more elaborate precautions than one making aluminium saucepans. Explosives factories are compelled by law to take elaborate precautions to minimise damage due to possible explosions, however caused. There are, of course, other kinds of works (besides explosives works) which, by the nature of the processes carried on there, are liable to more than ordinary damage. Gasworks and petrol storage tanks, for example, come in this category, as a direct hit would cause fire and explosion which, in turn, could cause widespread destruction.

Location near gasworks is for this reason strategically inadvisable, though this fact does not appear to have been borne in mind in the past. The economic reason for the proximity of gasworks to railways is obvious and air attack was unknown when most of the locations were chosen. It has been suggested that the vulnerability of gasworks would be greatly diminished by the use of high-pressure spherical gas holders, as the same amount of gas could be stored in a much smaller vessel. Not only would the target be much smaller, but protection against bombs could be more easily arranged. For other reasons, however, spherical gas holders have never achieved general acceptance in the industry. Works having steam-raising boilers, or using an inflammable material, would similarly be subject to serious damage if hit by a bomb.

Precautions against fire in factories now reach a fairly high standard. Fire-proof construction of the buildings themselves is generally reinforced by the installation of automatic sprinkler systems which afford protection to plant and stock. Most insurance companies allow a reduction in fire insurance premium when any recognised system of sprinklers is installed, so that the cost of the installation is to some extent offset. In relation to defence it must be remembered that public water supplies might themselves be damaged in an air raid, and any fire-prevention apparatus relying on them might be thrown out of action. Many works, however, have their own tanks working by gravity on to the sprinklers, and in other cases provision might be made, as in the case of public fire brigades, for the temporary use of portable hoses and reservoirs.

Finally, factories which are located in large towns, and rely largely or entirely on local transport services to bring in labour from relatively great distances, must be considered vulnerable on that account. Damage to, or dislocation of, the transport services might paralyse or seriously handicap the works.

Vulnerability of Industry to Indirect Forms of Attack

In addition to attacks on factories or groups of factories, industry would, in the event of war, have to be prepared to meet a number of indirect forms of interference, which could have as devastating effect as the actual destruction of machinery and buildings. As a result of its concentration in towns, the industrial population is particularly vulnerable to attack, for, as with factories crowded within a relatively small area, the chance of damage per bomb dropped is very much greater where population is dense. The most outstanding example of a working population

exposed to this danger is, of course, to be found in East and South-east London; but it would be foolish to forget the similar dangers threatening those living at Portsmouth or Chatham in the Home Counties or in the Birmingham and Bristol areas further west. Employees living near plants which are also prominent landmarks, as at Billingham or Corby, are subject to nearly the same dangers as the plants themselves, and even the so-called "neutral" areas, which may reasonably expect not to be so severely attacked as the "target" areas, may prove to have been somewhat optimistically so named by the Ministry of Health. Examples of the principal "neutral" areas are Derby, Plymouth, Leicester, Sunderland, Durham, Grimsby, Bristol and Barnsley.

Although neither industry nor population may suffer direct physical injury from attack, both may be seriously affected by damage to the transport system which brings in food and other necessities. The vulnerability of railways, and the existence of alternative routes has already been mentioned in this chapter. In addition, there is the possibility of damage to other public services, such as telegraphs and telephones, electricity, gas and water supply mains, sewerage systems, and roads.

Water supplies could be affected either by physical damage to pipes, reservoirs and tanks, or by contamination of the water in reservoirs.

Gas supplies have already been mentioned in connection with the more serious damage which may result from a direct hit on a gas holder. This risk is also present to some extent wherever a gas main may be hit. Many industries have turned increasingly to the use of gas, and while a gas failure might be overcome in some cases by reverting to other fuel, this would not always be possible. For example, the manufacture of electric lamps depends very greatly on a supply of gas, which is used for sealing glass. In the event of war, it is highly probable that supplies of gas will be cut off either at the gas works or at the main lead into each factory, and the supplies of other gases, such as acetylene or petrol refinery gas, are too difficult to procure to form any adequate alternative. In places which rely on coke oven gas supplies it would obviously be out of the question to stop making the gas, which would presumably be blown off into the air, since there are no possibilities of storage.

The vulnerability of electricity supplies has, it is sometimes suggested, been increased by the introduction of the Grid, and the policy of concentrating generation in a relatively small number of stations. While in answer to this it is stated that the former generating stations are still retained as stand-by, it should not be forgotten that the load on the Grid has increased greatly since the smaller stations ceased to generate, and they may now be quite inadequate, even as a stand-by. On the other hand, the interconnection of selected stations provided by the Grid, obviously in theory enables the effect of damage to a single station to be minimized, though experience has shown that a load suddenly dropped by one generating station is not always picked up without hitch by others. There is, moreover, the problem of protecting sub-stations and switchgear which is at least as difficult as that of the generating stations themselves and is to be provided against by the building up of a reserve of switchgear, necessary owing to the time normally taken by construction.

The combination of these indirect forms of attack on industry with the bombing of only one or two important but isolated and weakly-defended factories would make steady balanced production extremely difficult, because attacks on one district would produce alarms over a much greater area. In fact, the continuation of "pinprick" attacks spread over a long period, and affecting several counties at a time, would present both industry and defence with a very difficult situation. A long succession of air raid alarms, with all the hurry these would mean, with only short production periods in between, would produce considerable confusion and a great strain on the employees' morale.) If an attack were made on the factories and railways of Dagenham and East London, it is reasonable to suppose that the greater part of the Home Counties would be disturbed by warnings. Staffs would run for their shelters, while those allocated for rescue and fire-fighting work would hurry off to their stations, and, quite apart from any damage done by bombardment, industrial activity would come to a standstill. If this were to happen once a day for a week only, the position would become very grave, even though the enemy had inflicted little physical damage.

As has been shown in the preceding part of this chapter, there are two forms of defence of industry against enemy attack, the first being by the building-up of both offensive and defensive military equipment and the second being the regulation of location, raw material supplies, transport and labour conditions in such a way as to offer the smallest openings for interference from attack. The cost of carrying out the second of these two alternatives means that generally it is unlikely to be contemplated except where there is reason to expect that the regular military defence is likely to be inadequate.

The first question which arises, therefore, is how the defensive units should be arranged to give the maximum protection. To spread out the available units to cover a wide area would detract from their effectiveness, and if carried too far would render them almost powerless against a concentrated attack at any one point. Their strength lies in concentration to such an extent that attacking aircraft would stand little chance of getting through. Not only would direct protection be afforded in this way by bringing down attackers, but the knowledge of probable failure would be a powerful deterrent to attack. On this line of argument, therefore, the best course is to use available resources to erect these impassable barriers at suitable points, and collect behind them everything which is to be defended. Modern technical factors, by bringing together factories which were formerly some distance apart, reinforce this argument considerably.

In so far as industry and population are already concentrated to a large extent in cities and urban clusters, the selection of places to be defended in this way would not present great difficulty.) The possibility of erecting cordons of defence which will adequately safeguard areas such as London, Birmingham and Coventry, has, of course, already been given detailed consideration by the defence authorities. There must, however, still remain outside the defended areas a very important proportion of industry and population. Are these smaller groups to be left undefended, relying merely on Air Raid Precautions to minimise possible damage?

Or is a proportion of available defences to be drafted to form highly mobile units, capable of giving some sort of protection to small concentrations scattered over relatively wide areas? The vulnerability of these is, of course, considerably less than that of the large concentrations, for not only is each bomb dropped less likely to secure a hit, but attack is itself less likely owing to the smaller average gain to the attacker in proportion to risk and expense incurred. Nevertheless, some isolated works, particularly those engaged in the manufacture of armaments or other important products, might, from the attacker's point of view, be profitably singled out and it is in this connection that the recent decision to establish local anti-aircraft protection run by the works themselves—the "dungaree army"—is of importance.

The foregoing argument for concentrating industry and population behind powerful defence barriers rests, however, on an important assumption, namely, that the defence barrier will, in fact, be impassable. While the recent comparative success of the defenders of Barcelona in driving off attackers may be an encouraging sign, it should not be too easily presumed that similar or greater success could be achieved here.

It is probable that air defence in this country, which recent events have shown to be seriously behind-hand in certain respects, is unlikely ever to reach a state in which complete reliance could be placed on its invincibility. Not only do the powers of offence develop at a rate which at the least is not far behind the increase in the strength of the defence, but in addition, a concentrated industrial area will always be an attractive object of attack, because a concentrated area presents a target which is likely to be remunerative.

The placing of the new Royal Ordnance factories and Naval magazines so far west as Bridgend and Fishguard suggests that the authorities themselves, in practice, recognize this principle.

Change in Location Factors

If the required impenetrability of defence barriers cannot be obtained, the argument for concentrating industry and population loses some of its force, and other considerations have to be taken into account. In some respects, such as the dispersal of houses in town-planning schemes, the general trend to-day is in the right direction from the defence standpoint. At the same time, the tendency for industry to cluster in larger and larger constellations obviously increases the danger from year to year if defence barriers are pierced at any time. Trading estates themselves, despite their value from other points of view, are an example of this.

It is clear, then, that the problems of locating industry in accordance with the requirements of defence can only be solved by several different methods, each of which is complementary to the others.

Cost Factors

Before examining these methods, however, it is necessary to consider the question of costs, because in some districts it might be cheaper and cause less interference with industry to be surrounded with all the heaviest defences instead of

to have its factories removed to remote areas or scattered over larger sites. On the other hand, there are other districts in which the reverse would be the case, and obviously, whatever course is decided on, a close correlation of industry and defence would be required. Moreover, the authority responsible for such a correlation would have to examine the problem in the light of the present siting of factories, and could not adequately do so unless various factors affecting costs were borne in mind.

As already stated, there is a very strong tendency for modern factories to group together in constellations of increasing size. This process runs counter to the requirements of passive defence, which demand the dispersal of easy targets over larger areas than those now occupied. In heavy industry, not only is there the desire to place plant near sources of raw materials, whether imported, as in the case of the new Cardiff Dowlais works, or won locally, as at Corby, but, in addition, finishing processes tend to congregate near the iron and steel plants.

The cost of moving such industrial groups would almost certainly be prohibitive, while dispersal of the constituent mills and departments over a larger area would lead to a rise in operating costs. The cost of moving skilled labour and of altering transport facilities would form additional expenses which would have to be considered. Supposing, however, that it was decided to scatter one of these industrial constellations, the cost of doing so would vary according to the point in the train of finishing processes at which the break was made.

Another modern tendency is to use conveyors and other mechanical devices for promoting an easy flow from raw material to finished product, and to house all sections of the works under a single roof. In such cases, dispersal of the individual sections of the works over a large site would probably greatly reduce the risk of permanent dislocation from air attacks. It would, however, not only result in a higher capital cost, but—far more important—in greater operating costs.

The lighter industries, and particularly those supplying consumers' goods, have different location factors from those of heavy industries briefly mentioned above, and, as was pointed out in Chapter III, depend largely on proximity to their markets. Unlike the demand for the products of heavy industry, which will be largely assigned for military requirements, the markets for consumers' goods are likely to be seriously affected if large numbers of the population of the most dangerous areas are evacuated from their homes.

Access to raw materials and markets is bound up with problems of transport in war time; these have already been mentioned, and it is clear that use of alternative methods of transport could have as great an effect on costs in industry as the alteration or removal of sites. It would, for example, be much easier to obtain delivery of industrial raw materials in South Wales, Lancashire and Scotland than in London or the North-east Coast; while expense would be involved in diverting supplies from the normal port of import to another, and using railways and road transport to cover the intervening distance.

The cost of moving labour in the wake of any factories which might be transferred would also need consideration, for not only would employees themselves have to be housed adequately, but if they were required for any considerable period

at their new posts, provision would have to be made for their families (who, in any case, would probably be evacuated from dangerous areas near the original factory sites) and for their recreation in clubs, cinemas, etc. This movement would bring another difficulty in its train, because, as already indicated the locations chosen for consumers' goods industries depend on proximity to the market. The transference of earning power among the working population following on a movement of industry into Clydeside, Lancashire or South Wales, combined with an evacuation from London would, for example, adversely affect the new industries of Slough and Willesden.

In considering the costs aspect of the strategic location of industry it is impossible to do more than indicate the general nature of the problems involved.

Without a discussion of much greater length than is here possible, the cost of interfering with normal sources of raw material supplies and means of despatch to markets cannot be considered. At the same time the cost of erecting the new Ordnance factories does show the expense of building alone in the case of a single industry, part of which has had to be removed (from Woolwich) and other parts greatly expanded.) The total estimated cost involved in the case of the principal works is as follows:

	£		£
Bishopton	3,590,000	Glascoed	2,650,000
Blackburn	949,000	Irvine	1,006,000
Bridgend	4,548,000	Nottingham	1,845,000
Chorley	7,606,000	Pembrey	1,100,000

Since the sums shown above represent charges for buildings alone, without equipment, it follows that the total costs involved in the wholesale transference of factories, and to a lesser extent of dispersal around present sites, would be very great indeed.

Hitherto the question of cost has been considered purely as a matter to be decided in relation to questions of strategic needs. But it has to be remembered that most of the factories which have been considered produce goods to satisfy ordinary civil needs as well as equipment required by the armed forces. Indeed, as has been stated already, a large number of factories must, in the event of hostilities, continue to supply the home civilian and export markets. Cases are bound to arise in which peace-time conditions indicate a location at A, while defence considerations show a marked preference for location B. In such a situation production might perhaps be divided between two factories, one at each location. In so far as cost of production and delivery to the customer was higher at B, the extra expense might be regarded as a form of insurance.

Considerations Governing the Location of Industry

Having considered the nature of the costs involved in locating industry to meet the needs of defence it is possible to discuss more realistically the various complementary methods by which air attack can be countered.

It is clear that the country will have to be divided into zones according to their vulnerability: four factors would have to be considered in drawing these up.

- (1) The strength of the defence afforded against attack.
- (2) The importance of the industries in each area from the point of view of national economy.
- (3) The vulnerability of individual factories in the different ways discussed in this chapter.
- (4) The relative costs as between active military defence and the passive defence measures which industry could adopt so as to render it relatively immune from attack.

It may be assumed that, as a general rule, the Home Counties and the East Coast would be regarded as especially dangerous zones, and, after them, the East Midlands and Yorkshire. At the same time there would be within these zones districts such as Greater London, which would have to have as strong defence barriers as possible. To the west attack would become progressively more difficult, because the enemy would have to fly over British territory for considerable distances; none the less some points, such as Bristol, Newport, Cardiff, and perhaps South Lancashire, would still offer desirable objectives despite the risks involved in air attack. Thus, for the country as a whole, there would be a slant from west down towards the east, according to the general danger of attack.

In the light of these general considerations, the following suggestions may be put forward in dealing with any particular industrial district or, indeed, any particular factory.

- (1) Unless it can be assumed that attacking aircraft will never break through, or circumvent, a defence barrier, such as that contemplated earlier, dispersal is desirable. This applies not only to dispersal of works away from crowded areas, but also dispersal of individual sections of a works over a large site.
- (2) As far as possible, new locations should be chosen away from the East Coast.
- (3) Locations near obvious landmarks, especially if on the eastern side of Britain, are undesirable.
- (4) Certain types of factory construction are more liable to serious damage than others. As far as possible the less vulnerable types of construction should be adopted, especially if the factory must, for some reason, be in one of the more vulnerable locations. Individual sections of the works should, for example, as far as possible be housed in individual buildings rather than all under one roof.
- (5) Reliance on single sources of supply of raw materials and single means of transport should, as far as possible, be avoided. To have a reserve "in view" is not always enough. Both sources should be used concurrently, so as to keep them both in working order. In fact, duplication of all important functions might be desirable. In some cases a choice of location determined by the foregoing defence considerations might conflict with the location dictated by normal peace-time

conditions, while the adoption of special precautionary measures in factories would, in most cases, involve additional expense. These are, perhaps, the principal problems concerning the defence of industry.

(6) The question of defence does not, of course, end with the defence of industrial population and plant from the direct effects of attack. Quite apart from actual physical damage, the efficient functioning of industry may, for instance, be seriously disturbed by dislocation of its supplies. In so far as any of these are imported, dislocation due to delay or diversion of ships could be minimised by increasing the storage, not only of important raw materials, but also of food. The trend during recent times has on the average been rather to decrease the proportion of stocks in relation to the volume of consumption, and also to move the main place of storage back towards the producer. Since this is mainly a result of the availability of quick and efficient transport, it follows that possible interruption of transport can be partly countered by building up stocks at points of consumption. In fact, in considering the storage of bulky raw materials the fullest attention should be given to economy in transport in the event of war by holding stocks at the points of consumption. Apart from the cost of the extra storage space required, there are frequently also cost items resulting from damage to stocks which would have to be considered in these cases along with technical measures for minimising damage. Thus the coal stocks held by electricity generating stations are generally not large in terms of operating days. To increase them would be a valuable defence measure, though some damage to the coal would probably result from prolonged storage in the open.

Under the Essential Commodities Reserves Act, the Government has powers to create reserves of essential commodities either by purchasing stocks or by inducing traders to increase their stocks. The Government has, in fact, already laid up considerable stores of certain foodstuffs such as wheat and whale oil (for margarine, etc.), while other interests have also taken steps in this direction, but the practice might with advantage be still more widely adopted, as, for instance, it undoubtedly has been on a very big scale in Germany.

General Considerations

It is obvious that the strategic direction of the location of industry raises a number of extremely difficult questions of high policy on which it is difficult to give any opinion here. For example, it can be argued that it would be absurd to place defence considerations before all others, with the result that the advantages of peace-time economy would be lost. Moreover, it can and no doubt will be claimed that the maximising of national income is, in the final analysis, the surest form of defence. On the other hand, to ignore the strategic aspect of location entirely might, in the present state of the world, be too risky a neglect of Adam Smith's precept that security is more important than opulence.

It follows that a policy is needed which will decide in what way considerations of opulence can be compromised with those of security, because, as matters stand to-day, to make no decision at all would be very dangerous. At the same time, it is important to point out what a decision of this kind implies.

State control of location would not only be a direct infringement of the principle of *laissez-faire*, but would also be almost without precedent in Great Britain. Nevertheless, to some extent the Government has already exerted an influence on location, for instance, in the case of factories concerned in armaments production, while in the Great War, of course, it assumed a large measure of direct control over industry. This, however, took the form of co-ordinating supplies, and in a few cases (such as the coal industry) of public management rather than taking any direct defence measures, either by location or otherwise.

In the present defence programme the State has exercised some influence, if not control, over location in the case of factories concerned with armaments. In the first place, armaments contracts have been withheld from works whose location has been considered excessively vulnerable. In the second place, the location of the various aircraft and other shadow factories has been under State control. Though most of these factories have been placed close to the works to which they are attached, an exception has been made in the case of the Rolls Royce shadow factory which is to be placed at Crewe, which is considered less vulnerable than Derby.

An interesting question arises in connection with Air Raid Precautions in areas where new armaments factories have been located. Such areas are, of course, rendered more liable to be attacked, as a result of the presence of the armaments works, and the State must evidently, in such cases, take special steps to stimulate local Air Raid Precaution activities.

The payment for any increase in costs involved by either the complete removal of a factory or by its dispersal around its present site raises another important question, because it is highly probable that the firms affected would regard such expenses as one form of national defence and, therefore, a legitimate charge on the public funds.

In view of the recent decision of the insurance companies to exclude war risks from their field of business, and in view of the virtual certainty that war would be a totalitarian war in which conscription both of industry and men would be enforced, it may be argued that ultimately the cost of precautionary measures is bound to fall upon the State. As, however, the State has already been forced to assume some responsibility it should also have some voice in choosing the location of industry, with a view to minimising its own risks and commitments.

Such, then, are the main considerations affecting industry and defence. Their full application would probably involve a measure of State control or interference which is, as yet, far from obtaining in Great Britain. Nevertheless, if any system of State guidance or control of location is brought into being, it is evident that the foregoing defence considerations should be kept fully in view, while the existence of such risks is a strong reinforcement to the other arguments for influencing the location of industry in the national interest.

VIII. THE NEED FOR BALANCED REGIONAL DEVELOPMENT

Advantages and Drawbacks of Specialisation—Migrations of Industry and Population—Interferences with Migration—Declining Areas in Great Britain—Measures Leading to Immobility of Population—Declines in Industrial Employment—The Drift of Industry—The Choice of Objectives—Need for Surveying Regional Incomes—Classifying Prospects by Regions—Communities Without an Economic Basis—Quantity, Quality and Balance of Employment—Geographical Balance—Areas Where New Industry Cannot be Economic—Areas Where New Industries can Flourish—Future Distribution of Population

In previous chapters we have analysed the present pattern of industry and the forces which determine it. We have also shown how these forces have helped to produce apparent distortions outside the field of industry—for example, in the unbalanced development of local communities and of the towns in which they live. We have not yet, however, fully discussed the question how far these distortions may be desirable or inevitable, and in order to do so it is necessary to examine the concept of balanced development in a community or a region.

Advantages and Drawbacks of Specialisation

Every town and region is constantly, although unconsciously, seeking to reconcile the advantages and drawbacks of specialisation upon certain ways of earning a living with the advantages and drawbacks of non-specialisation. No town or region can provide all its own wants at a high standard of living: on the other hand no town or region can rely too largely on a few activities without unduly narrowing its life and exposing itself to severe long-run risks. Among the obvious advantages of specialisation are:

- (a) The higher standard of living and greater rate of development attainable through concentration of picked and trained personnel and of equipment designed for the purpose upon a limited range of tasks, and
- (b) The convenience of segregating some economic and social activities in certain towns or quarters of towns where they can be carried on more conveniently than if they were dispersed.

Among the obvious disadvantages (not all arising in any one case) are:

- (a) Unemployment risk through excessive dependence on particular markets,* especially vulnerable markets (e.g. exports), seasonal markets, or those subject to rapid technical change. (See page 187.)

*A more uncommon contingency is unemployment through excessive dependence on particular sources of supply, which Lancashire actually suffered in the cotton famine during the American Civil War, and the toothbrush industry as a result of shortage of pigs' bristles during the current Japanese invasion of China. Similarly, the Northern Irish flax industry is now threatened with at least serious dislocation by the Russian embargo on the export of flax.

- (b) Continuous poverty where there is excessive dependence on occupations and industries now yielding very low incomes, which may or may not also carry a high unemployment risk.
- (c) Lack of opportunity for a population, itself of normal diversity, through narrow range of jobs available. (See pages 136-7.)
- (d) Lack of correspondence between available jobs and the age and sex composition of potential workers, male, female, and juvenile. (See pages 63-4.)
- (e) Lack of diversity of growing points for new industries, and difficulty of avoiding excessive rigidity of outlook. (See pages 136-37.)
- (f) Lack of social balance due to excessive number of local inhabitants in low-grade (or high-grade) or otherwise undiversified occupations. (See page 168.)
- (g) Lack of co-ordination owing to development of large self-contained sectional interests or to the domination of the area by a small group.

Migrations of Industry and Population

The question of the appropriate form and extent of industrial specialisation is fundamental to any policy for the location of industry. Until a few generations ago it hardly arose, because except in a few cases (such as seaports) extreme specialisation was technically impossible on a world-wide or even a nation-wide scale. The industrial revolution and the nineteenth century development of communications opened the prospect of a reallocation of resources in labour and materials not only as between districts but as between countries and even continents. It looked for a time as if the economic future might be largely with specialised communities making only a few articles, or growing only a few products, and using the proceeds to buy a large part of their requirements in distant markets. Classical economists were so impressed with the obvious and vast possibilities of raising incomes by these means that they tended to underrate the seriousness of the strains, fears and discomforts involved, and to assume that the impact of this process on different areas would be met by automatic adjustments. Technical development and in some cases the exhaustion of resources proceeded, however, so rapidly during the nineteenth century that in order to secure an optimum distribution from an economic standpoint, an appreciable part of the world's industrial population would have had to become nomadic, flocking to vast mushroom towns as conditions changed in favour of these, and evacuating them in whole or in part at the turn of the economic tide.

These nomadic movements would have had to occur not only between towns but between different countries, and it is evidence of the strength of the *laissez-faire* idea that they actually did occur on quite a large scale, notably in the development of the American Middle-West by immigrants from other States and from Europe and in some of the historic "gold rushes." It soon became clear, however, that such a feverish exploitation of labour and natural resources involved great economic wastes, that the new industrial populations demanded services requiring immense capital expenditure only to be met by long-term amortisation, and that political and psychological resistances to migration on the required scale were

aroused not only in the areas supplying the emigrants but in those receiving them. Moreover technical changes such as the great increase in installed horse-power per worker and the developments in management technique made industry reluctant to face the high labour turnover involved in earlier methods, and probably increased the readiness of industrialists to choose locations where a good steady labour supply was available or could be attracted.

Interferences with Migration

The first large-scale interference with the process of industrial specialisation therefore took the form of tariffs and immigration restrictions designed to insulate entire countries from its full impact. One result of this economic nationalism, which has proceeded with growing intensity for the past seventy years, was to undermine the position of many of those industrial areas which had adapted themselves most fully to international division of labour, except in cases where their products formed a virtual monopoly, or had overwhelming competitive advantages. Regions such as Lancashire, which had led the advance towards world-wide industrial specialisation find themselves correspondingly handicapped in the retreat towards greater self-sufficiency. At first, during the latter part of the nineteenth century, the impact was felt in Great Britain mainly indirectly, but more recently Britain has moved more and more towards control as against "automatic" readjustment, and towards protective policies for industry and agriculture. At the same time rapid technical and economic development, which had already moved the centre of gravity in employment from primary production to manufacture, continued to the point where distribution and services became frequently the chief sources of new employment and of expanding income. As a large proportion of distributive services are not very subject to international competition this trend helped to mitigate the dislocation caused by economic nationalism. The growth of social services and of State supervision generally assisted in the same direction. Nevertheless, the insulated general prosperity which some had hoped to achieve within their respective national boundaries proved illusory, because the pace of economic change resulted in large industrial and agricultural populations soon finding themselves marooned in areas where they could no longer fully support themselves and which they could not leave because after 1914-18 emigration was checked and there was nowhere for more than a minority to go. In many cases the areas such as South Wales and the North-East coast which were injured by economic nationalism were at the same time passed by in the development of services and light industries.

If the *laissez-faire* policy was correct the appropriate remedy would be to abolish all forms of subvention to depressed areas and compel their inhabitants by the weapon of starvation to quit them and to struggle for a living elsewhere. On the other hand, if later policies of economic nationalism were well founded the appropriate means of dealing with this problem would be by recourse to economic regionalism, permitting each small region within a country, in its turn, to set up barriers against inward movements of goods in order to secure to the local inhabitants a protected market for the sale of local goods which could not otherwise attract the local consumer. The British Government has not adopted either of these methods

in a crude form but has, with gradually weakening conviction, on the whole pretended to do something like the first, while actually carrying out an appreciable instalment of the second.

Declining Areas in Great Britain

Between 1921 and 1981, while the nation as a whole increased by 5 per cent, 5 English and Welsh counties—Radnor, Monmouth, Brecon, Glamorgan and Durham—lost 10 per cent or more of their populations by migration, while 12 others—Westmorland, Pembroke, Montgomery, Rutland, Cardigan, Anglesey, Northumberland, Caernarvon, West Suffolk, Herefordshire, Merioneth and Shropshire—lost between 5 and 10 per cent. In all these cases except Northumberland, Durham and Shropshire the actual number of persons in the county declined, as net emigration was greater than the natural increase. It will be noted that these declining counties consist very largely of thinly populated agricultural land and of densely populated coal-mining areas. Similar trends are observable in Scotland, the Highland population having fallen by nearly 25 per cent since 1861. Certain towns have also declined considerably—Merthyr Tydfil having shrunk from over 80,000 to 68,000 between 1921 and 1987.

Thus there has actually been a decline, which is still continuing, in the population of certain areas, and this decline is partly due to government-assisted transfer of labour to places where employment can be had. At the same time political, social, economic and technical changes have been undermining the competitive position of further occupational groups in their existing locations. For instance, some Lancashire towns have been hit by the transfer of power over the Indian tariff policy, some fishing ports by changes in ways of life, including religious beliefs, which have injured fish consumption, some ship-building areas by prolonged depression of freights holding up replacement orders and by high costs imposed on them by the iron and steel interests, and the tinplate area of West Glamorgan by the introduction of the continuous strip process causing production to be moved elsewhere. What we cannot gauge is whether population adjustments are now overtaking the changes which make them necessary or whether on the contrary the type of change mentioned is demanding fresh population movements more rapidly than such movements are at present taking place.

The extreme practical possibility is that the greater part of the existing economic base of a given community might disintegrate without any adequate alternative economic base being discoverable. This process has already occurred to a number of mining towns where the mine has been worked out, and to a number of distilling and other centres which have lost their only market. If it were to happen fast enough over a wide range of industries it is conceivable that a rapid and prolonged local decline of population might be accompanied by an increase of chronic depression and unemployment among the remaining population of the affected areas, and by the spread of chronic depression and unemployment to many previously unaffected areas. This risk is increased by the fact that emigration tends to remove those members of the community most capable of earning and of new enterprise, and to

leave behind those least fitted to meet unfavourable trends with energy and resource. At the same time emigration has a cumulative effect in reducing regional purchasing power. As each group departs, further services become superfluous, undermining the position of those concerned and again curtailing purchasing power in a vicious spiral. It cannot therefore be assumed that emigration under economic pressure from regions of dwindling opportunity will necessarily ever lead to greater opportunities for those left behind, or will even in itself prevent increasing numbers of people from becoming affected.

Measures Leading to Immobility of Population

The economic and social pressure on the individual to leave such areas unless he can find work in them has naturally been very much reduced by the recent establishment of what amounts to a national guaranteed minimum standard of life, although a low one, through unemployment insurance and assistance, and through Exchequer grant adjustments and special grants in favour of depressed areas. For the first time in history it has become possible for a town or region to go on indefinitely with unemployment as its main "occupation." This process has been facilitated by the fact that national scales of benefit fixed with reference to urban costs of living may, when paid in remote areas, be as high as or higher than cash incomes normally earned, especially in the cases of unemployment benefit and assistance where child dependants, who are numerous in almost all depressed areas, are recognised by extra allowances. On the other hand it must be remembered that the aggregate income of these areas is very limited, and even relatively trifling sums raised in them by local rates and indirect taxation are a very heavy local burden.

To a large extent long-term unemployment which is provided for by State assistance, is a consequence of the permanent contraction of a local industry and the failure to develop any adequate alternative employment in the area. It would be overstating the case to say that official policy during the 'twenties and early 'thirties was to meet a growing mobility of industry by encouraging a growing immobility in population, but there was some trend in this direction, particularly through the encouragement of working-class house ownership and mortgages.

As the limited success of this policy became obvious, increasing efforts were made to increase the earning opportunities of the depressed populations, either by subsidising or reviving established industries or by introducing new ones. The first industries to benefit were mainly agricultural. In 1919 the Forestry Commission was established as a statutory corporation mainly dependent on government grants to produce and supply timber in Great Britain. Private enterprise had virtually ceased to invest in timber production and in effect a new State-run industry was created to meet the need, largely on grounds of national defence, but with the secondary result of providing an appreciable amount of employment in many thinly populated areas. In other branches of agriculture, starting with sugar beet, the State was content to subsidise private enterprise, again with the effect of increasing employment in many areas which were or otherwise would have been relatively depressed, although it is doubtful whether the overwhelming extent to which some of these subsidies would benefit relatively small parts of the country was foreseen

at the outset.* Financial assistance to shipping, ship-building, and fishing has similarly localised effects. Only in the case of forestry and sugar beet were new sources of employment stimulated to any appreciable extent, and even in these cases continued employment depended on continued subsidisation. Otherwise the ruling principle was to tide existing industries over bad times.

The Special Areas Act of 1934 marked a fresh development. Powers were now taken to encourage new industries in certain depressed areas by government assistance, and this policy was rapidly extended by the launching of trading estates (with funds supplied by the Treasury to the Commissioners for Special Areas, and by them to special trading estate companies), and by preferences over government contracts and the establishment of a number of factories in depressed areas in connection with rearmament.

At the same time significant steps towards economic regionalism were taken under government inspiration by the enforcement of the milk marketing schemes, with their different returns to producers in different regions, and the organised selling schemes for coal.

Declines in Industrial Employment

Distinct from government policy, and probably much more important in determining the fate of many areas, are the trends in industry itself. A large part of the depressed area problem is due to the fact that the number of coal-miners in Great Britain suddenly tripled between 1881, when it was less than half-a-million ($3\frac{1}{2}$ per cent of the working population) and 1921, when miners formed nearly 7 per cent of a much larger occupied population. No sooner had the peak employment of nearly $1\frac{1}{2}$ millions been reached than an even more rapid contraction set in, and since 1934 there have never been as many as 800,000 at work in this industry. Obviously fluctuations of this magnitude concentrated upon small areas completely overshadowed anything that government has yet been able or willing to do. It therefore becomes important to consider the likelihood of any great expansion or decline in the numbers employed in the more localised industries, and also the likelihood of further drifts of employment in the sense of industries in one area requiring fewer workers, while industries in another require more. As regards the first point, the greatest recent contractions of employment in relatively localised industries have occurred in coal-mining, which between June 1923 and June 1937 suffered a reduction by no less than 513,000 jobs, cotton (—80,000), woollen and worsted (—47,000), ship-building (—18,000) and jute (—13,000).

In the P E P Report on the British Coal Industry the surplus of labour in coal-mining in 1936 was tentatively estimated at about 200,000 men. To-day, after death, retirement, and transfer have removed a total of 70,000 in excess of new

*During its first twelve years the sugar beet industry received in subsidies and Excise remissions more than £50 million, a large part of which went to the eastern counties of England. According to Dr. Venn's calculation (*Economic Journal*, December 1935, page 656) Norfolk alone with a population of roughly half a million was receiving in the early 'thirties State subsidies and reliefs reaching a gross annual total of £3 millions.

entrants since 1936, the surplus is probably nearer 100,000, although it should not be overlooked that many ex-miners now appear in the returns as unemployed public works or general labourers on the strength of other jobs held for a short period since last working in the mine. Considering that the net reduction in jobs since 1920 has amounted to over 500,000 and that the industry has done little to facilitate adjustment, this surplus is remarkably moderate and may well be reduced to insignificant proportions not long after 1940.

In the textile industries also downward readjustment has gone a long way, and although no estimate of surplus labour is available it may be noted that in June 1937, in conditions of fairly good trade, unemployment among cotton operatives was just over 50,000, or 13 per cent. There is, therefore, some reason to believe that the process of squeezing out surplus labour in the export industries is not yet by any means complete, but it appears to have gone at any rate more than half way.

It must not, however, be assumed that the export industries are the last which are likely to decline. So far as workers and local communities are concerned, depression may result either from loss of markets or from technological change heavily reducing employment, and the main export industries have been temporarily unfortunate in meeting both troubles. We must expect other industries in the course of time to become depressed. Where these are highly localised they may create new depressed areas, some of which may well be in the south. The recent immunity of the south from depression has not been complete, as is shown by the instance of the Cornish tin industry, but it has been remarkable and can hardly prove permanent. Some southern industries, notably the making of gramophones and gramophone records, have slumped severely, but the impact has been relieved by simultaneous growth of related industries. This cannot always happen, and localised industries such as slate quarrying and pottery are threatened by development of concrete tiles and plastic mouldings respectively.

Undoubtedly many industries in the Midlands and South have profited for over a decade by the home equipment demand resulting from rapid urban expansion. A new and incalculable factor has been introduced by the intense building boom of 1932 onwards, followed by the more recent rearmament boom. It seems certain that the industries mainly concerned, notably building, iron and steel, and engineering, will afterwards have to face a contraction which may be sudden and painful. There will, however, clearly be great pressure for the process to be mitigated by large expenditure on public works, and its effects in any case are unlikely to fall on any one region as heavily as the contraction of coal or cotton has done, although a number of individual towns may be hard hit, especially those dependent on iron and steel.

The Drift of Industry

Apart from the expansion and contraction of particular industries there is the question of the drift of employment to be taken into account. In so far as net additions to employment tend increasingly to take place in mobile market-oriented

light industries and services, rather than in primary production and extractive or heavy industries, it must be expected that, in the absence of drastic intervention, increases of employment will continue to be enjoyed mainly by those towns and regions which are able to attract population for distributive, administrative, residential, recreation and amusement purposes, rather than by those areas devoted more exclusively to primary production, extraction and manufacture. An important influence may, however, be exercised by the trend towards decentralisation in manufacture, if this proceeds far enough to make it customary for the national market of each large firm to be supplied by two or more strategically placed plants in the north and south or in each region, rather than by a single larger plant. Nothing would do more to facilitate a better balance than an acceleration of this trend, but to count on it at present would come dangerously near wishful thinking.

What then is the outlook in the absence of further intervention? It seems certain that most of the counties and towns at present declining in population will continue to do so, and if only because of the natural trend of population, declines are likely to occur in an increasing number of areas at an increasingly rapid rate. Nevertheless, as we have seen, mere decline of population is unlikely to contribute much to a solution of the problem of depressed areas, while the importation of new competitive industries of permanent and substantial employment value is not proceeding nearly fast enough to make a great difference, although the possibility of cumulative benefits from the present initiatives must not be underrated. (Most important of all, the psychological and political problem of maintaining in permanent idleness substantial populations by taxing other areas where employment is still expanding, is likely to become more and more acute as time goes on.)

The Choice of Objectives

It seems reasonable to assume, therefore, that more comprehensive planning of the distribution of employment will be demanded, and this makes it necessary to analyse the possible objectives of such a development. Put in their simplest form the fundamental questions appear to be:

Should population be continuously redistributed according to the apparent needs of industry?

Should industries at least to some extent, be brought to places where employment is needed by existing populations? or

Should existing populations which do not "naturally" attract new employment on an adequate scale be subsidised to remain unemployed where they are?

Not long ago the great majority of informed people would probably have answered "yes" to the first of these questions and "no" to the other two. To-day the answers would undoubtedly be less clear cut, and the present official policy implies a qualified "yes" to all three. A considered answer adequate as a basis for action would imply a national survey of the present economic position and of the economic potentialities of each area. Such surveys have been made, mostly under

official auspices but with varying thoroughness, for a large part of South Wales, for much of Northumberland and Durham, for parts of Lancashire, for West Cumberland, for South-West Scotland and the Scottish Highlands, and for certain other areas. (They require a careful analysis of the character, scale and efficiency of existing local industries and facilities, of the employment provided and in prospect, and of markets and technical conditions with their probable future trends. In addition they demand a practical re-examination of each district with a view to determining its possibilities of developing new industries and services not at present represented, or only present in embryonic form.)

Need for Surveying Regional Incomes

Much light would be thrown on the needs of the different areas by more adequate estimates of the amount and composition of regional and local incomes. Each locality, like each country, has a balance of payments, and local communities cannot afford any more than nations can to neglect to analyse this balance and to watch its trend. In the extreme case of a colliery town, all food, clothing, building materials, vehicles, petrol, furniture and most other requirements and services must be purchased from other areas with the proceeds of sales of coal, with remittances and pensions, and with State grants or unemployment pay. At the other extreme some agricultural areas supply a considerable proportion of their own basic needs, but can do this only because of low standards of living. Some towns such as seaside resorts and the City of London earn the purchasing power to buy almost all their requirements by rendering services either direct or through correspondence and agencies.

It is possible with a wide margin of error to estimate local balances of payments for simple and fairly isolated communities, and the process is useful provided it is borne in mind that the results must be fairly rough and that superficial readers may feel tempted to use them in support of policies of economic regionalism calculated to repeat in smaller units and with even more harmful results the evils of economic nationalism. Some tables presented by Mr. John P. Ferris in an address to the American Economic Association at Chicago on December 29, 1934, show estimated balances of payments for two small counties in the State of Tennessee. McMinn County has 29,000 people, nearly half living on farms, and one-third being urban. There is close at hand a large city market for agricultural products and there is a substantial income from industry, the largest single enterprise being the Louisville and Nashville Railroad repair shops. Practically all the industrial products—cotton goods, stoves and furniture—are shipped to outside markets, and most of the plants are owned by outside capital. Grainger County on the other hand is exclusively agricultural, and has to buy almost all its requirements in exchange for the products of its soil or forests, especially chickens, eggs, and tobacco. It has 18,000 inhabitants, and the expense of maintaining it even at a low standard of living is clear in the accounts, its roads and schools alone costing three times as much annually as it pays in taxes, while post office local expenses are six times local receipts.

For Grainger County—and the same is probably true of certain parts of Great Britain—90 per cent of the net income on commodity and service account is derived from sale of farm products and the remainder from labour working elsewhere and from tourists. The largest “imports” are food, clothing and shoes, and automobiles with their service. Professional services outside, it is interesting to note, alone claim more than twice the net tourist income. On financial and governmental account the county gains nearly 40,000 dollars, largely because it draws in grants nearly five times as much as it pays in taxes. On capital account there is a heavy deficit, in the form of depletion of soil and forests and depreciation of buildings and equipment. The county was living on its capital to such an extent that it became frequent to find broken down motor lorries replaced by sleds.

McMinn County earns less from sale of farm products and from tourists, but has a large wage bill paid from outside the county which covers most, although not all, of its “imports.” It also gets considerably more in Federal and State grants than it pays in Federal and State taxes, and it again shows a fair-sized deficit on capital account, although there would be a surplus if the impairment of soil fertility were ignored.

Undoubtedly similar accounts prepared for many British local areas would show similar results and would bring to a head the issues of local earning power in relation to local expenditure, and of the extent of redistribution of purchasing power through taxation for the benefit of areas, some of which can only be an increasing burden on themselves and the rest of the nation.

Classifying Prospects by Regions

On such a basis it becomes practicable, provided the pitfalls already pointed out are borne in mind, to assess the existing and potential quantity, quality and balance of local employment in relation to the present and anticipated size and structure of the local population. Ultimately such material would enable the separation of areas in which

- (a) virtually no new industry or service is likely to be economically competitive on an appreciable scale,
- (b) openings exist for some new industries or services on an economic basis, but not enough to support the whole existing population and its natural successors,
- (c) openings exist for some new industries or services on an economic basis in the region, but not on or conveniently near the actual sites where the existing population lives,
- (d) openings exist on an adequate scale for new industries and services on an economic basis to support the existing and expected local population, and
- (e) new industries and services are likely to be attracted on a scale involving the immigration of population from other areas.

In every case a reasonable degree of enterprise must be postulated and it must

be borne in mind that exceptional slackness or lack of imagination in one area and exceptional initiative or government aid in another, may to some extent modify expectations, which may also be affected by unpredictable market and technical trends. Moreover, the acuteness of the difficulties of any area must depend largely on the stability and strength of its existing sources of employment. Some areas badly placed for new economic development are already derelict through the collapse of previous industries, others are suffering from acute fluctuations or are threatened with future collapse, while yet others, although having little hope of new development, have no reason to fear that their existing economic basis will fail them.

Communities Without an Economic Basis.

Thorough survey and careful analysis would therefore be required before sound decisions could be reached on any particular area. The possible scope of such decisions can, however, be indicated in the light of work already done. It is plain that certain populations, notably mining communities attached to worked-out mines and very remote primary-producing communities whose standards of living have always been extremely low, cannot support themselves where they are at an acceptable level either through their existing economic activities, or through any which can be brought to them without permanent subsidy. It is hardly likely to be questioned that the subsidisation of permanent unemployment in such communities is undesirable, but it is by no means so clearly unjustifiable to maintain some of them in existence by subsidising to a moderate extent suitable employment in agriculture, fishing, and recreation provision, for example.) Remote areas in particular have always supplied, and continue to supply, the labour forces of more populous regions and of the Empire with a disproportionate share of desirable young adult recruits, reared at considerable expense only to leave home as soon as they change from being economic liabilities to being economic assets. It would be defensible in such regions as the Highlands for this contribution of man power to be recognised by an appropriate payment from more prosperous areas. The importance of preserving cultural patterns which have played a large part in the building of the nation is an even more intangible factor which should not be ignored. On the other hand, such payments would not be justified in the case of towns based on exhausted mines, which are rarely suitable places for rearing a new generation and have no conspicuous cultural value to the world outside.

For towns of this type the only reasonable course appears to be a planned evacuation spread over a period of years, and accompanied by resettlement of the community either on a new site in the same region or in some accessible existing centre with an economic future before it. The reluctance to take this course is based on political fears, but these would largely be allayed by suitably generous treatment and adequate psychological preparation.) It is inequitable, and in the long run contrary to the interests of all, that the inhabitants of an ex-mining town with sufficient voters to make a loud political noise should be kept where they are indefinitely at the public expense, while the inhabitants of a Scottish islet whose hardships are far worse should be forced to evacuate, often unaided and at their own expense, and make a fresh start as best they can, abandoning such assets as their

families have built up over hundreds of years. Between 1921 and 1981 alone evacuation was forced on the 78 inhabitants of St. Kilda, the 28 inhabitants of Hevera, the 25 inhabitants of Tanera, the 19 inhabitants of Scotasay and a number of further small communities, who have since been followed by the inhabitants of Roan and others.

At the other extreme the areas exceptionally attractive to new industry should be examined with a view to establishing the long-term economic effects of their rapid development not only on the businesses concerned but on the community, and with special reference to the fact that on a falling national population they will be drawing immigrants at the cost of denuding other areas.

Quantity, Quality and Balance of Employment

In every case adequate survey material should facilitate a judgment on the quantity, quality and balance of local employment. As regards quantity, the undesirability of unemployment is only too familiar, but it is easier to overlook the need stressed in Chapter V for an adequate ratio of gainfully occupied persons to local population, which may not be met even by full employment if the range of available occupations is too narrow. As regards quality, it will be borne in mind that modern methods of communication and administration make increasingly for a national standard dictated by the prosperous areas, and make it difficult to maintain the long hours and poor working conditions of many industries less important in these areas than elsewhere—notably agriculture.

It is plainly undesirable, in view of recent experiences, that any town or region should be too dependent upon a single industry or group of industries, as the resulting localised depressions cause excessive differences between regions. Where, as sometimes happens, it is an advantage for an industry to be concentrated in one or more limited areas, other industries should be brought in to redress the local balance to the necessary extent. It is impossible, however, to do this where no good sites are available or where the location is uneconomic, and it is also impossible to subsidise chronic unemployment indefinitely or on the other hand to evacuate entire regions. In some cases the only way of reconciling the need for industrial balance and diversity with the need for economic locations is by large-scale re-development, which may involve moving population several miles in order to secure a suitable site for renewed prosperity.

Industrial balance raises several other considerations already listed on the first page of this chapter. It may, for instance, be used to imply a relatively even distribution of the main industries or groups of industries over different regions, or to imply a relatively even distribution of incomes over different regions. In both these senses a balance, however desirable, is clearly impracticable. It seems, however, possible to some extent to envisage a balance over broad regions in certain other respects. Analysis of distribution of markets of local industries would show that very great reliance is being placed in some areas on export markets and in others on the immediate local market, and in the light of such information it might be practicable to develop alternative or additional markets which would reduce vulnera-

bility on this account. Again, certain areas depend very largely on low-grade occupations, giving small incomes, poor conditions, and high unemployment risk. The mapping of such areas would in some cases probably indicate opportunities for developing higher grades of employment to redress the balance, as has been done, for example, by the decentralisation of the printing industry into a number of smallish country towns. Again, a survey would bring to light areas conspicuously deficient in variety of occupations and in diverse growing points for new industry, and these deficiencies might be remedied in suitable cases before rather than after they have led to widespread misery.

The correspondence of local employment to local age and sex composition is also capable of adjustment, and more generally it should be possible to detect and guard against the repetition of mistakes made through establishment side by side of incompatible industries or activities, and through developments tending to upset the social harmony of a community. Even in this limited sense it may often not be possible to attain a balance in a unit as small as an average town, although, other things being equal, balance is desirable even here. For many purposes the significant unit for balance is not the separate town but the urban region within which daily travel is possible, perhaps over a 20 or 30 mile radius, so that if employment in one or more towns permanently contracts and cannot be made good, there are openings for compensating the deficiency within the region and without going outside. A cotton town or a coal town with little or no alternative employment may sometimes be justifiable if situated in a region providing a diversity of other employment, but a large region composed almost exclusively of cotton towns or coal towns has been shown to be highly precarious.

Geographical Balance

Balance must, in fact, be considered in geographical terms as well as in terms of function. The poor, thinly populated area with no town facilities and the urban cluster with no countryside or adequate recreation area are both grossly unbalanced, and it seems desirable that as large a section of the population as possible should be near enough to a fairly large town to enjoy most urban amenities, but with ample access to open spaces. Such a criterion implies restriction of the growth of very large towns, and of the development of urban regions into continuous urban clusters.

It may be suggested that the objective of policy should be the attainment of maximum earning capacity with minimum risks and liabilities in the long run over a wide area, instead of the pursuit of maximum earning capacity in peak years in terms of narrow areas with high risks and with liabilities left uncovered.

It is misleading to speak of a conflict between economic and "social" considerations. The real issue is not between "natural" economic locations for industry and arbitrarily enforced uneconomic locations, nor is it even between economic and social considerations: it is between locations which may be economic for the individual or small group in the short run and those which are economic for the community as a whole in the long run.

Areas Where New Industry Cannot be Economic

The most serious and conspicuous problem of all is what to do with the depressed areas. Parts of the interior of Durham, Monmouth, Brecon and Glamorgan contain substantial communities attracted there by minerals which have since become exhausted. In some of these places there are suitable sites and conditions for a moderate development of new industry, but it seems obvious that many of them are in any case destined to lose a large part of their population, and others to be completely abandoned in the long run. In such cases it is extremely desirable that the political nettle should be grasped, and arrangements made for partial or complete evacuation over a period of years, with suitably generous provision for resettlement of the community as a whole on the nearest site giving the conditions for renewed prosperity, which should not in any case be much more than twenty miles distant. Many of the objections which apply to the forced piecemeal emigration of individuals to alien districts and the haphazard cutting of losses disappear in the case of planned group transfer within the same region.

There is a tendency to distort the picture by overlooking how much public money is being wasted on maintenance at a wretched standard of life of towns doomed to decline, and by exaggerating the cost of bolder policies. Few people appreciate the enormous difference in cost to the nation of maintaining urban communities in a chronically depressed condition as compared with towns which are in a position to maintain a reasonable level of employment. The following table shows the current comparison for four large towns, of which Merthyr and Gateshead are depressed and Leicester and Coventry are prosperous.

NATIONAL PAYMENTS TO CERTAIN COUNTY BOROUGHS

	Merthyr Tydfil	Gateshead	Leicester	Coventry
Estimated Population, 1937	63,250	117,600	262,900	204,700
	£	£	£	£
Government grants in aid of revenue expenditure, 1937-38	818,606	418,986	742,408	488,803
Paid out through employment ex- changes in area*—				
Benefit†	55,871	107,043	260,279	101,617
Assistance	458,392	319,503	100,238	47,681
Approx. unemployment benefit paid through Associations to persons in county boroughs	—	—	52,000	20,000
TOTAL	832,369	840,532	1,154,925	653,051
Approx. payments per head of popu- lation*	£18 3 0	£7 3 0	£4 8 0	£3 4 0

* The areas served by the unemployment exchanges do not exactly correspond with the county borough boundaries.

† Equal thirds contributed by employers, workers and State.

During 1988 unemployment in Coventry ranged around 4-8 per cent, in Leicester around 7-11 per cent, in Gateshead around 25-30 per cent, and in Merthyr around 40-42 per cent. Allowing for other items such as pensions, it can be said that the average Merthyr family owes its maintenance to an expenditure from national funds of about £1 a week.

As the prosperous towns shown above are considerably larger than Merthyr it may be useful to provide some supplementary figures for two other county boroughs almost identical with it in population. In the following table the total amounts raised in local rates and drawn from government grants by the local authority are compared, but no payments to individuals in the area are included, although the unemployment figures indicate roughly the relative scale of such payments.

RATES LEVIED AND GRANTS OBTAINED BY THREE COUNTY BOROUGHS

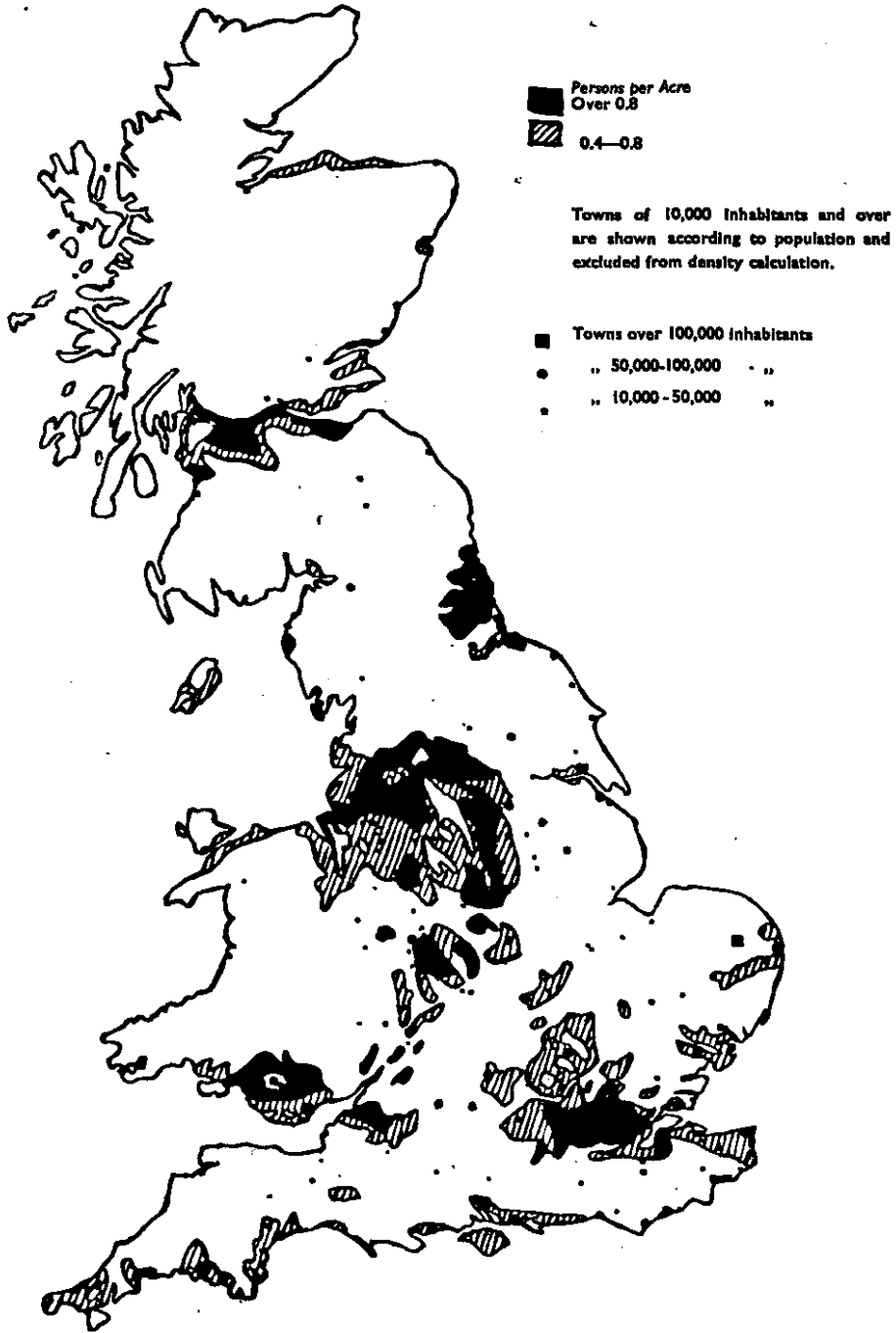
	Merthyr Tydfil	Lincoln	Hastings
Estimated Population, 1987	68,250	68,080	68,450
Per Cent Unemployed (av. 1986)	52.9	14.3	10.0
	£	£	£
Government Grants received, 1985-86	800,848	229,710	156,504
Raised in Rates, 1985-86	279,537	822,881	823,820
Total Debt, March 31, 1988	700,188	2,422,909	2,435,406
Debt per Head, March 31, 1988	£11 1s. 4½d.	£88 8s. 2½d.	£88 7s. 7½d.

It will be observed that, even disregarding the £500,000 a year paid out of public funds to support unemployed in Merthyr, the county borough itself required nearly twice as large a sum in government grants as Hastings, which is the same size. Despite the very heavy poundage levied (now 27s. 6d. in the £) the total rates collected in Merthyr are low for a town of its size. Its total debt is extremely low—less than one-quarter of the national average for county boroughs—partly owing to lack of recent expenditure on social equipment. The conclusions to be drawn from this situation are discussed in the final chapter.

Areas Where New Industries can Flourish

For most of the remainder of the distressed areas the problem is considerably simpler. They are almost without exception areas suffering from over-concentration upon a few basic industries vulnerable to technical and economic change, which have sharply contracted and are liable to contract still further. They contain excellent sites but the local outlook and equipment are not fully up to date, and they need a powerful stimulus and considerable redevelopment in order to regain prosperity. It is not practicable even if it were desirable to take the existing and still important basic industries away from those areas where they are most economically located,

Figure 14
GEOGRAPHICAL DISTRIBUTION OF POPULATION OF GREAT BRITAIN



nor is it economically or socially justifiable to leave these areas for many years with a heavy surplus of unemployed workers and suffering frequent blows from the depressions to which their particular industries are exposed. The principle of balance demands that local employment and industry should in these cases be diversified. There is every reason to suppose that a large range of new industries once started in these areas can flourish as well on suitable sites (not necessarily exactly where industry has previously been centred) as anywhere else, but there is no hope of the necessary impetus being forthcoming except from the State*.

Readjustment therefore involves a concerted use of many instruments, including administrative reorganisation of government and public services, town and country planning, co-ordination of plans for transport and communications, and the controlled development of light industries and services such as provision of recreation facilities.

Future Distribution of Population

Many ideals might be suggested for the distribution of British population, but in practice it is essential to recognise where the population already is, and what are its current trends. The majority of people are in fact collecting, according to the Royal Geographical Society, in a compact quadrilateral in England and Wales stretching from Gravesend and Haslemere in the South to Colwyn Bay and Knaresborough in the North, while in Scotland similar concentration is occurring within the Clyde-Forth-Tay corridor. There are a few other smaller but also significant concentrations, for instance, on the N.E. coast and the Bristol Channel. (It seems unlikely to be possible to reverse this trend, although we may regulate it and possibly set up some secondary counteracting trends. It seems also unlikely that the economics of location of industry will for some time be well enough understood to permit much more than a broad division of the country into areas of general industrial concentration, thinly populated outlying areas, and an intermediate zone. For the remoter areas the economic future appears restricted in the main to agriculture and forestry, fishing, sport, recreation and tourism, and a limited number of special industries, largely extractive in character. For the intermediate zone these activities are also important, with the addition of residential development, and a considerable number of other industries where conditions are specially favourable, as in the larger towns. For the more thickly populated remainder the choice of industries is much wider, and in these most of the growing service activities must develop. On these, therefore, will fall the burden of paying most of the national overheads and of finding such subsidies as are needed to support any excess of population, above the economic level, which it may be decided to maintain elsewhere. This is the broad objective for policy which seems to be emerging and is in fact to an increasing extent being pursued in practice, although blindly and with much secondary waste and confusion at the present time.

To sum up, when location of industry is considered from a regional angle, two dominant issues emerge. The first is how to reduce wastes and fluctuations by

* Isolated efforts by industrialists, such as the revival of Penistone by David Brown & Sons, gear-makers, have shown what can be done in an apparently derelict, but suitably-located, town.

securing a more stable equilibrium between the employment capacity of the industries in a given area and the population of that area. The second is how to guide the migration of industry and population so as to prevent communities from being left stranded with insufficient employment in some areas and industries from being hampered by labour shortages and congestion in other areas. These two issues of the balance and the geographical distribution of employment in relation to population are evidently very closely connected. In fact the unbalanced area where most of the workers are employed in the same industry, or working for a single market, or at very low rates of pay is already half way to the depressed area where there is no longer enough employment of any sort to go round.

The problem, therefore, is to prevent fresh areas from becoming depressed, as well as to salvage those which are depressed already. It is necessary to recognise that almost all the heavy and export industries on which the now depressed areas were built up are likely to afford less and less employment, although these industries are unlikely in most cases to cease entirely or to be removed to other areas. In so far as certain industries have to remain in depressed areas there is a case for diversifying local employment by bringing in other types of industry, where this can be done by incentives sufficient to attract them in the first place, but not where it involves permanently raising operating costs as compared with alternative sites. Contraction where necessary of established industries, introduction of new industries, redevelopment on a regional scale involving considerable local shifting of population, and in the last resort transference to other regions, must all play their part in adjustment. The extent of the dislocations arising out of industrial change can be very much reduced, and serious wastes avoided if new industry is restrained from flocking needlessly to those areas which have lately proved prosperous at the expense of those which have lately been depressed. Such guidance may be in the interest of the industrialist as well as of the community, provided that the criterion is long-run economic efficiency and that the mistake is not made of replacing the short-sighted test of immediate individual profits for the business man by an equally short-sighted test of "social needs" unrelated to economic limitations.

IX. AIMS OF NATIONAL INDUSTRIAL POLICY

The Industrialist and the State—The Objects of National Policy—National Resources Policy—Aims and Methods of Guiding Location—Possible Measures—Information and Publicity—The Finance of New Enterprise—Adjustment of Local Rates—Transfer of Specific Burdens to Central Government—Direct Subsidies—Preference in Government Contracts—Levy for Redevelopment—Revision of Labour Agreements—Social Measures—Devolution of Administration.

The Industrialist and the State

The general problem of the interplay of the State and industrial activity is far wider than the scope of this report. At the same time any examination of the questions involved in the location of industry is intimately bound up with one salient aspect of the wider problem, namely the effect, upon economic life and social progress, of the ebb and flow of regional industrial prosperity, as influenced by the interference of many controllable external factors. The Board of Trade maintained before the Royal Commission on the Geographical Distribution of the Industrial Population that, with certain exceptions, "individual choice has on the whole placed industry where the individual employer has found it economically most advantageous to place it." Even when this statement is examined from the limited economic viewpoint of the individual industrialist, its validity is questionable. And even if it were valid in this limited sense, it is extremely doubtful whether the continuance of this process is conducive to the long-term interests of the industrialist himself or to the long-term requirements of the community as a whole. It need not be disputed that most industrialists do succeed in choosing a location which is economic in the sense that it enables them to make profits, but it is doubtful if they succeed in choosing the most suitable location. In any case, the extent to which a location can be judged economic in the sense that it enables production to be carried on at a profit is relative. Under conditions of perfect competition, it could safely be assumed that the location of a plant in a site that was uneconomic in relation to the site occupied by a competitor would result eventually in bankruptcy for the promoter and the liquidation of his enterprise. In practice, competition never was perfect in the strict use of the term, and owing to the trend of social developments and of industrial organisation itself in recent years, the imperfections are becoming steadily greater (see Chapter I). The representatives of the Board of Trade did not point out that the factors determining the economically most advantageous sites are no longer "natural," but are largely the result of the attempts of a large number of public authorities to administer piecemeal a welter of services which greatly influence the decisions of entrepreneurs.

The odds against the selection, even by the most far-sighted industrialist of a location which will remain "economic" for him, even in the most limited sense, for

a long period, are continually lengthening both on account of the tendency towards an increasing rate of technological change and owing to the multiplication of extraneous and unpredictable factors which are capable at any time of altering the assumptions on which the initial choice was made. It is at this stage that a practical interest by the State in the choices of industrialists is justified.

The Objects of National Policy

The State cannot be expected to avert the consequences to industries of natural phenomena, technical progress or international forces. At the best it can only mitigate them. But if it decided to assume the necessary powers, it could limit substantially the wider economic and social effects. It is in this connection that a co-ordination of State activities and an extension of State influence on the location of industry has most urgently to be considered. Since the State—almost despite itself—partially affects the location of industry by piecemeal action, it would, if these and its salvage activities were co-ordinated, have to decide on the relative merits of an immediate maximisation of profits or of a longer view of its responsibilities to posterity.

On the one hand, it seems desirable that existing industries, ways of life, and traditions should as far as possible continue a peaceful and prosperous existence—though not at the expense of rising standards of living. On the other hand, it seems desirable that advances in the efficiency of manufacturing and distributive processes, in the social services or in the less tangible amenities of life should be pushed ahead—but not at such a pace as will disrupt existing society and, for the supposed benefit of future generations, inflict excessive misery and suffering on our own. To devise machinery which will function smoothly without inflicting numerous casualties among operators and spectators alike is one of the great problems awaiting solution in the twentieth century. Hitherto material progress, though admittedly very great in many directions, has been so uneven and uncertain in its effects that for great numbers of people many of the advantages have been seriously diminished, if not entirely lost.

There is a further aspect in which a balance or adjustment has to be made. Every citizen engaged in the economic process has, in effect, two incomes. The first is a personal money income, the second is in kind and consists of the common inheritance. The problem of balance here is to ensure for all citizens a reliable and steady personal income as well as providing for the maintenance of, and if possible for the improvement of, social and environmental income. The responsibility for reconciling these interests, which sometimes conflict but are often complementary, must rest upon the State. In order to discharge its task, the State requires to extend its functions in certain directions. But if in future the State is to extend its powers it must be prepared to set up services which will assist the industrialist to perform his own function more efficiently.

In the second place, the State needs to set its own house in order by the co-ordination of its many activities affecting industry and economics. The agencies of government should attend more to the total and reciprocal effects of

their policies, as well as to the separate and immediate effects. Preventable waste occurs, first, through failure to co-ordinate various measures, with the result that their aims and methods conflict so as to reduce their efficiency in operation and their effectiveness in attaining the desired individual objectives; and second, by failure to co-ordinate the provision of State services generally with industrial requirements over the long period.

But action along these lines will not materially reduce the risk for the community of the decay of whole industrial regions unless the risks of individual industrial failure through causes of an unpredictable nature are spread by reducing as far as possible the dependence of particular regions upon only a few sources of livelihood, and unless some continuity of industrial and economic life in changing circumstances is ensured by a diversification of activities.

Thirdly, it is desirable that the State should have some residual powers to curb the activities of the minority of economic pirates, who, it has to be admitted, exercise greater influence than their numbers might indicate at first sight. It has for long been recognised that the State has certain duties towards its members as a whole, and even when the principles of *laissez faire* were most widely held limits were set to economic liberty in some directions. The Factory Acts are a familiar example. But there remain examples in which communal resources are wasted by the methods used by some enterprises, both small and large. An extreme type of waste which has occurred on a large scale overseas is the use of methods of agriculture which have considerably reduced the value of large areas of land, by removing and not afterwards replacing, communal capital represented by the fertility of the soil. At certain stages, the sacrifice of communal income in order to obtain a greater material income may be justified and widely approved. Victorian industrialism certainly did approve it. But this phase is now clearly past and the nation is no longer willing to surrender communal income as a matter of course in order to obtain an increase in material income which may in itself be somewhat problematical. The enactment of Town and Country Planning legislation to restrict, however inefficiently, the use to which land may be put is one aspect of this change of heart: the steady demand from those engaged in the economic process that rises in the standard of life due to technical and other developments should be enjoyed in the form of increased security and of increased leisure, either through shorter working hours or through longer holidays, is another.

Finally, it is now unfortunately necessary that the State should possess powers to direct the nature of industrial development with reference to the requirements of national security. This is, in a sense, merely a special case of conservation of communal income, though continuity of material income also depends on it to some extent. Until recent years, it was not necessary to consider very seriously or very often the extent to which material considerations entering into industrial development needed to be set aside or influenced by considerations of national security. With the alteration in the balance of strategic forces occasioned by the development of air power it has now become necessary in certain cases to disregard economic considerations if they conflict strongly with the requirements of national security.

National Resources Policy

The wide scope of the objectives which were outlined above shows that the questions involved are far larger than those merely relating to ability to place a factory on the most suitable of available sites. Under modern conditions it is becoming clear that the primary need is a well formulated but flexible policy, which will guide the use of all national resources. In practice a start has been made in this direction by various apparently unconnected measures, each of which is concerned with an important section of the country's resources. The unification of coal royalties in the hands of the Coal Commission and the nationalisation of all unexploited coal and oil resources has given the State, in the last resort, control of the nation's fuel resources. The establishment of the Electricity Commission and of the Central Electricity Board have had a similar effect in the increasingly important sphere of electricity supply. A similar advance has been made in the sphere of land drainage, the importance of which should not be underestimated in view of the damage caused by floods in, for instance, the Fen country. The unification of numerous local bodies into Catchment Boards with considerable, but still insufficient, powers, especially in financial matters, has laid the foundation for an efficient modern system of drainage. Potentially, the most important example is the movement towards increased control of the use of land to be found in the Town and Country Planning Act, for this must form the starting point of any form of conscious control over national resources. As yet the control of the use of the land under the Town and Country Planning Act is hardly effective, in view of weaknesses both in administration and in policy, added to defects in the Act itself. The degree of restriction imposed upon the liberty of the individual to disregard the communal interest by the zoning provisions of many town plans is often, in practice, negligible. The zones are so widely drawn and the provision made for future development in many cases is so enormous in relation to any development conceivably possible in practice that the range of choice left to the individual is still extremely wide. In order to make more effective the control which is inherent in the idea of town planning and which is fundamental to any attempt specifically to guide the location of industry, it seems desirable that local authorities should be given more explicit guidance on the principles which they should observe. There is an urgent need for a national body which could undertake this function. The form such a body should assume is discussed in the next chapter.

Many factors enter into the choice of industrial location in addition to a desire to make the best use of available land. The objects of a specific policy of control of industrial location must be to satisfy the dual requirements of siting and location. It is important that the distinction between these be kept clear. Siting is a limited matter of regulating the use of land and is primarily a local problem. It is concerned with securing for industry land which satisfies the technical requirements of an industrial site, in respect of subsoil, accessibility and service facilities, with the minimum of offence to other users of land, whether for residential development or recreation. Existing town planning is intended to secure these aims but, apart from other shortcomings, town planning schemes often ignore the just needs of industry. Those responsible for schemes are often interested mainly in recreational

and residential facilities and assign to industry land which remains after these needs have been satisfied, regardless of its suitability for industry. The past faults of industry in ignoring communal needs are no argument for going to the other extreme, a course which can only serve to bring sound town planning into disrepute. This is a matter for improved town planning practice, reinforced by more effective legislation and administration, with the guidance of a central advisory body.

Location is a wider problem because a balance has to be struck between the varied economic requirements of the community and the requirements of the manufacturer. The needs of the community demand, first, that regard should be paid in the choice of location to the prospects of economic survival of a particular enterprise. Second, in the event of a decline of such an enterprise, reasonable prospects should wherever possible be present for the alternative employment of the labour and social capital involved. Third, in present circumstances, attention has to be given to the strategic requirements of national security. Fourth, the effects of the development of new industries in particular locations upon the economic basis of other industries and occupations have to be considered, especially with a view to the prevention of waste through excessive congestion. Fifth, the effects of the establishment of new industry on communal income generally, including the preservation of amenities, have to be borne in mind.

Aims and Methods of Guiding Location

In evolving a mechanism to secure these objects many alternative or complementary courses of action must be considered. The State has already made a first step in this direction by establishing the Commissioners for Special Areas, who seek by means of persuasion, financial inducement and a certain amount of capital investment in the improvement of site facilities and amenity values, to attract new industrial development to selected areas. The principal failing of national policy in the treatment of this problem hitherto has been the fact that it has been attacked as if it concerned only the Special Areas. For this reason, and to a less extent because of the methods used in choosing the areas, all measures so far taken have tended to be palliatives only. Unemployment, moreover, is only one of the factors which should determine any policy for guiding industrial development, and is not necessarily the most important nor is it the most stable. Already, partly on account of the ameliorative measures undertaken within the Special Areas, certain communities excluded from the privileged schedule are just as depressed as parts of the Special Areas themselves. Once the State has shown itself willing to undertake the rehabilitation of areas which have become "special" by reason of various economic causes, it is a reasonable and necessary extension of policy, and an essential step if waste is to be prevented, to take measures to ensure that other areas in imminent danger of becoming depressed do not reach the stage where they must be treated as "special". Moreover, any decision to favour the development of industry in such areas, wherever it is economically possible, seems to require a complementary effort to prevent the further expansion of areas where congestion is rapidly becoming economically wasteful and socially and strategically intolerable. Isolated measures in a few selected places may act as a palliative in the regions

where suffering has been greatest, but will not correct the conditions which permit lopsided development to take place, nor prevent the continual recurrence of "Special Area" problems. A fundamental conclusion of this report, therefore, is that the problem of industrial location requires treatment as a whole on a national as well as on a regional or local scale.

The reconditioning of the present Special Areas and the prevention of the recurrence of the same troubles elsewhere can only be a gradual process. It is patently impossible, by some sudden measure, to correct immediately a maladjustment which is the result of the economic trends of a century of development. Industry is a growing organism, and the only means of arriving at the form which is ultimately desirable is by training its growth in the required directions. The need, therefore, is not for interference with established industries, but for a permanent machinery for guiding and adjusting industrial growth.

The extension of national action in this respect would require a re-assessment of priorities. Re-assessment would in turn require the collection of information and the evolution of a satisfactory method of measurement. The measurement of the current prosperity and future prospects of localities is a complex matter and existing methods of measurement are hardly adequate. While current unemployment, the principal criterion used at present, would certainly be one of the important social factors to be considered in measuring the needs of areas, other social factors would have to be borne in mind, as well as a number of economic and strategic factors. Thus, the relation between different districts and the position of the industries within them would have to be considered as well as the general standard of living and the ultimate object of attaining a better diversification of employment within regions. It is, in fact, quite conceivable that a national survey of regional economic prospects would regard many areas which are now flourishing as potential sources of "Special Area" problems, to which preventive policy should be applied, on the grounds of showing a poor industrial composition. It might, for instance, be wise to regard localities such as the Corby and Scunthorpe districts as areas where the introduction of complementary industries would be desirable, although they are, at present, by no means depressed.

In the bottom class of all, from the standpoint of future prospects, would be found certain towns and areas which have little or no chance of attracting on an economic basis new industries capable of giving employment to more than an insignificant proportion of their unemployed population. These are mostly towns of the "mining camp" type which have lost the industry on which their existence was originally based and which cannot provide sites suitable for the requirements of new industries. In such towns, the cost of devising inducements sufficiently strong to attract industry on a scale adequate to provide occupations for any substantial part of the unemployed population will certainly be so high that the only economic solution will be found to lie in partial or wholesale evacuation and re-settlement at the national expense. Examples of such towns are, unhappily, not difficult to find in the mining valleys of South Wales.

Slightly higher in the scale are certain towns, of which Jarrow and Whitehaven provide good examples, which are extremely depressed, but not without hope of

rehabilitation by energetic measures for the attraction of new industries and the redevelopment of local amenities. A substantial part of the Special Areas as at present defined must be regarded in this light.

Only slightly less embarrassed are a large number of localities, such as certain Lancashire cotton towns, Stockton-on-Tees and Swansea, which are in grave danger owing to excessive dependence on a single industry or limited range of industries which are already feeling the pressure of adverse economic forces.

In the majority of areas, which are neither down and out nor heavily depressed nor in danger of becoming heavily depressed in the near future nor, on the other hand, expanding excessively at the present time, there is not much cause for strong encouragement of further industrial development although, from long-term considerations, it may be desirable to guide carefully the location of new industry in order to promote diversification and spread the risks.

Clearly, however, positive dangers and serious wastes are threatened by the continued industrial development of the Greater London area, and possibly of Birmingham also, and any national scheme designed to secure a better balanced industrial pattern in the future would undoubtedly have to envisage the restriction of certain types of further development in these areas for the time being.

It would be impossible in practice to devise a rigid scheme for grading towns and areas according to the above analysis and it would be unwise to attempt to do so. In view of the nature of the problem generally and of the many incidental factors to be considered it is of the highest importance that any machinery adopted should possess the greatest flexibility.

Evidently, in some regions the introduction of particular kinds of industries already well represented locally, though helpful in the short period, might actually increase the dangers of ultimate depression. The principal aim of long-term policy throughout must be the achievement of maximum diversification within regions, since it is then less probable that all the markets of regional industry will be affected adversely at the same time. It would, however, be unwise to attempt to make rigid distinctions between different branches of industry, since there is, under modern conditions, often no natural line of demarcation, and any division can only be made arbitrarily. The process of vertical and horizontal integration is, in the first place, obscuring old divisions. And, in the second place, many individual firms in recent years have begun to practise industrial diversification within their own organisations and to manufacture products belonging to several different industrial categories in order to minimise the effects of a decline in any one market. Many of the more successful modern developments in industry begin in this way.

Possible Measures

In order to deal with the many difficulties arising from unconsidered industrial development which have been pointed out in these pages, it appears necessary to frame an industrial development policy with the objects already discussed, and to co-ordinate action accordingly. While the acceptance of a common aim and the

co-ordination of the many conflicting policies of different public and private agencies will form the basis for guidance of the future growth of industry, they will not in themselves solve the problem. It is doubtful whether an adequate solution is possible in the absence of reforms too far-reaching to be usefully considered here, such as the complete recasting and modernisation of the national system of taxation, central and local. Nevertheless, there are many more limited measures which might be applied to influence the direction of industrial growth. These may be classified under the heads of (a) information and publicity, (b) financial, (c) social, (d) development of local facilities, and (e) measures connected with administration. In the following summary some of the principal possible measures are first briefly outlined, after which the desirability and practicability of each type are more fully considered.

(a) Information and Publicity Measures

Much could undoubtedly be done towards guiding the growth of new industry along predetermined channels by publicity work of the nature undertaken by the former Empire Marketing Board and by the establishment of centralised sources of information and advice for industrialists seeking suitable sites for new enterprises. Possible measures would include:

- (i) Positive publicity, to emphasise the advantages, from various standpoints, of particular regions for industrial or recreational purposes.
- (ii) Negative measures, in the form of publicity to educate public opinion to the undesirability of further development in certain areas.
- (iii) Regular information and advisory services to be available for detailed consultation by manufacturers. A regular service of this nature might be fortified by specific campaigns, for example, in the national and trade press, directing the attention of prospective employers to the emergence in particular areas of important new factors, such as actual or expected shortage of particular types of labour.

(b) Financial Measures

Financial measures can take the form either of inducements or deterrents. Inducements are clearly more practical, and an inducement confined to one part of the country is in effect a deterrent elsewhere. This has to be borne in mind in connection with the following measures, all of which, if adopted, would tend to influence the location of industry by the adjustment of financial burdens as between areas.

The measures, to be considered later, are:

- (i) A readjustment of relative local financial burdens could be effected by further discrimination in the basis of block grants. Alternatively an adjustment of the incidence of local rates could be arranged. Thus, in areas where new factories are to be encouraged, rates could be paid on behalf of new plants from a special fund, while in areas where restriction of new enterprise is required, derating might be abolished for new factories.

- (ii) The cost of especially burdensome local services might be transferred to the national taxpayer. A beginning has already been made in this direction (e.g. in the case of trunk roads and unemployment assistance), but the policy might be extended to cover, for instance, public assistance and highway maintenance.
- (iii) Subsidies might be provided in certain cases to statutory public utilities in particular areas, such as gas, water, electricity and transport undertakings, in order to secure a lowering of service charges. In certain cases if special encouragement, accompanied perhaps by financial assistance, were given, for instance, to enable local authorities to make provision for supplies of cheap coke oven gas to industry, it would be of definite assistance in attracting new works.
- (iv) Special levies might be raised on prosperous regions to finance schemes of national redevelopment.
- (v) Revision of national labour agreements might be encouraged in order to differentiate more sharply between regions.
- (vi) Differentiation in income taxation might be introduced, particularly as regards the treatment of depreciation allowances and reserves of firms in different regions.
- (vii) Provision of capital and/or credit might be, and to some extent has been, made for selected new enterprises in special circumstances.
- (viii) Direct subsidies might be given for specified periods to individual firms in selected locations; these could take the form of payments to offset utility charges or income-tax liabilities, as under the Special Areas (Amendment) Act.
- (ix) Preferential placing of government contracts might be introduced, as in the case of rearmament orders for the Special Areas.

(c) Social Measures

The following measures would be designed to improve the amenities of areas which at the present time offer few social advantages:

- (i) Provision of improved local recreational and other amenities such as parks, playing fields, swimming pools, and greyhound tracks.
- (ii) Provision of improved social services—such as educational facilities (including private education), health centres, and community centres.
- (iii) Stimulation of local cultural life including art, dancing, drama, and music.

While it would be impractical to consider arranging conscious deterrents to further development of over-developed areas it must be recognised that such areas, while tending to provide more elaborate and highly organised recreational facilities, often give rise to automatic deterrents in the form of discomfort and loss of leisure through long and congested daily journeys to and from work, increased danger, inconvenience and exposure to epidemics, higher rents and higher prices for amusements.

(d) Development of Local Resources and Service Facilities

The economic potentialities of particular areas could be more effectively realised through special measures for the development of industrial and recreational attractions. In this connection the following measures might be considered:

- (i) Provision of extra or improved roads, bridges, aerodrome and harbour facilities, road transport, gas, electricity and water supply, drainage schemes, housing and other public services.
- (ii) Provision of trading estates, where industrialists can obtain certain facilities at low charges and without capital expense. As a particular inducement on trading estates the charges for services might be fixed in the initial stages at the level of the lowest bulk rates, in anticipation of later developments in demand.
- (iii) Provision of technical education and training for specific industries.
- (iv) Establishment of marketing organisations of local producers in unprosperous regions to enable them to compete in national markets, or satisfy latent demands.

(e) Measures Connected with Public and Industrial Administration

Both public authorities and industrial undertakings are capable of influencing appreciably the regional distribution of talent and personal enterprise. The present tendency to drain the provinces of the most talented and ambitious of their citizens might be counteracted by:

- (i) Reversal of the tendency to concentrate administration (both governmental and industrial) in London, which results in a relative shortage of the more highly-paid income earners in other areas.
- (ii) Readjustment of pay and conditions of work of public servants as between London and the provinces in order to make service in the latter relatively less unattractive. For example, service in the provinces might be made a condition of promotion to certain higher administrative posts.

In order to construct an efficient machine from the various available components it is necessary to assess the relative value of alternative measures and combinations of measures with reference to (a) practical effect, (b) ease of administration, (c) cost to the State, and (d) possible repercussions.

It is therefore necessary to consider in greater detail the various possible measures listed above before deciding which are most suitable for practical application.

Information and Publicity

While publicity on the part of municipalities designed to attract the tourist and the holiday-maker goes back a very long time, systematic publicity directed towards the industrialist is a much more recent activity. The introduction of the tariff and the influx of branches of foreign works which had formerly exported to the British market stimulated a large number of local authorities to undertake

industrial publicity. It is hardly surprising that the earlier efforts were chaotic, and were largely foredoomed to defeat their own principal objects.

Thus, the simultaneous display of numerous posters on exhibition stands and elsewhere, merely exhorting the industrialist to put his factory at X, Y or Z, did very little in the way of bringing the right industries to the right places. Moreover, such publicity was often conducted with the greatest persistence by districts which, from the national viewpoint, were not those where new industrial development was most desirable. It is, unfortunately, still the prosperous rather than the hard-pressed local authorities which can best afford to undertake elaborate publicity, though all are strictly limited by the Health Resorts and Watering Places Act, 1936, as to the amounts they can spend on publicity out of the rates. The general limit is the product of a 1½d. rate—higher in the case of certain authorities with special powers, such as Blackpool—and no general power exists for local authorities to advertise their industrial, as distinct from tourist and health resort, attractions. A few authorities have obtained Parliamentary sanction individually for industrial publicity, but there is some obscurity about the legal justification for the activities of other enterprising local authorities in the industrial development field. For publicity abroad, local authorities, under the Act of 1931, are allowed to contribute up to the product of a ½d. rate to bodies approved by the Ministry of Health for this purpose. So far, only the Travel & Industrial Development Association of Great Britain and Ireland has received such approval.

The prevention of wasteful publicity and the co-ordination of local effort within regions were among the primary objects of the various Development Councils which began to be formed about 1933, such as the Scottish Development Council, the Lancashire Industrial Development Council, the South Wales and Monmouthshire Development Council (now the National Industrial Development Council of Wales and Monmouthshire), the North-East Development Board, the Ulster Industries Development Association, and the Cumberland Development Council. The primary object of these bodies has been to publicise the advantages of their region as a whole, and, though in some cases the reconciliation of rival interests within the area has not proved easy, they have on the whole done very valuable work. Later, their scope has tended to expand, in particular in the direction of collecting and making available information, and of providing free economic advice, for which a whole-time officer may be specially employed.

In practice, co-ordination is needed between the various regional councils. In the case of inquiries from abroad regarding the establishment of factories in Great Britain, this function is fulfilled by the Travel & Industrial Development Association. While Englishmen may know little of Central European countries, industrialists in these countries certainly often know little of England, and need a central organisation to which they can write for literature and information regarding all the principal regions. At one time it appeared that with the decline in the big influx of foreign concerns starting manufacture in Great Britain after the early post-tariff years, this particular function of attracting and assisting the incoming industrialist from abroad would lose its importance. Recently, however, political

refugees have restarted the movement, and have in many cases brought to this country processes and products not previously established here. On several trading estates they already account for a remarkable proportion of the new enterprise and employment. While, therefore, from the point of view of the refugee the advantages of Great Britain may not need advertising, there is still an important function to be carried out in assisting industrialists from abroad in the early stages of their search for sites and facilities.

Publicity directed abroad is, however, only a part of the story, and there is much that could be achieved in the national interest by redirecting attention at home to the merits of areas in need of new industries or of holiday-makers, and possibly even to the disadvantages arising from excessive concentration in crowded areas.

But publicity measures designed to influence developments of major importance to the nation as a whole should, in principle, be subject at least to the ultimate control of a national body, for only in this way could differences of local policy be avoided, or reconciled. As far as home publicity is concerned, national policy might do worse than follow the technique of the former Empire Marketing Board. A campaign would be mapped out so as to devote a certain length of time to publicising on a national scale a region such as South Wales. During this time the advantages of the area from the viewpoint of specified industries could be pointed out, existing facilities described and details regarding sites, and types of available labour, given. A similar period could be devoted to publicising other regions according to needs.

While publicity of this sort would undoubtedly help to remove misconceptions regarding the nature and supposed disadvantages of many depressed areas which large sections of the population have never visited, it would have to be regarded as definitely a more wasteful and less reliable method of influencing promoters of new enterprise than a direct service of information and advice.

The provision of a centralised information service assumes that although industrialists acting entirely upon their own initiative seldom fail to light upon a location where they are able to make some profit for a considerable period, they do not necessarily choose the most economically and socially desirable location in each case. There is no guarantee that a State-organised advisory service would produce better results, but it is not an extravagant assumption that such a service could, on the basis of continued research, not only relieve industrialists of the laborious and wasteful task of conducting much preliminary investigation work by their individual efforts, but could also present the relevant facts for consideration much more rapidly and in much clearer form. It is also possible that a service of this sort could bring to the notice of industrialists factors which the latter might not normally consider—such as the interest of the industrialist as well as the community in creating and maintaining a reasonable balance of industries within broad economic regions, so that the particular regions may be able to acquire some internal economic momentum of their own and accordingly build up an insurance against heavy depressions arising out of external factors.

The organisation of an efficient information service is largely a matter of intensive economic research into the growth of industry and the factors affecting it, and of ensuring that the service is recognised by industry and used in practice as a matter of course. In order to ensure that the full information necessary for a comprehensive examination of the direction and nature of industrial growth should be forthcoming, some system of, at least, registration for new industrial projects and extensions seems to be necessary. And, in the second place, in order that an advisory service should be fully and regularly consulted, some residual power of compulsion would probably have to be retained by the State. The implications of this are discussed in the next chapter.

The Finance of New Enterprise

The existing machinery for the provision of capital and credit for new enterprises is highly intricate, as has already been shown in Chapter III, but it is not very successful. The facilities made available through the machinery of the City of London and through such other agencies as exist in the provinces are inadequate, and additional machinery is required for speeding up the flow of savings into new enterprise. There is a widespread belief that the finance of new industries cannot be carried out on a profitable basis by a financial institution and must depend upon the success or good fortune of the promoters in finding individual backers willing to carry the risk. If this is correct, there is a very strong case for continuing on a public and national basis the work done in the last two years by the Nuffield Trust, which has undoubtedly made a contribution to the solution of the Special Area problem of a value far in excess even of the £2 millions provided by Lord Nuffield. For, on account of national taxation policy and other economic and social changes, the supply of individual backers of the requisite temperament and substance has fallen far short of the demand, and is likely to diminish still further. Any institutional body set up to take over the function of the individual backer on a permanent basis must, however, be able to act quickly and to take a "business" rather than a bureaucratic view of propositions submitted. Although the problem is a national one there is probably also scope for local industrial finance organisations in different industrial areas where existing local experience and contacts can be utilised, and where the progress of the new enterprises can be closely watched. Such local finance companies could be organised in close co-operation with the trading estate companies. In October, 1988 it was announced that a company on these lines, the Scottish Development Financial Trust, Ltd., had been formed by the Scottish Development Council for the assistance and development of struggling small industries in Scotland.

There is good reason to believe that the small success of general industrial finance companies hitherto has been due to a large extent to faulty organisation—for example, to bad or insufficient "vetting" in the early stages, or unwillingness to take a sufficiently long view. Specialised financial trusts with a good knowledge of the industries in which they operate play a big and successful part in the finance of new enterprises in their own and, in certain cases, other fields. If the need for the development of new industries were more widely realised, merchant banking and other institutions would be prepared to act co-operatively on these lines. At least one financial trust associated with one of the biggest merchant banks has

already done so with marked benefit to South Wales. The best way to encourage further interest in this problem by private enterprise might well take the form of State initiative to create new institutions with the joint participation of Government and private capital.

Adjustment of Local Rates

The adjustment of the incidence of local rates is an expedient of doubtful value. What is needed is a fundamental overhaul of the whole system of national and local taxation with particular reference to the incidence of existing taxation on different income classes and administrative areas. In default of this much-needed basic reform; adjustment of the incidence of local rates within the existing system might be applied as a mild incentive to new industrial development in some regions and as a mild deterrent in others. Since the partial derating of industry came into force the direct effect of local rates on industry is, in any case, relatively small, as industrial undertakings only pay rates on one-fourth of the normal assessment. Differences in local rates fundamentally only reflect the relative strength and elasticity of local government finance. They may, however, for this reason have indirect effects on industrial location.

Thus, the effect of high rate payments on all-in rents may have some influence on labour supply, and may sometimes, therefore, be taken into consideration by industrialists seeking sites for new plants. In the second place, high rate burdens often signify a stringency in local finance which may be reflected generally in inability to provide or maintain various public services of the first efficiency, and this factor may also in some circumstances carry weight with industrialists.

In addition, the differences between the English and Scottish systems of rating have often been held to discriminate against economic development in Scotland. The Scottish system levies rates on the owners as well as the occupiers of used property, and on the owners of unused property, whereas the English system only affects the occupier and exempts unoccupied property. The Scottish system is said to deter industrialists owing to the liability to pay full rates on unoccupied industrial property, and also to discourage house-building owing to the element of uncertainty introduced into investment in house property and the effect of owners' rates on rents. There are also differences in the method of valuation and of revaluation, the latter being annual in Scotland and quinquennial in England. Whatever the respective merits of the two systems, it is clearly highly undesirable that these differences, which may have serious effects on equality of economic opportunity, should be allowed to continue. Now that choice of industrial location is considered nationally, the objections to, for instance, a separate Scottish factory inspectorate or a separate Scottish customs service with different standards apply also to a separate Scottish rating system. In fact, both systems have their serious weaknesses. The levying of rates on owners of property and on unoccupied property has both advantages and disadvantages. Revaluation at quinquennial intervals only deprives local authorities in rapidly-developing areas of the expansion of rate-paying capacity during that period, and acts, as it were, as a hidden subsidy to purchasers of

property pending revaluation. While, however, both systems are greatly in need of overhaul, on particular grounds, the most urgent need is for the co-ordination of the two systems.

The Local Government Acts do not empower local authorities to "adjust" their rates and assessments in particular cases, for example in accordance with the status of the individual occupier, although in practice effective discrimination is not unknown. It is clear that remission or adjustment of rates, if applied at all for the purpose of influencing the direction of new industrial growth, should not be left in the hands of local authorities, as this would not only leave scope for misuse—in that remission might be granted in districts where it was not really needed—but would also merely decrease the burdens of some local ratepayers at the expense of others. What is needed in this connection is not so much the readjustment of rate burdens *within* districts, as readjustment between districts. This principle was followed in the London Equalisation of Rates Fund set up by statute in 1894, and the Metropolitan Common Poor Fund created in 1867, both of which ceased to function in 1930. It is also recognised in the powers of the Commissioners for Special Areas to remit rates within the areas concerned. For remission is effected by the payment by the Commissioner of the rates due on behalf of the occupier, and the financial burden, therefore, falls not on other ratepayers in the district but upon the National Exchequer. Any adjustment of the incidence of rates between regions, under the present system of local finance, would have to continue to take this or a similar form—for instance, the equivalent result could be obtained by even greater discrimination between areas in the basis for the allocation of block grants, and a more frequent revision of the block grants, which at present only occurs every five years. Whether a further increase of discrimination would be desirable is by no means clear. Certain growing areas claim to be injured by even the present degree, and the 1937 revision benefitted certain counties by the equivalent of 2s. or more in the £. These payments are, of course, already calculated on a "need" basis, wealthy districts receiving a smaller proportionate grant than those less prosperous, but the difference might be made greater. Any substantial increase in discrimination would, however, undoubtedly create difficulties owing to the necessary increase of rates in even the most prosperous areas, since the present local taxation system places the burden of rates for the most part upon occupiers of residential and commercial premises only. Thus, the lawyer, in relation to the value of his business, pays low rates, while the department store in a main street bears a heavy proportion of them. In general, it may be said that the professions pay low rates, while distribution pays, in comparison, very high rates. This is bound to occur as long as size of premises is the main basis of valuation for rating purposes.

It must in any case be emphasised that such measures could only be justified as tending to render less harmful the effects of a fundamentally unsatisfactory system. Drastic revision of the rating system, and reconsideration of the relation between national and local taxation is long overdue, and would enormously benefit the more depressed areas, which are bearing an excessive burden in relation to their taxable capacity. It can, for instance, be shown that many householders in highly-

rated areas who have purchased their houses and who therefore tend to be tied to the locality, are compelled to pay out a substantial proportion of their income in rates. If these were to be reduced, there is little doubt that surplus income would be released for expenditure on pressing personal needs not now satisfied. The absence of such a surplus at the present time seems to be partly responsible for the slow growth of consumption goods industries in such areas. The real grievance of industry against the present rating system is not its burden on production costs, which is usually negligible, but its deadening effect on the expansion of consumer markets, which industry badly needs, and which it is in the national interest to develop.

Transfer of Specific Burdens to Central Government

The transfer to central government of certain especially burdensome local services is a specific method by which relief can be given to the hard-pressed finances of particular districts. In such cases the State might also be expected to take over outstanding liabilities. For example, in spite of the fact that responsibility for unemployment assistance itself has since been transferred to the Central Government, some South Wales authorities are still having to carry the weight of interest on funds which they were compelled to borrow (at high interest) to meet long-past expenditure on unemployment assistance. In one case, at least, the burden amounts to a 2s. rate. Such a commitment naturally retards, even if it does not prevent, a recovery in local finances and in the local economy as a whole. So far as the Goschen loans are concerned, the Treasury was afterwards forced to admit that a serious blunder had been committed in allowing the high interest rates which were fixed.

As regards the maintenance of highways—one of the biggest items of local expenditure in which the nation and not merely the locality has an easily identifiable interest—something has already been done in that certain of the more important “national” highways have been taken over by the Ministry of Transport. There are still, however, numerous inter-urban highways not yet taken over which are hardly less “national” in character, and some further assistance could be given to needy local authorities in respect of these.

Direct Subsidies

Direct subsidisation of individual industries in specified locations could only be considered in extreme cases. It would, in the ordinary way, be difficult to decide which industries should receive subsidies unless it was abundantly clear that certain specified industries were necessary to the proper development of a region and could not be attracted by other means. Cases may also occur where a site, otherwise suitable for a specific project which it is highly desirable to encourage for the benefit of the region as a whole, may suffer from one particular disadvantage—e.g. inadequate water supply. Under these conditions a specific subsidy calculated to offset the unfavourable factor may be justified.

In any case, it is highly desirable that subsidies should be extended for short periods only and should be designed merely to give an enterprise an advantageous start. A time limit should therefore be prescribed when the grant is first made.

Preference in Government Contracts

Discrimination between areas is already practised to some extent in the placing of Government contracts and the location of Government plants with a view to giving preference where possible to the Special Areas, or, where this is not possible, to the more depressed areas. For instance, in the selection of Bridgend in Glamorgan, Chorley in Lancashire, and Bishopston in Lanarkshire, as sites for Government Ordnance factories, strategic and social considerations have happily coincided. But it cannot be expected that these and other relevant considerations will always coincide. For example, the placing of a large number of Government contracts for military equipment in the North-East might be considered highly desirable from the social standpoint, but would be difficult to justify on grounds of national security. The availability of plants suitably equipped to carry out the orders in question must also be considered, and the result may not necessarily be favourable to the plant located in the more depressed area.

In general, therefore, discrimination on social grounds in the placing of Government contracts must be regarded only as an expedient which may become possible under certain combinations of circumstances. Some scope, however, probably exists for improvement in the application of such expedients. There is little doubt, for instance, that the merits of some of the smaller engineering works in the remoter regions are not as fully appreciated as those which are better known owing to their proximity to London. The survey work on industrial resources from the aspect of mobilisation for defence purposes which has been carried out by the Committee of Imperial Defence might be used, in this connection, for the placing of civil as well as military contracts by Government departments, with results of strategic as well as economic and social value.

Levy for Redevelopment

The theoretical possibility has to be considered of a special levy on prosperous regions in order to finance schemes of national redevelopment. The proposal is open, however, to the grave practical objection that it should be one of the main functions of central government and of national finance so to adjust policy and methods as to hold, as far as possible, a balance between the various regions in respect of their economic prosperity. The solution of the maladjustments, therefore, lies in the overhaul of central government policy and the national and local taxation system, and not in the introduction of palliatives of this type.

In practice, the difficulties in making a levy for redevelopment would be considerable if it was proposed suddenly to place a new burden on all existing industry, so that a general levy cannot be considered seriously, even as a possible expedient. Schemes of national redevelopment would, in fact, be much more appropriately and smoothly carried out within the framework of the existing national financial system or as a measure of national public works.

It is, however, possible that a direct obligation might be placed on new enterprises, requiring them, broadly, to leave local amenities as they find them in

the event of subsequent transfer or liquidation. Such a measure would be calculated to minimise the necessity for redevelopment in the future, and would not be designed to make good past destruction of communal capital.

Revision of Labour Agreements

There are already agreed scales of wages in certain trades whereby wage rates are lower in some towns or regions than in others, towns being more usually chosen than regions as the unit. In the engineering industry some of the "districts" with differing wage rates include large groups of counties while others consist of single towns, in some cases as small as Otley and Grantham. While in some cases the differences in rates merely suffice to compensate for differences in costs of living, in other cases they tend to outweigh such differences. The basis both for the number and nature of the districts and for differences in district rates is often a traditional and historical one. District agreements regarding rates between employers and labour often existed informally or traditionally long before national negotiation was thought of, and as national negotiation grew up a medley of different district practices were thrown together. In some trades, efforts have been made to overhaul and co-ordinate the various district peculiarities thus inherited by national conciliation bodies from earlier district bodies. In all trades, the process of adjustment is being continuously applied through piecemeal adjustment of rates in the ordinary working of conciliation machinery. But although a less anomalous wage structure is being evolved by these methods, many maladjustments still exist and in some cases the results may be decisive. There is reason to believe, for instance, that development of a South Wales printing trade was killed by the enforcement of higher rates than those obtaining in other towns, such as Gloucester and Cheltenham.

Further progress towards the adjustment of wage rates so as to accord more nearly with differences in district costs of living and towards the maintenance of the balance, once obtained, is clearly desirable. It is equally clearly impossible to depart from any such economic basis for differences in district rates in an effort to attract industry to particular areas by the incentive of cheap labour. Employers would, no doubt, to some extent be attracted to districts paying low wage rates, but in spite of the general immobility of labour there would probably be some simultaneous attraction of labour away from such areas towards others where the money wage rates prevailing offered the opportunity of a better standard of living. It is, moreover, far from certain whether organised labour would be willing to operate any such scheme or in fact could reasonably be expected even to entertain it.

Social Measures

The possible measures classified as "social" are of great importance in themselves, and with the present trend of social habits and standards of life are likely to become relatively even more important in the future. There is no doubt that the enormous differences which exist between the amenities of different areas are playing some part in determining the location of industry. It is hardly surprising that people should seek the best amenities which they can obtain and there is an understandable

tendency on the part of promoters of new enterprises to select the site which, other things being equal, will give them the highest amenity value. A case is known of a manufacturer who wished to expand his production and wanted to examine sympathetically the suitability of site and labour in South Wales, but could not induce his manager even to look at the prospects owing to resistance to the idea of going there to live. In another case, a foreign manufacturer established works in Lancashire, but objected to living in Oldham. Eventually he settled at Didsbury—within easy reach of theatres and concerts in Manchester.

Individual tastes and local traditions are bound at times to differ considerably—and rightly so. In other cases they will coincide. Thus, the managing director of a works established in London considered very favourably proposals involving the opening of a new factory on the North-East coast which would necessitate his living there—largely because he was born there and had never become accustomed to the ways of Southerners. On the other hand, it is incontestable that most of the older industrial districts and towns would benefit by paying greater attention to the improvement of local amenities, in that they would be better able to attract new industries.

Financial incentives designed to attract new industry to an area are not sufficient in themselves to enable that area to develop a momentum of its own, and must be supported by the necessary improvements in amenities. In many towns, particularly in the North of England there is a strong local patriotism which has undoubtedly been a great asset in keeping the community together. It has also, however, the unfortunate effect of blinding people to the possibility of introducing improvements which may seem at first sight a little alien to local traditions. There is often a long tradition of municipal enterprise, but the planning and creation of amenities have been largely neglected or misconceived.

The difference in amenities between different areas and regions, and particularly between London and the provinces, has its most pronounced effect on people who travel. Those who come to London from elsewhere may find amenities which they consider to be superior to their own and therefore want to live in it or near it. Increased travel is a strong force tending to promote demands for a higher standard of living by sharpening the critical faculties of the travellers.

The more obvious and superficially attractive features of London amenities are undoubtedly offset by disadvantages which are now causing increasing concern. These need to be given wider publicity both in order to counteract the superficial attraction exercised by obvious amenities and as a warning of the discomforts of excessive urban development. An outstanding disadvantage is the difficulty in London of getting away from the town and into the country. In this respect London compares most unfavourably with, for instance, Sheffield or Glasgow. It is difficult to find good open country within less than three-quarters of an hour's motor drive from Hyde Park Corner—and an hour and a half at summer weekends—whereas the same car will reach Loch Lomond in twenty minutes from Sauchiehall Street. Other drawbacks have been considered in detail in Chapter VI.

Regional and local development offer wide scope for immediate action of a kind which could go far to redress existing lack of balance. A highly developed transport system enables the Londoner, except at rush hours, to move with ease, if not with speed, from one point to another, while the fact that public service vehicles operate until midnight (in some cases all night) makes evening social life much easier in London than in most provincial towns. In several important urban clusters, such as Tyneside, Merseyside and Manchester-Oldham-Stockport, there is a complete absence of transport co-ordination. Again, as compared with other towns situated on a river, London is well supplied with bridges, which are so numerous in the central area that the river is hardly a serious barrier, although London itself is ill-equipped with bridges compared, say, with Paris. The value which is placed upon ease of crossing a river in a town can be judged by the fact that people are willing to pay £2 per month for annual season tickets for motor cars going through the Mersey Tunnel. Postal services, particularly in the matter of late collections and deliveries, are better in London than elsewhere, although recent improvements in the provinces have reduced this disparity.

It should be pointed out that much of the national revenue is drawn from the provinces, but goes to enrich London. Thus, of a nett £250,000 spent annually by the Office of Works on parks and pleasure grounds, all but an insignificant proportion goes to Greater London. Westminster, England's richest city, with a rateable value of £11 millions, or nearly as much as Birmingham and Manchester combined, pays for six out of its 723 acres of open spaces, the balance being owned by the Crown and maintained by the national taxpayer, at a cost of nearly £100,000 a year. South Shields, on the other hand, a town with heavy unemployment and with about a twentieth of Westminster's rateable value, has to pay a rate of about 1s. 2d. in the £ in order to enjoy a smaller acreage of public open spaces. Incidentally, South Shields people are contributing their quota to present Westminster with its fine free parks, and so are all the other towns in the distressed areas which cannot afford enough parks and playing fields of their own. The parks provide an important tourist attraction and they increase the rateable value of adjoining sites to the benefit of the finances of local authorities contributing nothing to their cost. Similarly, in the case of social services, funds are collected by contributions and taxes from all over the country, while the higher officials live and spend their salaries very largely in London. Again, the London Stock Exchange causes a concentration of institutional investors in London, with a resultant disproportionate flow of "un-earned income" from other parts of the country into London.

It would not be difficult on these grounds to justify the expenditure of a larger share of national funds on developments such as a Severn bridge or tunnel, which would help to compensate for the flow of wealth from outlying parts of the country into the capital, and to increase earning capacity more evenly.

Such measures as are listed under (d) on page 221 would go far to improve the social and industrial status of many areas and to create a more diversified and less over-centralised national life. At the same time, further measures are needed to deal with the problem of over-centralisation at its roots.

Devolution of Administration

An important, if intangible, factor in determining the recent location of industry has been the bad example set by government in excessive centralisation of control in London. Government Departments, Commissions, Boards and other public or semi-public agencies have been brought into existence on a very large scale, and in almost every case, whether the office in question is concerned with administration of the law, with a social service operating all over Great Britain, with a trading activity, or with a remote rural industry such as potato-growing or the herring* fishery, the central office in which nearly all power is concentrated has almost as a matter of course been placed in London. In most cases the mere possibility that any alternative location might be preferable, or that any but the most subordinate functions should be entrusted to provincial or branch offices, has hardly been considered: it has been taken for granted that London should run everything, to such a degree that some business men who recognise that the appropriate location of their headquarters is elsewhere, must seriously consider whether they can afford the loss of prestige through having a provincial headquarters.

Each organisation which comes to London helps to tip the balance in favour of making others follow, and at the same time to create market attractions, which make it more and more likely that new industries will, if possible, choose the London area. It is essential, both for the better distribution of industry and on many other grounds, that the unthinking and unjustified concentration on London should be checked and reversed by a conscious national effort. There are signs that the need for such an effort is increasingly appreciated, and a number of useful first steps towards decentralisation have recently been taken—notably through the creation of the Post Office regional offices, on which wide powers have been devolved; the B.B.C. regional offices; and the reorganisation of Scottish administration. Government must clearly take the lead, and the Regionalism Group of P E P is preparing a large-scale report upon possible methods of securing devolution from London in all government and public services. At the same time, efforts are needed on the lines sketched in the Reports of the Commissioners for Special Areas to break the fashion among industrialists of looking to London for a lead and of constantly acting in such a way as to increase the power of London at the expense not only of the provinces but of national vitality and of national defence.

* The first Herring Industry Board sat in London, contrary to the recommendations of the Sea Fish Commission and despite appeals that its headquarters should be removed to Edinburgh.

X. PROPOSALS

An Industrial Development Commission—Licensing of Factories—Research and Publicity—Provision of Inducements—Finance of New Enterprise—Trading Estates—Preservation and Restoration of Amenities—Evacuation and Resettlement Schemes for Derelict Areas—General Principles of Evacuation and Resettlement—Legal Powers—Operation of Resettlement Schemes—Compensation and Transfer—Finance of Resettlement—Constitution and Finance of the Commission—Compensation of Landowners—Relationship with Town and Country Planning—General Considerations.

An Industrial Development Commission

In the preceding chapter some principles were set out which, it is suggested, ought to guide national policy with regard to the growth of industry and in particular the location of new industry. Further, consideration was given to a number of possible measures which might be applied.

It appears that much could probably be done to avert the wastes which occur under the present system by two main groups of measures:

- (a) Provision of a centralised information service to assist industrialists in the choice of sites and locations of new plants and in problems of industrial development generally.
- (b) Co-ordination of policies and actions of central and local government authorities, public utilities and other public institutions, through some mechanism for watching the effects of the policies of the various public departments and other institutions upon different parts of the country and advising the Government. The problem seems to be one of creating a body responsible to Parliament which shall be able both to approach the other departments and seek to influence and co-ordinate, with reference to their regional and local effects, the various measures and policies submitted for Parliamentary approval, and shall also be bound to report independently to Parliament its own observations.

Any practical scheme must fit into existing machinery of government, and must provide for the safeguards essential under a democratic constitution against bureaucratic action which is felt to be arbitrary. Broadly speaking it must aim not at constant petty interferences with choices made by individuals on grounds which seem to them adequate, but at examining the background factors which lead to short-sighted or anti-social developments and causing such adjustments to be made as will remove friction and confusion and will lead all concerned spontaneously to act in a manner consistent with the public interest. Having regard to these considerations, it is believed that the aims set out above could best be implemented through the instrumentality of a permanent Industrial Development Commission created for the specific purpose of guiding the location of industry and of advising the Government on this question.

In order to enable it to function efficiently, such a Commission would need to possess executive powers in certain matters, within strictly defined limits. But in order that these limited powers should not be rendered valueless in practice (as has occurred in the case of attempts in the past to control economic forces through similar bodies) by legal impediments, whether intended or resulting from unexpected interpretations by the Courts, it is important that the general terms of reference of the Commission should be drawn widely.

A Bill to set up an Industrial Development Commission would take cognisance of all the major difficulties of the existing position, which are:

- (i) The generally undesirable social and economic consequences of the present uncontrolled growth of industry.
- (ii) The lack of industrial balance in many towns and regions, resulting in incomplete employment of existing capital equipment and labour resources in some areas, and labour shortage and excessive strain on transport and other public utility services in other areas.
- (iii) The existence of derelict areas where there is no prospect of relieving unemployment on any economic basis by local industrial development.
- (iv) The undesirable social consequences, in increased cost of living and loss of amenity, of the present excessive industrialisation and urbanisation of large areas.
- (v) The vulnerability of existing industrial concentrations in time of war.
- (vi) The present lack of information regarding the economic conditions prevailing in and industrial advantages offered by different parts of the country and the lack of co-ordination between the individual efforts of various authorities to solve regional and local problems.

The Commission would be charged with the general responsibility of remedying these existing defects, as far as possible. But the more important part of its functions would be to guide the future location of industry so that the repetition and multiplication of such defects may henceforth be avoided. Its task would be to promote dispersion, diversification and devolution.

With this general object in view it is suggested that the following specific duties should be vested in the Commission:

I. Licensing of Factories

It should be provided that no new factory or extension to an existing factory may be built or begun without a licence from the Commission, after an appointed day.

Very careful consideration would have to be given to the exact machinery best suited to carry out this seemingly simple provision in practice. It is necessary to decide exactly what is to be licensed, and to arrive at satisfactory legal definitions of "factories" and "extensions." Further, the procedure by which licensing applications come before the Commission requires to be evolved in a form which gives the

Commission maximum control over undesirable developments and would-be "pirates," with the minimum of interference to desirable developments and to the healthy growth of industry and enterprise in general.

Careful choice of the procedure to be adopted by applicants wishing to obtain a licence would to some extent provide protection against evasions, and should in any case prove capable of nipping in the bud attempts at deception in a big way. At the same time it is vital that safeguards introduced in order to make the procedure watertight should not render the machinery of licensing so unwieldy as to exercise a deterrent to new enterprise. It is believed that a procedure based on the following principles would be found satisfactory.

- (a) Persons wishing to set up or extend a factory (or to acquire and use premises for manufacturing purposes not covered by the existing licence), would be obliged to file with the Commissioners an application specifying the principal relevant particulars in a standard form. These, it is suggested, would show:
 - (i) area and location of proposed site;
 - (ii) nature of proposed manufacturing or processing operation;
 - (iii) estimates of quantity and nature of raw materials, power and labour to be employed in the completed plant in the first instance, and, as far as is known, eventually (i.e. at full capacity);
 - (iv) evidence of adequate provision for financing;
 - (v) estimates of immediate and ultimate transport requirements.
- (b) The Commission should be empowered to call for further information on any point and to inspect plans, etc.
- (c) The Commission should be obliged, *within 14 days* after the filing of an application of a licence, to inform the applicant whether a licence will be freely granted subject to the completion of the formal procedure or whether the application will have to be considered further and/or further information will be required. In the former event, the applicant shall be entitled to proceed immediately with his project. In any event, the applicant shall be entitled to proceed, if a final decision is not forthcoming from the Commission *within 3 months* of the filing of the application.
- (d) No building operations should be permitted prior to receipt of a licence, or expiry of the time limit under (c) under penalty of the withholding of a licence, whether temporarily or permanently and/or a heavy fine.
- (e) The Commission should be required to make public the broad lines of policy which it intends to pursue. That is, it would be obliged to declare in advance that authorisation would, in practice, be automatic in the case of certain industries or certain areas, or in the case of certain industries in relation to certain areas. Such declarations would in no case exempt manufacturers from the necessity of making formal applications and con-

forming to the normal licensing procedure. Similarly, the Commission would be obliged to make public statements specifying the industries or areas, or industries in relation to areas, in respect of which it is likely to regard applications for licences unfavourably.

- (f) The Commission would be empowered to veto absolutely the establishment, extension or transfer of a factory on or to any given site. In such cases, however, it should be made obligatory on the Commission to append full reasons for its decision, in which it would, as a matter of course, set out any alternative suggestions put forward by it and seek to justify such alternatives.
- (g) With a view to minimising clashes between the Commission and individual applicants it is envisaged that prospective applicants should have a right to seek the advice of the Commission prior to making an application. The importance of some provision of this kind, in conjunction with the general publicity proposed under (e) above can hardly be overstressed.
- (h) In issuing licences, the Commission should have power to attach conditions, within limits which it would be necessary to define beforehand. As will be seen later, it is proposed that the Commission should be entrusted with the responsibility to prevent destruction of amenities etc., and this could most effectively be secured by attaching conditions to licences.

It is, perhaps, advisable to deal in some detail with the difficulties of administering a licensing scheme. Licences could conceivably be issued in respect of (a) legal persons, (b) occupiers of premises, (c) the premises themselves, (d) the product or group of products to be manufactured, or (e) a combination of these. In practice, the control of the Commission is not likely to be effective unless licences are issued in respect of some combination of these factors, and it has to be considered what combination should be chosen. Taking all the contingent factors into consideration, it would seem that the best results are likely to be obtained by issuing licences to the present occupiers of premises in respect of the premises themselves. If licences are issued in respect of legal persons the routine work of the Commission would be much increased in cases where a company wishes to change its legal identity or dispose of its business. It is therefore undesirable to insist that in such circumstances a new licence should be obtained. Though it would be necessary to name the existing occupiers in the licence, it should be provided that licences are freely transferable on transfer of the control of the business. It is essential that the premises should be specified in the licence, otherwise the power of the Commission to control location would be seriously limited.

A case can be made out for specifying also the product or group of products which may be manufactured in the licensed premises, but, on the whole, the disadvantages would seem to outweigh the advantages. The principal object of licensing premises in respect of a certain group of products, even if only for a certain period or with regard to a certain percentage of output, would be to prevent the general aims of the Commission from being frustrated by false applications. In the

absence of such a provision, a manufacturer determined to set up on a certain site a plant of a type which the Commission would probably not approve, might, in applying for his licence, misstate his intentions regarding the product which he proposed to make. Having secured his licence, he could then abandon manufacture of this product after a short time and revert to his original intentions. In practice, it is unlikely that the question would ever arise except in isolated cases, as few manufacturers would care to run the risks involved in practising such deception. Specific penalties could be provided for mis-statement, and the general deterrent of incurring the displeasure of the Commission would probably be even stronger. Moreover, the powers of the Commission to inspect plans and to require information prior to the grant of a licence, and to withhold a licence if it is not satisfied regarding the *bona fides* of the applicant, should be ample to detect all important attempts at deception. The over-riding consideration which seems to rule out exact specification in the licence of the purposes for which premises may be used is the damage which might be done thereby to the dynamic growth of industry. Countless businesses have developed by the exploitation of products which have originated as side-lines and have become in time the principal products, and it would be highly undesirable to discourage general development in this direction by an excess of red tape for the sake of preventing isolated developments which might be undesirable. A compromise might conceivably be reached by defining the licensed use of premises with reference to a time limit, or to the proportion of the premises so employed, or by allowing the Commission to attach conditions regarding the range of products to be manufactured or not to be manufactured in very special cases, but the practical difficulties would still be considerable, and the main objections would not be entirely removed. Undoubtedly some risk would be involved, by omitting to define the product manufactured, of weakening the ability of the Commission to secure an improvement in the balance of industrial employment within regions, but it is not believed that this would detract seriously from the effectiveness of the Commission's powers in practice.

The definition of a "factory" and an "extension" should not give rise to insuperable difficulties as legal meanings exist already for these terms, and these could probably be adapted. But some difficulties do exist, particularly as regards extensions. For the achievement of its general aims, control by the Commission of the power of manufacturers to make extensions is as important as control over the erection of new factories. But here again it is important that an excess of "red tape" should not interfere with the normal growth of industry as would occur, for instance, if every extension, however small, should require a licence from the Commission. On the other hand, if the minimum size of extension (however defined) requiring a licence should be fixed at a relatively high level, a manufacturer might achieve his object of making large extensions without applying for an additional licence by undertaking such extensions piecemeal, in small instalments, where such a policy is technically feasible. It is believed that the occasions on which evasion of this kind would be technically possible and worth while would in any case be very few. And these could probably be reduced to insignificant proportions first by careful definition of what constitutes an extension (with reference, for instance, to (a) period over

which the extension is made, (b) cost, (c) floor space or cubic capacity involved, (d) additional power consumption, (e) additional employment provided); and second, by providing that an extension licence will be necessary when a proposed extension, with all and any extensions carried out without licence since the issue of the last preceding licence, together exceed the statutory minimum.

Any further difficulties in this connection might be met by the practice usual in similar cases of empowering the Commission to amend definitions by Order, subject to Parliamentary approval.

2. Research and Publicity

The Commission should be charged with the responsibility of keeping under review factors affecting the efficient operation of industry, with particular reference to those factors arising from the choice of location. It should be empowered to publish information concerning the facilities available for the establishment of factories in all suitable areas. It should be provided that the services of the officers of the Commission should be available for prior consultation by persons desiring to apply for licences in respect of new factories or extensions.

This is regarded as one of the most important sections of the work of the proposed Commission, and it is not untrue to state that the smooth working of the machinery as a whole would depend largely upon the success achieved by the Commission in collecting and disseminating information and advice calculated to assist manufacturers to locate their plants advantageously.

Something has already been said under (1) of the necessity for (a) public statements of general policy by the Commission with the object of providing broad information for industrialists regarding the types of licence application likely to be received with favour or disfavour, and (b) prior consultation between officers of the Commission and industrialists regarding the choice of the most suitable location for an individual project. Persuasion is infinitely preferable to compulsion and the work of the Commission would be a moral, and probably a material failure, if it were to result in widespread compulsion of manufacturers to locate their plants in areas not of their own choice. The primary object of the machinery envisaged is to provide a means of collecting and collating through a single specialised organisation all the information likely to be of assistance to manufacturers in determining the broad regional location and the exact site most favourable to an individual project, having regard also to social considerations. It is believed that an efficient central advisory service organised through the Commission would in practice obviate all question of compulsion in the vast majority of individual cases, since the choice of a suitable site could thereby be arrived at in amicable agreement, and the confirmation of that choice through the licensing machinery would then become, in practice, a formality. Although records should be centralised, the working of the Commission should be decentralised through intelligence officers in each region and frequent tours by members of the Commission, who should be available for consultation in the leading towns at intervals.

The task falling upon the Commission in undertaking the necessary research and keeping its information up-to-date must not be under-estimated.

- (a) One of the first tasks of the Commission would be the determination of the economic regions into which it would divide the country for its own guidance, and the needs of those regions in relation to the aim of achieving industrial balance.
- (b) The Commission would require, in addition, a comprehensive knowledge of sites available and suitable for further industrial development.
- (c) Similarly, it would need a comprehensive knowledge of the existing distribution of industry and of national resources generally.
- (d) Finally, the line of policy with regard to social and strategic considerations would need to be determined in relation to the distribution of unemployment, vulnerability to attack, and other factors.

The above items are listed only by way of brief illustration, and do not by any means exhaust the field which would have to be covered by the research and information branch of the Commission. The magnitude of the preparatory work to be done is, however, sufficiently clear to justify a considerable interval between the setting up of the Commission and the coming into force of certain of its executive powers, particularly the licensing provisions. (It may in fact be regarded as essential to the smooth working of the complete machinery from the outset that the Commission should be given a considerable period in which to build up its essential information services, both for the purpose of formulating its own policy and for the purpose of providing an adequate information service, prior to the "appointed day" for the coming into force of its executive powers.)

In issuing general statements of policy for the guidance of the public a balance would have to be achieved between the two desirable objects of giving as much advance guidance as possible and of retaining flexibility in the policy of the Commission itself. For this reason it is not envisaged that the Commission would publish hard-and-fast definitions of the economic regions which it had determined, nor would it attempt to define precisely the industries or areas in respect of which it proposed to issue licences freely in practice or to regard applications unfavourably. For the purpose of making up its own mind on individual applications, it might well decide to maintain schedules showing within each area the industries which should be encouraged and the degree of encouragement which should be given to each, and the sites and/or towns in which development should be encouraged, with the degree of encouragement. Such schedules would provide a general guide to the Commission in its own deliberations, but as the conclusions which they indicated might frequently require some modification in practice, and as revisions would periodically be necessary, the objections to publication in full are clearly considerable. It would, however, be possible for the Commission to publish on the basis of its schedules a general indication regarding its intentions in respect of applications in different areas and to state the areas and industries in relation to which applications would, in practice, be freely granted.

In addition to pure information services of this sort, it would probably be necessary to empower the Commission to undertake general publicity and propa-

ganda work, but the relation of such work to the existing efforts of local authorities would need to be considered. If local authorities were to continue to advocate to industrialists the claims of their areas without regard to the policy of the Commission, it is likely that clashes with the policy of the Commission would occur, and that industrialists would thus be misled. In practice, however, the existence of the licensing powers of the Commission should be sufficient to deter local authorities from continuing publicity in defiance of the policy of the Commission, as continuance would merely result in the waste of money, and co-operation in advertising policy would almost certainly be arranged at an early stage.

3. Provision of Inducements

It should be provided that the Commission be empowered to offer inducements, either generally throughout specified areas, or with special reference to individual projects, with a view to guiding new plants, having regard always to their efficient operation, to the sites where they are most needed on social or strategic grounds.

It is contemplated that the inducements which the Commission should be empowered to offer should be of two distinct varieties:

- (a) general measures calculated to make certain areas more attractive to industry;
- (b) special assistance to help individual firms to set up on particular sites.

(a) *General Inducements.*

(i) *Co-ordination of Departmental and Public Utility Policies.*

The Commission would be entrusted with the responsibility of watching the general economic development of the country, and of the different regions, with a view particularly to ascertaining whether the interests or prospects of actual or potential industries in any area, or the general economic development of the area itself are being prejudiced by lack of proper provision of public or communal services, such as housing, highways, road transport, power services, and technical education, or if the operation of railway rates, shipping freights, or labour agreements is having a similar effect. Where occasion arises the Commission should have power to require the production of information relevant to any of these matters. It should be competent for the Commission to consider and report on the effects regarding industrial location of national policies, such as, for example, tariff policy and trade agreements.

The Commission would take action by making representations to the appropriate Government Departments, local authorities or other authorities (such as the Electricity Commissioners, Joint Electricity Authorities, the London Transport Board, and the Railway Companies) concerned, with a view to joint discussion of suitable action. The Commission would be obliged to report annually to Parliament, which would provide an opportunity of recording and ventilating its general policy in respect of the co-ordination of the policies of other bodies and of securing public support. In this way the Commission would be fulfilling in some senses the function

of a National Resources Board and could do valuable work in an advisory capacity in co-ordinating the policies of different Government Departments and other authorities regarding the development of the social services and public utility services. Some of the factors which might, in the opinion of the Commission, require rectification would certainly be capable of direct influence by the actions of Government Departments or other authorities. In other cases power to rectify maladjustments would certainly not lie within the province of any Government Department or statutory body. In such cases the Commission would be able to exercise some pressure in the desired direction through its annual reports to Parliament, particularly if the contents of such reports were to enjoy the position of privileged statements, as is the case, for instance, with the reports of the Unemployment Assistance Board.

(ii) General Assistance to Regional Utility Services

In addition to the general duties and powers outlined above of securing the co-ordination of development policies and policy generally of various bodies, it might be desirable to empower the Commission to take direct action of its own accord in certain extreme cases. For this purpose a development fund might be set up, out of which the Commission would be empowered to make loans and/or outright grants for the purpose of the improvement of utility and other services within a limited area where special circumstances exist. Such assistance might, for instance, take the form of contributions to specified development projects of electricity, gas, water or drainage undertakings. It may be recalled that the Commissioners for the Special Areas already enjoy limited powers in this respect.

(b) Special Inducements

The Commission would almost certainly find that the general improvement of industrial opportunities by means of the measures outlined in (a) would not be sufficient in all cases to attract new industrial undertakings to suitable sites in areas where, for social or strategic reasons, new development should be encouraged. And it may often be found that a site which is eminently suitable to be developed for a particular project in most respects suffers from some relatively minor disadvantage, such as high charges for power and water. In these circumstances, it is suggested that the Commission (like the existing Special Areas Commissioners) should be empowered to enter into agreements to pay, on behalf of any person setting up a new factory or making an extension, part or all of his expenses in respect of rates of all kinds, the supply of gas, electricity and water, and income tax. Such payments would be made direct by the Commission to the appropriate authority. Payment of income-tax by the Commission on behalf of industrialists cannot be considered as desirable in principle since income-tax is a charge on profits and not a cost of production. On the other hand it is in some cases desirable that new concerns should be relieved of taxation on profits put to reserve or allocated to depreciation in excess of the statutory allowances in order to allow them to build up a firm financial basis. Partial exemption in this way has been held to be impossible and the existing Special Areas legislation has therefore had to provide for complete exemption.) In default of a radical and necessary overhaul of the taxation system,

such considerations will continue to apply, and the Commission would have to be empowered to discharge income-tax obligations as a whole. It is, on several grounds, undesirable that such payments should be continued indefinitely. They should, rather, be designed to give a new enterprise an advantageous start and would be payable only for a limited period determined by the Commission, subject to a maximum period of years imposed by Parliament.

The powers of the Commission to offer such special inducement would be used, at the discretion of the Commission itself, only to offset an unfavourable factor in relation to a site which might otherwise be considered suitable and socially desirable for the project in question ; or, alternatively to attract a new enterprise to a site where its presence may be desirable on social grounds, as opposed to another proposed site where its presence may be less socially desirable. In this way the offer of special inducements could be used to reinforce the powers of the Commission to determine the location of new industry through the licensing provisions. But clearly the offer of inducements to particular enterprises would have to be made sparingly and only in very clearly defined circumstances. It is not proposed that the powers of the Commission under this head should be used for the general purposes of assisting the development of new industry by the provision of finance, which is a separate problem and has been dealt with separately. Moreover, in proportion to the success of the Commission in securing a better co-ordination of Departmental and public utility policies on the lines envisaged under "General Inducements" above, with a view to securing a greater equality of economic opportunity as between areas, the necessity for the offer of special inducements to manufacturers would become progressively more rare.

From general considerations of finance, it would be desirable in principle that the location of industry should be guided by the Commission through the negative methods of prohibition and deterrent rather than by the positive method of inducement. In practice, however, the exercise of deterrents is likely to be difficult for many reasons, and the exercise of special deterrents (the counterpart of special inducements) may be virtually impossible except on strong grounds of damage to local amenities. There is, in the first place, the general difficulty that while financial assistance to the unfortunate, in the shape of some form of subsidy, is often acceptable to public opinion (though not to the competitors of the assisted enterprise) the alternative of special taxation in some form of the fortunate is usually hotly opposed. It cannot seriously be advocated, for instance, that power charges should be raised on a differential basis to particular firms because they are prosperous or that public capital equipment in particular prosperous areas should be allowed to decay in order to discourage further general development. Such deterrents as are likely to be practicable will therefore have to be of general rather than special application. General deterrents are already automatically present to some extent in over-industrialised areas in the shape of labour shortage, destruction of amenities, congestion of transport and rising site values. Substantial discrimination is already practised in the financing of public services in different areas through variations in the proportions of the block grants payable by the Exchequer to Local Authorities.

It is suggested that the Commission should be empowered to make representations to the Ministry of Health regarding the basis of the revisions of the block grants which are undertaken at regular intervals with a view to introducing still larger discrimination. With a view to the possibility of further development of the system of deterrents, the Commission might also be charged with the responsibility of examining how far such discrimination is effective in relation to local industrial development as long as industry enjoys immunity from the greater proportion of the local rate charge.

In dealing with individual enterprises, however, the threefold choice of the Commission between inducement, deterrent and absolute prohibition is likely to be narrowed down in practice, with a few exceptions, to a direct choice between the first and last. It is not, of course, anticipated that either inducements or prohibitions would be necessary except in a very limited variety of circumstances, but where decisive intervention is necessary the choice of the Commission is likely in practice to lie between these two.

4. Finance of New Enterprise

The Commission should be empowered to advance money for the promotion of new industrial enterprise.

It is important that the problem of financing new enterprise should be kept distinct from that of providing financial inducements to enable new or existing firms (however financed) to set up successfully on particular sites. The problem of financing new enterprise is much wider, and in many ways more serious, since if the normal economic and financial machinery for ensuring that adequate finance is available for the development of new industrial plants fails to function, the question of location may never arise, because there will be nothing to locate.

It has been shown in an earlier chapter that the existing machinery is not functioning as efficiently as could be desired, and this fact has been publicly recognised in the actions taken by the Government to ensure that sound enterprise shall not be prevented from setting up in the Special Areas through inability to find finance. The Government's efforts in this direction have been supplemented by those of the Nuffield Trust. It is not suggested that it is either necessary or desirable that the Government should continue to make these efforts in competition with the activities of private enterprise, whether actual or potential. It is, in fact, considered that a solution to the present unsatisfactory position could be found by the stimulation of private enterprise in co-operation with Government enterprise. (It may be desirable to empower the Commission to finance individual enterprises by direct lending at low rates of interest, but such financing should be subordinated to indirect financing in conjunction with private enterprise. The Commission should be instructed to explore with bankers and business men the possibilities of setting up one or more specialised institutions to deal with the financing of new enterprises generally and should be empowered to subscribe a proportion of the capital of any such institution. In proportion to the scope and effectiveness of any machinery so created, the necessity for direct financing by the Commission of individual enterprises would be materially reduced and might eventually disappear.)

It is accordingly proposed that the Commission:

- (a) be empowered to enter into negotiations with a view to setting up independent specialised institutions for the finance of new enterprises, and to subscribe towards the capital of such institutions;
- (b) be empowered on its own initiative to subscribe capital, make loans or extend credits for limited periods to any particular enterprise where, in the opinion of the Commission, suitable finance is not available through ordinary channels.

The Commission should be left with some freedom to determine the rate of interest applicable to advances under both (a) and (b), provided that it should in no case be less than the rate of the day for Government borrowing over a similar term.

5. Trading Estates

The Commission should take over responsibility for all existing Special Areas trading estate and site companies and should be empowered to set up and finance further trading estates and site companies on its own account either within or outside the existing Special Areas.

Since trading estates, by providing facilities for the easy and inexpensive growth of enterprises, can act as a powerful inducement attracting industry towards themselves, it is essential that estates which have been promoted directly or indirectly by the Government, and future extensions of Government policy in this respect, should be brought under the general guidance of the Commission, as being the body responsible for guiding the location of industry. The Commission should not, however, be confined in its powers to set up further trading estates or site companies to any particular areas. It should not undertake the *management* of trading estates and site companies. The trading estates should continue to be operated as private companies with government capital advanced by the Commission, which should retain general powers of supervision and control over major policy, and exercise much the same rights to appoint directors and so forth as are now enjoyed by the Commissioners for Special Areas.

In this respect, the Commission would be taking over the functions of the existing Commissioners for Special Areas, but at the same time these functions would be expanded on a national basis.

6. Preservation and Restoration of Amenities

With a view to the preservation of existing amenities the Commission should be given discretion to attach conditions to licences obliging manufacturers to provide for the safeguarding of local amenities or their restoration, if damaged or destroyed. Where amenities have already been destroyed by past industrial development, the Commission should be empowered to make grants to local authorities for the purpose of restoration.

One of the most important services which the Commission could perform to the community at large would be the preservation of local amenities from destruction or deterioration by industrial development. In this connection, the Commission would be faced with two distinct problems. Unrestricted development by private

enterprise in the past has resulted, in certain areas, in widespread destruction of local amenities. Extensive salvage operations are necessary in order to restore such areas to a condition in which they can again become usable for industrial and social purposes. The restoration of such areas should exercise an early claim on any Government funds available for general public works purposes, and the Commission would be the most suitable body through which the planning of restoration projects and the distribution of funds to local authorities should be carried out. In this respect it would develop and enlarge the pioneer work of the Commissioners for Special Areas.

It is, perhaps, even more important that future destruction of amenities by industrial development should be prevented as far as possible, and the Commission, as the body controlling industrial development generally, is clearly the most suitable organisation for carrying out a policy directed to this end. The mere institution of licensing powers should go some way towards preventing further destruction of amenities, since the Commission would take this factor into consideration in handling applications for licences. This fact alone should substantially reinforce the efforts of public authorities to preserve amenities through Town Planning regulations. It must, however, be recognised that in the case of very many industries, some destruction of amenities is inherent in industrial development. In some cases there are obvious sources of public nuisance, and legislation already exists to restrain the industrialist from the consequent destruction of public amenities. In all cases of industrial development there is a potential source of public nuisance in the possibility of the decline of the industry or undertaking and its eventual abandonment, with the consequent loss of social capital.

There is, accordingly, a good case for proposing that the Commission be given powers to offset as far as possible the risk of dissipation of communal capital, which nearly always results from the dissipation of private capital. Neither the Commission nor anyone else can be expected to foresee the decline of industries or enterprises through the emergence in the future of new economic factors, whether of an internal or external nature. Public policy can therefore do little or nothing to strike at the root cause, which is the decline of the industry or enterprise itself. It can, however, take steps in advance to prevent the repercussions of such declines on local public capital and local society as a whole from becoming too drastic.

The whole aim of guiding the growth of industry so as to achieve a better balance of industry within regions is to achieve this object on the large scale. The problem also arises on the small scale in the matter of the purely local effects of industrial decline, and it is desirable that steps should be taken to offset the small scale risks no less than the large scale risks. Since the risk is largely intangible and its manifestations unpredictable, the problem is best solved by the formation in some way of a sinking fund. The best mechanism for securing this would need to be carefully considered, and the Commission might well be entrusted with the task of evolving and recommending a scheme. In the case of industries which are obvious sources of public nuisance, provision can fairly easily be made by attaching conditions to licences requiring the holder to take specified counter-measures. In less tangible

cases it might be possible to evolve a scheme whereby the manufacturer could discharge his liability by some form of tax or annual payment or even by a lump sum payment to the Commission which would be paid into a reserve fund held for the general purpose of restoring amenities destroyed by industry. It might even be possible to create as a condition for the issue of a licence a prior charge on the undertaking to become exercisable in the event of bankruptcy. Such a charge would constitute a contingent source of loss to the undertaking against which the undertaking might be able to insure, as undertakings already do insure against their liabilities on account of Workmen's Compensation. In any case, the terms of the arrangement would be attached to the licence.

Since, however, it is highly important to avoid as far as possible the placing of financial burdens, however small, on new enterprises, and since the deterioration or destruction of amenities is likely to proceed just as much from the actions of existing industries as from the actions of new enterprises, the possibility of a small levy on all industry should be seriously considered, and the Commission should be charged specifically with making investigations and recommendations. The resulting fund would be earmarked for the restoration of local industrial and social amenities, where necessary, on the future transfer or liquidation of any factory.

7. Evacuation and Resettlement Schemes for Derelict Areas

The Commission should be empowered to prepare schemes for the partial or complete evacuation of areas and towns where, in the opinion of the Commission, there is no prospect of providing employment on an economic basis for a substantial proportion of the population and to initiate planned resettlement.

Stagnation at low standards of life for considerable populations in the depressed areas is the outcome of two main groups of difficulties. The first is the geographical remoteness and unsuitability of these areas, some of which contain few if any suitable sites, judging by ordinary modern standards. The second consists of the financial, social and other barriers in the way of sufficient new industries being established and taking root. It is now widely recognised to be the line of least resistance for new industry to flock to the Midlands and South-East, not because of any peculiar economic virtues in the location, but because there is an abundance of available sites with modern services and elbow room, because the conditions for securing finance have been relatively favourable, and because the atmosphere of economic prosperity and social progress is congenial. If new industry is to be persuaded to go elsewhere otherwise than by drastic compulsion or extremely lavish subsidy, it seems that some effort must be made to reproduce these conditions in the areas at present depressed.

The fact that these areas have had so much industry in the past is a handicap rather than an asset to new activity, particularly from the standpoint of finding suitable sites. In many depressed towns it is possible and worth while either to find suitable sites near at hand or to create them by local clearance and redevelopment. There are, however, considerable areas, notably in mining valleys, where suitable sites do not exist and cannot economically be created. Here, the commonsense remedy seems to be removal of the population to the nearest possible point where a

suitable site can be found. Merthyr Tydfil, for instance, owes the beginning of its growth to the discovery there of iron ore deposits by iron smelters, compelled by exhaustion of wood fuel supplies to emigrate from Sussex in the sixteenth century, when there was no unemployment scheme or Special Areas Commissioner to maintain them as unemployed in Sussex. The sole justification for a large town on this site has been the abundance of profitable coal and iron deposits, and no detached person would be likely to favour going to live at such a spot after the minerals have ceased to make it worth while. Nor does it seem reasonable to ask the taxpayers of the rest of Britain indefinitely to pay hundreds of thousands of pounds a year in order to give large numbers of people the doubtful pleasure and benefit of continuing to live at subsistence level in one of the least habitable districts of England and Wales. The fact that iron and coal once supported the population of Merthyr is no reason for keeping it all there when they have ceased to do so, but the fact that Merthyr's basic industries have collapsed is certainly a reason for using the resources of the State as generously as need be to give such a stranded community a fresh start. Other less-known and often smaller areas, such as Rhymney, are in a similar position.

It is easy to enunciate the principle of resettlement, but the difficulty is to put forward a financially and administratively workable scheme for carrying it out. The following proposals are made tentatively as a basis for discussion.

General Principles of Evacuation and Resettlement

Where employment is lacking and cannot economically be provided, the State should provide for transference of the affected community as a whole, subject to the right of any of its members still employed in the district or able to maintain themselves there, to remain, and to the right of others to settle anywhere they please if they do not wish to be transferred to the new town or settlement. The new town or settlement should be (a) as close to the old as is consistent with securing a suitable site for renewed economic prosperity, (b) as far as possible self-contained for living, employment and recreation, (c) planned to enable those transferred to function as a community, retaining vital elements of their own outlook and traditions, but with a greatly improved environment.

Legal Powers

Legislation should ensure that areas burdened with serious and chronic unemployment should be examined by the proposed Industrial Development Commission, which should present to Parliament a Report, to be published, on the prospects of new economic development in that area. If the Report showed that these prospects could not be expected within, say, five years, to provide employment for the major part of the local unemployed, the Commission should be authorised to draw up a resettlement scheme. Each resettlement scheme would be in three parts. Part 1 would form a plan of partial or, if necessary, total evacuation of the area over a period of, say, up to ten or fifteen years. Part 2 would form a plan for developing on a new site within twenty or at most thirty miles, a new town with housing, services and trading estate, sufficient for as many of the inhabitants as were willing to transfer there as a group and to revive their community in conditions where it could flourish

again. Part 8 would form a plan for suitably rehousing and servicing on a neighbouring site any minority of the population which might still have local employment (for instance, from a colliery remaining in production), and could not be economically or conveniently maintained in the old settlement after most of the inhabitants had been transferred. The complete resettlement scheme would be laid before both Houses of Parliament and would have to be approved by them before becoming operative.

Operation of Resettlement Schemes

The method of operation might be as follows. On the approval of a scheme, two bodies would be set up. The first would be a Compensation Tribunal which would determine the general basis of compensation to the various persons affected, and later deal with individual claims on this basis. The second would be a Resettlement Company, similar in character to the Trading Estate Companies set up under Government auspices in the Special Areas. A third set of duties in connection with the evacuation programme would devolve on the local authority, but power would be necessary to replace the local authority by an appointed Commission in case of serious disagreement.

The Resettlement Company would, like the recently formed Trading Estate Companies, undertake all the work of acquiring, preparing and planning the new site, and erecting on it houses, factories and public buildings. The first stages of the transfer would occur before building began, when a contingent of unemployed unskilled labourers would be brought there from the area concerned and housed in Company huts in order to level and prepare the ground. Any skilled and semi-skilled men from the area available for help in construction would also be transferred as soon as possible, and any deficiency made good from outside. For the industrial part of the estate the existing Trading Estate Company of the region concerned would probably be closely consulted and perhaps employed as managers, in order to secure co-ordination. As dwellings were built and services provided the transfer of the main body of inhabitants would begin.

Compensation and Transfer

Those owning their own houses, shops or other premises might be given the option of taking in cash their assessed compensation or of being credited with a larger sum, say 50 per cent greater, towards the purchase outright or on mortgage of property on the new site. In this way a strong inducement would be given for those with most stake in the community not to go elsewhere, while those who wanted to do so would still get compensation. Claims for compensation would have to be presented within a time limit and the Resettlement Company would become the legal owner of all property for which compensation was accepted. It is unlikely that many would fail to claim, in face of the impending evacuation of large numbers of families and the progressive curtailment of local services under the programme. Simultaneously, as accommodation at the new site became available the number of claims for Unemployment Assistance which would be accepted from claimants within the evacuation area would be correspondingly reduced, while arrangements would

be made to pay the equivalent number of claims at the new site until the claimants find work. The actual choice of order in which families would move would be so far as possible left for them to arrange by whatever means was most acceptable and convenient. Removal would be carried out at public expense. In this way, over a period of several years the population on the new site would grow and that in the old decline. A new local authority would be established for the new town and given appropriate status for its size. Naturally, if the scheme were well supported it would enjoy a large measure of continuity from the old town, and the same would apply to all other institutions, which would be saved many of the growing pains of a new settlement recruited piecemeal. There would, of course, be many temporary inconveniences, but against this would be the opportunity of creating a model town with immensely improved amenities and services.

Finance of Resettlement

In order to discuss the finance of resettlement it will be convenient to take as an example the town of Merthyr Tydfil, about which more information is perhaps available than other areas which might be concerned. While there is strong reason to suppose that the population of Merthyr Tydfil could most effectively be rehabilitated by at least partial evacuation, it is immaterial to the argument whether Merthyr proves, on examination, to be in need of such treatment or not. There are certainly some and possibly many communities in need of resettlement, and Merthyr, although larger than most, is in many ways typical. The figures given are very rough, but are believed to overstate the probable cost of resettlement.

According to the Report of the Royal Commission on Merthyr Tydfil (Cmd. 5039, 1935) the number of houses in Merthyr, including houses and shops, was about 16,000 in April 1935, and there were in addition just over 500 lock-up shops and some 1,700 other rateable properties, the population being about 67,000. We may roughly estimate the cost of rebuilding Merthyr on a new site along the coastal belt of Glamorganshire or in the Usk Valley as follows:

Purchase of agricultural land (8,000 acres) of which not more than 3,000 acres should be built up, the rest being kept as an agricultural belt, and to secure for the public any increments of land value—say	£250,000
Development (levelling, roads, drainage) etc.—say	£1,750,000
Industrial building and equipment—say	£1,000,000
Water, gas and electricity services—say	£1,000,000
Building of 15,000 new houses at an average of £400 each—say	£6,000,000
Total	<u>£10,000,000</u>

This, it will be appreciated, is the gross cost. Interest and sinking fund on this

sum may be placed at £500,000, a large part of which would even in the early stages be covered by:

Revenue from utility undertakings.

Rents of factories and houses.

Sale of factories and houses on ground rent or chief rent basis, the Resettlement Company to retain all freehold.

The deficit to be met by the Exchequer would for the early years probably average around £200,000 to £300,000 tapering over a period of ten years, by which time resettlement would be complete, to well under £50,000.

It should be borne in mind that large-scale expenditure on development is unavoidable whether the community is shifted or not. For instance, according to the 1937 Report of the Commissioner for Special Areas, investigation by an eminent consulting engineer into a proposed grant towards improving the sewerage of Merthyr Tydfil disclosed that the necessary remedial measures would involve "a more or less complete re-sewering of the town with new or improved disposal works, at a cost estimated at between £180,000 and £250,000." It would clearly be easy at this rate to spend more on patching up an old town on an unsuitable site than in creating an infinitely better new town on a virgin site.

In addition there would be compensation for the evacuated property. In view of the fact that some 90 per cent of the houses and shops in an area such as Merthyr have a rateable value of less than £18, that the whole rateable value of the town is under £230,000 and that the entire net loan debt is only £700,000 it seems probable that a sum of the order of £4 to 5 millions would cover all reasonable claims with the generosity appropriate to the occasion.

Allowance would have to be made for cost of removal, cost of demolition and other items, but against these there would be offsetting items such as proceeds of sale of materials and equipment, and the net figure would be relatively insignificant. The total net cost to the State of resettling the inhabitants of Merthyr in far better conditions, when capitalised with a sinking fund, should not amount to more than £800,000 a year even at the outset and would rapidly be reduced to a far lower figure.

In a case like this public policy should be concerned with the current and future earning power of social assets and with their current and future cost of maintenance at an adequate standard, rather than with the amount invested in the past, which should have been, and to a large extent has been, written off. Where local solvency can only be secured by a virtual ban on modernisation and replacement, or by heavy subsidies from outside, the conclusion is obvious.

What is the cost of keeping the inhabitants of Merthyr where they are with an unemployment rate of more than 40 per cent? During the 52 weeks ended April 4, 1938, the amounts of unemployment assistance allowances alone paid out in Merthyr Tydfil* totalled £458,892—equivalent to over twice the whole rateable value of the

* Through the offices at Merthyr, Merthyr Vale, Dowlais and Treharris, and Merthyr Juvenile Employment Bureau.

town. A further £55,371 was paid in unemployment benefit, making a total of over £500,000 a year in doles to individuals with no other purpose than to keep them alive. In addition, State grants to the local authority amounted to nearly £320,000 in 1937-38. This simple analysis shows that quite apart from a local rate burden of 27s. 6d. in the £ it is at present costing British taxpayers approximately £1 a week on the average to keep each Merthyr family alive in Merthyr. It seems reasonable to assume that well-planned resettlement might reduce unemployment at any rate to one-third of the recent level, which would still be well above the national average; and that it would enable the reduction of State grants to something approaching the level realised for industrial towns of 50-60,000 inhabitants such as Gloucester and Wakefield, which would give an annual saving to the Exchequer of at least £100,000, as Merthyr at present depends far more heavily on central grants than the average county borough. (For comparative figures see Chapter VIII.)

Resettlement therefore offers a potential saving in unemployment and general local government grants of up to some £600,000 a year, to offset against outgoings of some £800,000 a year or less, rapidly falling to a relatively small sum with the operation of sinking funds and the local prosperity inevitably resulting from the expenditure involved in the building of a new town. Even if such a scheme did not substitute valuable capital assets for useless relief payments, and if it did not promise to replace a chronic burden on the British taxpayer by the creation of new taxable income able to contribute to the national revenue, there would still be a strong case for it on the ground of reducing the annual drain on the State at an early date. When it is borne in mind that the recent prosperity of the South is largely due to intensive capital development of this very type, which sets up a virtuous spiral of economic activity, and when it is recalled how much avoidable misery is being prolonged by maintaining towns like Merthyr in their present state, the case is even stronger. It is necessary to stress that Merthyr is by no means the only nor the extreme example of a dying town artificially kept alive. The population of areas which might be affected is probably not much more, although not much less, than 500,000, and the development of ten new towns of 50,000 population or resettlement of the same total in a larger number of units would not involve the State or the building industry in any problems greater than those already solved in the South-East, where, for example, a new town of 100,000 people has been created at Dagenham in a few years without any of the favourable nuclei provided by group resettlement.

The objection may be raised that even after resettlement heavy unemployment might persist, and the expense and dislocation might have been incurred for nothing. If the site were well chosen, and were the subject of rapid capital development on the lines of the trading estates, failure would be almost impossible, owing to the local boom conditions which would be created, by large-scale building and equipment, and the favourable openings for new industries which would result, as has happened on the trading estates. The proposal, in fact, means no more than doing consciously, with a minimum of waste and friction, what has been done

unconsciously in such cases as Wembley and Park Royal, Slough and Cowley, and many places in the Midlands where immigrants have been successfully settled in what are for all practical purposes new towns.

8. Constitution and Finance of the Commission

Discussion of the constitution and financial basis of the Commission has purposely been left over until the functions which are contemplated for it have been fully described. The choice of the most suitable constitution for the Commission itself and the determination of its relationship to the machinery of government as a whole must depend to a large extent upon the nature of the responsibilities which it would be called upon to assume. On the one hand, it is essential that the Commission, particularly in respect of its licensing powers, should be subject to the safeguards of democratic control. On the other hand, it is highly desirable that the smooth working of its machinery in practice should not be interrupted by the possibility of continual intrusion of politics in the detailed work of the Commission. This balance is best achieved by ensuring that the Commission should contain at least a nucleus of full-time long-service members, that its detailed decisions, e.g. in the licensing procedure, should be subject to the jurisdiction of some body other than Parliament, and that its responsibility to Parliament should be related to its policy and activities as a whole.

(A) Constitution of the Commission

In accordance with these principles, the following proposals are put forward:

- (a) The Commission to consist of a Chairman, and five other members, the Chairman and at least two of the other five to be full-time members.
- (b) Members to be appointed for a fixed term of years by the Government. Members to be eligible for re-appointment, and the Commission to enjoy the privileges of a Crown Office.
- (c) The Staff of the Commission to include Civil Servants, and the permanent head to be a Civil Servant with the rank of a head of a major department; but non-Civil Service staff also to be employed.
- (d) The Commission to appoint advisory technical committees in the various spheres of their work, to assist with technical advice wherever necessary.
- (e) The appropriate Government Departments to be consulted whenever their sphere of work is entered.
- (f) A senior Cabinet Minister without departmental duties to be responsible to Parliament for the activities of the Commission, which shall in addition present to Parliament an annual report of its activities.

(B) Appeal

The nature of the provision to be made for appeal from the decisions of the Commission, which would hardly arise except in connection with the grant of licences, would need to be carefully considered. It would be desirable as far as

possible to eliminate opportunities for lobbying or for protracted and expensive litigation. The simplest and most satisfactory solution would seem to lie in providing for appeal to some such body as the Railway and Canal Commission against any decision by the Commission to reject an application for a licence or any condition attached by the Commission to the grant of a licence, the decision of the Railway and Canal Commission to be final. Other questions arising in connection with the acts or omissions of the Commission are likely to be, in the main, questions of policy, and would, therefore, be best raised as Parliamentary Questions or in the course of the Debate on the Annual Estimates. As regards the financial powers of the Commission, these either involve agreement with industrialists in free negotiation or would be implemented by the attachment of conditions to licences. This does not, of course, cover the possibility of a tax on all industry to provide an Amenities Fund, but it is not contemplated that the Commission should be given powers to levy such a tax at the outset, and any such impost would doubtless have to be provided for separately in the Finance Bill or by special Act.

(C) *Finance*

In discussing the functions and responsibilities of the proposed Commission, consideration of methods of financing the various sections of the Commission's work has been held over in order to avoid undue complication of the argument. But it must be recognised that the effectiveness of the Commission's work in practice would depend to a very large extent upon the financial resources at its command. The amount that might be spent, for instance, in general and special inducements, in the financing of new enterprises and in the restoration of amenities, could reach a very large figure. In practice, however, it would be necessary to impose strict limits on the expenditure of the Commission. It should further be borne in mind that a more balanced distribution of industrial and social facilities could be obtained by some re-arrangement of the existing total expenditure of the relevant authorities, without in the aggregate any significant net increase in expenditure over the country as a whole. This, of course, would involve a stronger control from the centre. It must be remembered also that in proportion to the success of the Commission in achieving its objects, beneficial forces would be set in motion, in relation to the national finances as a whole, to offset the financial outlay of the Commission. If the Commission should achieve any success at all in securing the more efficient location of industry, in achieving a better balance of prosperity throughout the country, and in spreading and extending employment, the advantages to the Exchequer would be immediate. On the one hand, expenditure on unemployment assistance would tend to decline ; on the other hand, the yield of taxation generally would be increased by an expansion of the national income. In considering the financing of the Commission, these factors must be borne in mind. Fundamentally, the whole case for the creation of the Commission and for entrusting it broadly with the task of controlling and supervising industrial growth rests on the conviction that some constructive expenditure in advance will avert the necessity for a much larger and recurring expenditure later to remedy the social damage and waste caused by maladjustments.

The principal heads of expenditure to which the Commission would be committed by the machinery contemplated are as follows:

(a) *Final (Non-Recoverable) Expenditure*

- (i) Administrative Expenses.
- (ii) Cost of special inducements (payment of income tax, rates, service charges, etc., on behalf of new enterprises).
- (iii) Cost of general inducements (assistance to local authorities, etc., for the development of regional services).
- (iv) Cost of grants for the restoration of amenities.

(b) *Investment (Self-Liquidating) Expenditure*

- (v) Provision of capital for trading estates and site companies.
- (vi) Provision of financial assistance by loan, credit or subscription of capital,
 - (a) for new enterprises;
 - (b) for institutions set up to finance new enterprises in co-operation with private capital.

(c) *Self-Balancing Expenditure*

- (vii) Preservation of amenities fund.

Administrative expenses would best be provided for by the usual procedure of presentation of annual estimates to Parliament. The cost of inducements would constitute a recurring charge to the extent that the Commission might enter new commitments on this score in each year, though the Commission's liability in each individual case would almost certainly be of limited duration. It is not improbable that the total amount of commitments under this head would tend to decline in course of time. The Commission would, however, be likely to have some difficulty in estimating in advance the total sums to be paid out each year in inducements, and it might, at any rate in the initial stages, be necessary to use the machinery of a grant-in-aid for a term of years. The fund so created could then be replenished and adjusted in the light of experience.

The provision of capital for trading estates and for the financial assistance, directly or indirectly, of new enterprise would call for the creation of a capital fund under the control of the Commission. This fund would tend to become self-replenishing after a period, as repayments by borrowers began to flow in, and at all times some income would accrue from the sums advanced or invested. The fund could be constituted either by direct borrowing by the Commission itself with the backing of a Treasury guarantee or by empowering the Commission to draw on the Exchequer up to a certain amount. If an Exchequer Fund were preferred, it would probably be necessary to provide that capital repayments should not operate to increase the spending power of the Commission without further statutory authority and that interest and dividends should accrue to the Exchequer.

There would be no financial return from any grants made for the purpose of restoring amenities, but this would essentially be a terminable item designed to make good the devastation caused by past industrial development. Action in this matter is highly necessary but not urgent. Owing to the absence of any direct monetary return, it would better be financed by special vote, and should be given a high priority in any capital expenditure voted by Parliament for general public works as an instrument of slump control.

The preservation of amenities in the future was, it will be remembered, to be a matter for investigation by the Commission in order to work out the possibilities of a contributory scheme. Although there would be a case for Exchequer contributions to the Amenities Fund as well as contributions from industry, the basis of the scheme would essentially be contributory, and this part of the Commission's finance would be self-contained.

It is not possible to state definitely the sums which would be required annually under these heads. Since the constitution proposed for the Commission would permit it, in certain circumstances, both to subsidise industries by contributions towards their working costs and by the relief partially or wholly of their profits from taxation, and to participate in the finance of new enterprises, the limits to its possible expenditure are imposed less by the limitations to its powers than by the amount of funds put at its disposal. Lavish expenditure of funds through the Commission would in fact give to it something of the character of a National Investment Board and might compete seriously with the machinery of private enterprise for the reinvestment of the nation's savings. It is, however, envisaged that the funds available to the Commission would be anything but lavish, and it remains to indicate what appears to be the minimum amount which would justify the institution of the Commission and which would suffice to enable it to work effectively during a trial period of up to two years in the course of which a decision could be reached, in the light of experience, regarding its financing on a permanent basis.

In view of the extreme importance of the working of the Commission from the national standpoint, it is highly important that it should be able to employ personnel of the highest qualifications and that the completeness and continuity of its research work, most of all in the early stages, should not be prejudiced by lack of funds. The salary of the Senior Commissioner should, therefore, not be less than £7,500 per year, and the senior permanent staff would have to be drawn from the higher ranks of the Civil Service. But even after allowing for all possible branches of development, the total administrative expenses of the Commission should not exceed £150,000 per year, which is about one quarter of the annual gross vote of the Department of Overseas Trade, and in the first year or two might well not exceed £100,000 per year.

The probable commitments of the Commission on account of inducements, provision of trading estates, joint subscription of capital towards institutions for new industrial financing, and direct provision of capital for new enterprises, should be amply covered by a fund of £10 millions in the first two years. Of this amount possibly £3 millions should be earmarked for the provision of new trading estates

and £2 millions for the subscription of capital towards an industrial financing institution with the proviso that at least an equal amount should be forthcoming from private enterprise. The organisation of such a body could suitably be arranged in co-operation with the Bank of England, thus ensuring a link with the private financial institutions of the City of London, though the personnel should be drawn largely from the ranks of industry. The power of the Commission to make loans directly to new enterprises should be strictly limited in respect of the maximum period to which the loans should apply, and it would also be desirable to limit the amount to be advanced by this means. A maximum of £1 million would seem to be sufficient for the first two years. The above total of £6 millions would be partly self-renewing in course of time and should be earning income from the outset. It should not, moreover, be necessary to continue indefinitely expenditure at the rate of £5 millions per annum on account of trading estates and institutional financing; expenditure on these items should tend to disappear after the first few years or would, at any rate, only recur sporadically.

The remaining £4 millions from the total of £10 millions would be left for the purpose of providing special inducements to new enterprises on specified sites, and general inducements, by the development of regional services. It is not proposed that the Commission should undertake expenditure on the latter account from its own resources except in extreme circumstances, as much could be achieved in this direction by the successful co-ordination of the development of policies of other bodies and of the central government and a greater spreading of overhead costs by public utility services over the country as a whole. Having regard to the fact that many of the enterprises whose location it would be possible and desirable to influence are small at the outset, it is believed that a substantial amount could be achieved by the judicious outlay of £4 millions over the first two years. In this matter, however, above all, practical experience is necessary in order that the precise relationship of cause and effect may be worked out more fully.

For comparison it may be noted that the amount budgeted for the Special Areas Fund in 1938-39 was £7.5 millions. All, or nearly all, of the responsibilities of this Fund would in course of time be transferred to the Commission, so that the nett increase of national expenditure would be relatively slight.

No allowance has been made in the above estimates for cost of restoration of amenities or for an amortisation fund for amenities in the future or for costs of any evacuation and resettlement scheme. The restoration of amenities, while an extremely necessary public work, is not essential to the successful working of the Commission in the early stages, while it is envisaged that the amortisation fund would be contributed largely by industry itself and is equally not immediately essential. The whole question of evacuation and resettlement stands by itself and its finance has already been separately examined.

Compensation of Landowners

It will be observed that no provision has been made for compensation to owners of land in connection with the refusal of a licence for industrial development, and

the reason for this omission must be briefly explained. We do not envisage that under the licensing scheme here proposed there will be any appreciable disturbance of existing land values in any district. It is true that there will be areas, such as Greater London, in which an Industrial Development Commission may be expected to refuse a number of applications for a licence to carry on certain industries on a considerable range of sites, on the ground that the area is already industrially overdeveloped, or that the development will be against the national interest. But even in these cases the Commission would in no case veto the use of any specific plot of land for industrial use in general. While, say, the multiplication of toothpaste or razor-blade factories in Greater London might be frowned upon, there would still be many undertakings, such as service and repair depots for all sorts of vehicles and appliances, laundries, dry-cleaning establishments, utility service stations and by-product plants, fashion workshops, and so forth, which form a large and increasing proportion of new enterprise, and would without question have to be freely permitted even in areas where ordinary factory development is banned. The number of such enterprises in prosperous urban communities, and their tendency to move out from the central areas, will certainly be sufficient to prevent any serious general fall in real land values, even if the Commission should adopt a most drastic policy of restriction towards new factories in certain areas.

The Commission would not, of course, in any way override the zoning of land for industrial and non-industrial uses in town and country planning schemes. Any actual site which may now legally be used for industrial building would continue to be available for that purpose, and even in areas where factory expansion was discouraged there would remain an effective and unfettered demand for essentially local industrial purposes. The Commission would, it is true, be expected to divert a large share of certain types of new industry from areas where their establishment would be against the national interest, but there is no more ground for compensating landowners on this account than for compensating them if a rival site-owner offers a more attractive bait to the prospective buyer. There are, it is understood, some special cases where industrial undertakings have bought up land ahead in anticipation of extensions or new works, but such cases can very well be treated on their merits, and there is no reason to believe that any actual financial loss need fall on any undertaking in this position. Schemes for compensating landowners or for extinguishing development rights in land are therefore not discussed in this Report, because the subject, however important, does not appear relevant to our proposals.

Relationship with Town and Country Planning

It has been pointed out already that the proposed Industrial Development Commission would not override in any way the zoning provisions of town and country planning schemes. The relationship between town and country planning and the control of industrial location must, however, be rather more fully discussed, as considerable confusion exists over it. Parliament itself recently, through the Restriction of Ribbon Development Act, 1935, created serious fresh difficulties (wherever major roads are concerned) by requiring two different sets of authorities,

working under different Acts and different Ministries, to deal with the same development proposals from much the same standpoint, but with different methods. It is clearly desirable both that this particular duplication should be corrected and that any fresh machinery brought into existence should provide for the smoothest possible co-operation and the clearest possible division of field between town and country planning and related activities.

The basis for separating the functions is clear enough. Town and country planning is essentially control of the use of land. In any particular area it has to reconcile the claims of industrial, residential, and other uses in such a way as to secure the best pattern of development, taking into account both economy and amenities. It is vital to town and country planning that new industry of any type should not be permitted in the middle of a residential zone, but it is usually irrelevant to the town planner whether a proposed new industrial building is to be used for repairing motor cars or for manufacturing cigarettes. On the other hand, it is of no importance for the national guidance of location of industry whether a new factory at Coventry is in the middle of the town or on the east side or on the west: the main consideration from this angle is what the factory is going to make, and whether it ought to be in the Coventry area at all.

There is no reason, therefore, to fear that the jurisdiction of an Industrial Development Commission would either duplicate or overlap with town and country planning: the Commission would simply fill what town planners have long recognised as an embarrassing gap, and the existence of such a body with a clear, long-range policy and mechanism for the guidance of industrial development nationally and regionally would be of great assistance to them, even in existing conditions.

It has, however, been pointed out on page 215 that control of the use of land under the Town and Country Planning Act is handicapped by defects in the Act itself and by weaknesses in policy and administration. The question of reform has recently been studied by a strong committee of the Town Planning Institute, whose report*, after pointing out the various weaknesses, proposed the creation of a National Planning Commission, "whose functions, broadly speaking, would be:

- "(a) to compile and collate all relevant information bearing on the use, development, and planning of land from a national point of view;
- "(b) to advise and co-ordinate Government Departments, statutory undertakers and highway authorities in their use and development of land;
- "(c) to provide planning authorities with constructive advice and guidance (such as the Minister of Health is prevented by his quasi-judicial position from providing), to watch their planning operations and, where these appear to be proceeding on unsound lines, to make appropriate representations to the Minister of Health;

*Report of the National Survey and National Planning Committee, 1938. Town Planning Institute, 11 Arundel Street, W.C.1. 1s.

- “(d) to keep the general progress of planning under review, to investigate its problems, defects and delays, and frame proposals for overcoming them, and generally to advise the Minister and the Government on the legislative and administrative development of the planning system;
- “(e) to formulate, as a basis for all its advisory activities and as a background for local and regional planning, a national plan or policy on broad and flexible lines for the allocation and distribution of major land uses and developments.

“It will be seen that these functions of the Commission do not interfere either with the administrative powers and duties of the Minister of Health, or with the executive powers and duties of the local authorities under the present planning system. Nor do they constitute any new departure in executive or administrative action. In effect—and without prejudice to any possible future development—the Commission would be an advisory body. But in so describing it we do not imply the narrow and limiting sense of the description ‘advisory,’ as frequently applied to bodies which are used only for consultation on such particular matters as Ministers may, from time to time, refer to them (for example, the existing Town and Country Planning Advisory Committee). The Commission should operate continuously, with full initiative over the widest relevant terms of reference; and it should have full and sufficient statutory powers to obtain all the information it requires, to consult directly with all central and local authorities, to make its views effectively known, and to ensure that they are given due consideration.”

The Town Planning Institute’s scheme for an advisory Commission dealing nationally with the use of land does not conflict either with the administrative functions of the Ministry of Health, the Secretary of State for Scotland, and the local authorities, nor with the Industrial Development Commission proposed in this Report. On the contrary, the sorting out between well-organised agencies of functions which are now often confused or neglected between a mass of unco-ordinated authorities would simplify the work of all concerned, and would remove the great uncertainty and frustration now felt throughout this important branch of national life.

While no reasonable person can wish to see further Commissions appointed except where they are really needed, the need in this case is obvious to anyone who looks at any British town. Lack of forethought and co-ordination are plain all over the country, and the only way to fill the need is by providing trained staff and suitable organisations.

General Considerations

Advocacy of an Industrial Development Commission with precise powers of compulsory licensing in addition to powers to extend financial inducements may seem at first sight to go very much further than is necessary to secure the efficient fulfilment of the functions summarised at the beginning of this chapter.

Prolonged consideration of this and alternative mechanisms has, however, led irresistibly to the conclusion that powers of ultimate compulsion are necessary in

order to ensure the efficient working of the mechanism, although such powers need be applied very seldom in practice. It is not anticipated that the licensing system need prove to be more than a formality in the case of at least 80 per cent, and probably 90 per cent, of the 600 odd new industrial developments and extensions that are likely to arise in an average year. The justification for obliging industry to incur the trouble necessitated by the imposition of even this amount of "red tape" is held to lie in the first place in the value for the purposes of national policy of the information which will be provided for the assistance of the Commission, and in the second place in the simultaneous creation of an advisory service which should prove of real economic value to industry.

While it is envisaged that in practice by far the greater part of the country should be declared free for industrial development, it is neither likely nor desirable that the (in practice) "free" or "restricted" areas will remain the same for all time. The problem of change and adjustment seems to be met more satisfactorily within a comprehensive system under which purely administrative changes will, in fact, remain matters of administration than under a partial system in which necessary changes could be made only with the possibility of political friction, serious delays and pressure from vested interests. For, let there be no mistake, partial restriction at least is inherent in any scheme for guiding the location of industry unless the mechanism is to operate only by means of inducements, at colossal cost.

Nevertheless, the most important part of the task to be performed by the proposed Commission would be educational, informative and co-ordinating, rather than regulatory. Its licensing powers, and its financial resources, should be merely the means of assuring that the Commission would have a secure status and would be able to get its policy taken seriously. The test of success would be the extent to which, in practice, these powers could be kept in the background, although they would undoubtedly have to be firmly used in certain cases. Given that industrialists were bound to consult the Commission, it may safely be predicted that, quite apart from any question of refusing licences, the Commission would soon exert an important and constructive influence. The extent of this influence would, however, depend on the Commission's power to satisfy industry of its competence and understanding of the aspect of business conditions, regarding which it would form the leading specialist body of advisers in the country. Similarly, given that it could make representations freely to any Government Department, local authority, or other public agency regarding regional aspects of industrial development, and that it was expected to make public statements and reports, the Commission could very substantially assist in securing increased attention to aspects of policy, whose neglect is largely responsible for the existence of depressed areas, congested urban clusters, and several other chronic problems of the present time. The Special Areas Commissioners, by their pioneer work within limited boundaries and powers, have shown what can be done by a public-spirited and vigorous agency able to establish close contact with the needs and outlook of areas far from Whitehall, and to take up with the many branches of Government the effects of their actions on particular places and problems.

It has been proposed above that the majority of the functions of the Special

Areas Commissioners should be transferred in course of time to the Industrial Development Commission. Such an evolution would be natural, and was, in fact, foreshadowed by the Government spokesman in the Second Reading Debate on the Depressed Areas Bill (as it then was) on December 3, 1934. The Minister of Labour, Mr. Oliver Stanley (now President of the Board of Trade), said on that occasion: "Do not let us forget that the whole thing is advisedly meant to be experimental, to try out in those particular areas certain definite ideas . . . but, in so far as those ideas succeed, in so far as the experiment is of value, then the results of it can be taken beyond the boundaries of the areas in which they are tried out and applied to the satisfaction of the country as a whole." Such an extension is now undoubtedly overdue, and we have tried to show how it could be effected with a minimum of dislocation.

It is useless to blame either the industrialist or the public bodies if the sum of their decisions, taken upon narrow grounds in each case, produces a state of affairs which is economically wasteful, socially unhealthy and unpleasant, and strategically hazardous to national security. The remedy cannot be found either in coercive policies on the one hand, or in drift and belated half-measures on the other, but only in searching examination of what is going wrong, and the education and guidance of all concerned in the methods of preventing future mistakes and curing the mistakes of the past. Research, education and guidance on a problem of this magnitude requires the continuous attention of a body with first-rate resources and status. The cost to the nation of doing without such a body hitherto has been enormous, and will multiply in proportion as its appointment is delayed.

Table I—REGIONAL DISTRIBUTION

(Calculated from the Industry Tables of the census of

Opposite each industry the plain figures represent the proportion of that industry in each region. The italic figures are the Location Factors, which are derived as follows: If *x* per cent of a given industry is in a particular region, the Location Factor for that region is *x* divided by the percentage of the total population in that region. The regions are defined and mapped in Appendix IV. They apply to place of enumeration not to place of birth. The horizontal rows of percentages should in all cases total 100.00, but as the individual figures are corrected to the second place of decimals it

Code Numbers in the Census	Description of Industry	Total No. of persons employed in the Industry	Greater London	South-East (excluding Greater London)	North I	North II	North III	North IV	Midland I
	All Industries	21,074,751	19.56	11.26	4.40	2.66	7.93	14.79	10.27
000	Sea Fishing and Oyster Beds	61,582	0.26 —	3.68 0.3	3.85 0.9	12.21 4.6	0.07 —	7.92 0.5	0.06 —
010, 012, 018	Farming (other than Poultry)	1,101,126	2.16 0.1	16.76 1.5	2.43 0.6	5.71 2.2	3.60 0.5	6.05 0.4	9.66 0.9
011	Poultry Farming	29,358	2.16 0.1	31.12 2.8	1.28 0.3	3.13 1.2	5.76 0.7	16.34 1.1	8.21 0.8
014	Other or Undefined Gardening	32,841	19.89 1.0	24.48 2.2	1.55 0.4	2.03 0.8	4.66 0.6	8.78 0.6	8.84 0.3
015-019	Forestry and other Agriculture	31,066	1.07 0.1	11.09 1.0	2.15 0.5	2.86 1.1	1.06 0.1	1.36 0.1	5.60 0.5
030	Coal Mines	1,162,889	0.12 —	0.60 0.05	19.17 4.4	1.11 0.4	16.91 2.1	3.47 0.6	8.43 0.8
039	Coal, Iron and Steel (undefined)	6,515	0.57 —	0.20 —	0.68 0.2	0.09 —	0.78 0.1	2.47 0.2	13.00 1.3
040	Iron Ore Mines and Quarries	12,993	0.22 —	1.32 0.1	0.18 —	63.49 23.9	0.32 —	4.75 0.3	0.45 —
041-2	Lead, Tin and Copper Mines	5,425	3.01 0.2	0.81 0.1	5.44 1.2	6.57 2.5	0.81 0.1	0.77 0.1	0.98 0.1
043	Stone Quarries, etc. (not owned by Local Authorities)	52,057	0.29 —	3.02 0.3	6.76 1.5	3.57 1.3	10.52 1.3	6.98 0.5	10.81 1.1
044	Slate Quarries	11,840	0.22 —	0.07 —	0.03 —	2.09 0.8	0.07 —	2.81 0.2	0.24 —
045	Clay, Sand, Gravel and Chalk Pits	17,315	7.01 0.4	22.18 2.0	2.59 0.6	1.63 0.6	4.87 0.6	2.40 0.2	9.13 0.9
046-9	Oil Shale, Salt, and Other Mines, etc.	12,038	3.88 0.2	3.63 0.3	10.31 2.3	2.39 0.9	0.93 0.1	35.52 2.4	8.89 0.9
050	Coke Ovens and By-Product Works	18,626	3.63 0.2	0.40 —	23.15 6.4	9.72 3.7	29.02 3.7	2.36 0.2	2.68 0.3
053, 055	Cement Manufacturing and Lime Kilns	21,978	6.13 0.3	44.56 4.0	2.64 0.6	6.31 2.4	2.22 0.3	4.84 0.3	7.31 0.7
051, 054, 056-9	Other Treatment of Non-Metalliferous Minerals	27,368	19.38 1.0	7.59 0.7	3.93 0.9	2.61 1.0	5.51 0.7	16.00 1.1	12.78 1.2
060	Bricks, Tiles and Fireclay Goods	87,188	2.74 0.1	17.80 1.6	4.13 0.9	1.41 0.5	9.51 1.2	9.70 0.7	22.95 2.2
063	Earthenware, China, Porcelain	90,394	2.07 0.1	0.76 0.1	1.17 0.3	0.05 —	0.97 0.1	2.33 0.2	79.10 7.7
064	Glass (other than Bottles)	31,425	17.47 0.9	2.60 0.2	6.69 1.5	0.24 0.1	9.87 1.2	33.07 2.2	21.68 2.1
065	Glass Bottles	18,154	27.00 1.4	3.66 0.3	2.28 0.5	0.72 0.3	28.12 3.5	26.90 1.8	2.33 0.2

OF INDUSTRY IN GREAT BRITAIN

England and Wales 1931, and the census of Scotland 1931)

region expressed as a percentage of the total number of persons employed in the industry. region, and y per cent of *all* industry is in that region, then the location factor for that industry in that region is x divided by y . workplace. The South-East region probably includes many people working in Greater London. decimals only, there is sometimes an error in the last place of the total. This, of course, cannot be corrected without introducing a third the individual figures.

Midland II	East	South-West	Wales I	Wales II	Scotland I	Scotland II	Scotland III	Scotland IV	Description of Industry	Male workers in the Industry as a percentage of the Total
5.41	8.79	4.29	8.70	1.41	0.54	2.98	5.08	2.08	All Industries	70.80
0.02	24.90	6.89	2.02	4.54	1.01	4.24	0.86	27.55	Sea Fishing and Oyster Beds	97.00
—	6.6	1.6	0.5	3.2	1.9	1.4	0.2	13.6		
4.97	15.48	10.93	2.91	5.81	2.23	2.06	2.14	7.62	Farming (other than Poultry)	93.80
0.9	4.1	2.5	0.8	3.8	4.1	0.7	0.4	3.8		
5.88	10.70	7.63	1.07	1.58	0.59	2.01	1.75	1.29	Poultry Farming	84.20
1.0	2.8	1.8	0.3	1.1	1.1	0.7	0.3	0.6		
8.88	4.69	6.74	1.61	1.29	0.93	3.32	3.94	4.80	Other or Undefined Gardening	98.90
0.7	1.2	1.6	0.4	0.9	1.7	1.1	0.8	2.2		
2.48	6.25	8.79	2.08	3.25	9.59	6.25	5.52	30.60	Forestry and Other Agriculture	98.20
0.5	1.6	2.0	0.6	2.3	17.8	2.1	1.1	15.1		
11.65	0.07	0.44	20.12	1.40	0.18	5.37	5.87	0.04	Coal Mines	99.48
2.2	—	0.1	5.4	1.1	0.2	1.8	1.2	—		
85.73	0.21	0.08	25.60	0.12	0.12	4.22	16.15	0.08	Coal, Iron and Steel (undefined)	96.50
6.6	0.1	—	6.9	0.1	0.2	1.4	3.2	—		
15.98	9.81	0.41	2.84	0.06	0.02	0.02	0.08	0.06	Iron Ore Mines and Quarries	99.77
2.9	2.6	0.1	0.3	—	—	—	—	—		
8.77	0.13	58.80	1.59	5.35	3.58	0.20	3.10	0.13	Lead, Tin and Copper Mines	98.08
1.6	—	13.7	0.4	3.8	6.6	0.1	0.6	0.1		
14.88	1.13	15.21	4.88	10.96	1.59	3.41	3.90	2.64	Stone Quarries, etc. (not owned by Local Authorities)	99.21
2.7	0.3	3.5	1.3	7.3	2.9	1.2	0.8	1.3		
0.03	0.02	4.51	0.31	86.80	—	0.03	0.14	3.01	Slate Quarries	99.77
—	—	1.1	0.1	61.2	—	—	—	1.5		
4.60	4.25	87.75	0.49	1.22	—	0.53	1.21	0.01	Clay, Sand, Gravel and Chalk Pits	98.78
0.9	1.1	3.8	0.1	0.9	—	0.2	0.2	—		
5.72	0.22	0.97	0.37	0.65	0.02	25.28	0.98	0.30	Oil Shale, Salt, and Other Mines, etc.	86.62
1.1	0.1	0.2	0.1	0.5	—	8.6	0.2	0.1		
10.93	0.51	0.04	9.50	0.45	—	1.26	1.86	—	Coke Ovens and By-Product Works	99.28
2.0	0.1	—	2.6	0.3	—	0.4	0.3	—		
9.36	5.32	2.06	4.71	0.60	0.01	1.58	1.87	0.38	Cement Manufacturing and Lime Kilns	96.15
1.7	1.4	0.5	1.3	0.4	—	0.5	0.4	0.2		
11.71	1.70	2.81	10.56	2.19	0.20	0.74	2.28	0.10	Other Treatment of Non-Metalliferous Minerals	92.17
2.2	0.4	0.7	2.9	1.6	0.4	0.3	0.5	—		
8.26	4.95	4.47	2.44	2.60	0.08	3.07	5.48	0.23	Bricks, Tiles and Fireclay Goods	93.20
1.5	1.3	1.0	0.7	1.3	0.1	1.0	1.1	0.1		
6.38	0.07	1.98	0.09	0.40	—	0.44	4.14	0.02	Earthenware, China, Porcelain	49.27
1.2	—	0.5	—	0.3	—	0.2	0.8	—		
1.41	0.31	0.22	0.25	0.08	0.02	0.92	2.90	0.17	Glass (other than Bottles)	80.85
0.3	0.1	0.1	0.1	0.1	—	0.3	0.6	0.1		
0.09	0.02	0.02	0.08	0.02	0.01	3.87	3.45	1.38	Glass Bottles	88.00
—	—	—	—	—	—	1.3	0.7	0.7		

Table I—REGIONAL DISTRIBUTION OF

Code Numbers in the Census	Description of Industry	Total No. of persons employed in the Industry	Greater London	South-East (excluding Greater London)	North I	North II	North III	North IV	Midland I
069	Miscellaneous Products of Clay and Sand	2,361	58.85 2.7	8.05 0.3	1.69 0.4	0.84 0.1	8.72 0.5	8.47 0.2	28.92 2.3
070, 078, 079	Alkalis, Heavy Acids, Drugs, Fine Chemicals	86,924	26.20 1.3	5.22 0.5	12.59 2.9	4.69 1.8	5.00 0.6	27.42 1.9	6.08 0.6
071	Tar and Wood Distillation	6,558	14.84 0.7	8.48 0.8	7.64 1.7	9.66 3.6	11.05 1.4	16.62 1.1	15.22 1.5
072	Dye Manufacturing	9,088	4.04 0.2	0.81 —	0.21 —	1.10 0.4	34.62 4.4	45.85 3.1	0.48 —
074	Fertilisers, Dips and Disinfectants	9,454	17.88 0.9	8.26 0.7	6.46 1.5	6.81 2.4	5.09 0.6	14.65 1.0	8.89 0.4
080-3	Explosives, etc.	12,999	22.85 1.2	7.81 0.7	1.82 0.3	1.98 0.7	5.51 0.7	8.26 0.2	15.70 1.5
090-1	White Lead, Paints and Varnishes	29,190	38.05 1.9	4.98 0.4	6.65 1.5	6.91 2.6	2.88 0.3	15.81 1.1	18.26 1.3
098	Vegetable Oils and Oil Cake	15,627	11.10 0.6	8.70 0.3	0.24 0.1	28.28 10.6	4.48 0.6	38.78 2.3	6.21 0.6
094, 099	Animal Fats, etc.	7,758	38.48 1.7	8.92 0.3	4.96 1.1	3.08 1.1	12.17 1.5	28.40 1.6	7.11 0.7
095	Glues, Gums and Gelatine	4,552	28.95 1.5	9.12 0.8	2.18 0.5	8.12 1.2	4.29 0.5	22.42 1.5	8.46 0.8
096	Soap, Candles and Glycerine	81,662	26.81 1.3	2.28 0.2	2.67 0.6	1.20 0.5	5.18 0.7	48.90 3.3	4.56 0.4
097	Mineral Oil Refining	9,688	9.72 0.5	24.59 2.2	0.81 0.1	0.87 0.1	0.97 0.1	7.55 0.5	0.85 0.1
100-2	Blue, Polishes and Ink	10,626	44.80 2.3	5.81 0.6	1.82 0.4	18.81 7.1	8.17 0.4	18.87 0.9	2.65 0.3
108	Matches	4,051	36.06 1.8	5.88 0.6	0.22 —	0.10 —	1.97 0.2	36.65 2.5	18.56 1.3
110	Blast Furnaces	13,042	0.29 —	0.84 —	2.78 0.6	17.92 6.8	8.25 1.0	8.88 0.2	8.56 0.8
112	Puddling Furnaces and Rolling Mills, etc.	185,876	0.29 —	0.12 —	6.22 1.4	13.51 5.1	28.60 3.6	7.44 0.5	9.88 1.0
114	Slag and Slag Wool Manufacturing	2,386	1.68 0.1	0.17 —	10.89 2.4	13.44 5.1	9.05 1.1	1.87 0.1	24.72 2.4
120	Copper Manufacturing	3,291	1.40 0.1	0.46 —	12.78 2.9	0.21 0.1	1.00 0.1	31.00 2.1	5.90 0.6
121-9	Extr. and Ref. of other Non-Ferrous Metals	15,722	17.58 0.9	8.80 0.3	6.75 1.5	0.80 0.1	2.84 0.3	14.84 1.0	20.88 2.0
180	Iron and Steel Foundries	90,042	4.67 0.2	8.85 0.3	4.19 1.0	5.66 2.1	7.52 0.9	9.81 0.6	24.19 2.4
182-8	Brass, etc., Foundries, and Cast Metal Finishing	42,076	11.85 0.6	1.89 0.1	2.18 0.5	1.46 0.6	14.87 1.9	7.81 0.5	49.90 4.9
185-6	Forging	44,488	5.07 0.3	8.61 0.8	7.09 1.6	3.27 1.2	7.24 0.9	7.64 0.5	26.40 2.6
187	Tinplate Manufacturing	82,717	0.48 —	0.09 —	0.16 —	0.05 —	0.05 —	0.27 —	8.86 0.3

INDUSTRY IN GREAT BRITAIN—continued

Midland II	East	South-West	Wales I	Wales II	Scotland I	Scotland II	Scotland III	Scotland IV	Description of Industry	Male workers in the Industry as a percentage of the Total
0.89 0.2	0.04 —	0.04 —	0.13 —	0.08 0.1	0.04 0.1	1.61 0.5	7.32 1.5	0.21 0.1	Miscellaneous Products of Clay and Sand	76.85
3.73 0.7	0.81 0.2	0.71 0.2	0.79 0.2	0.51 0.4	0.05 0.1	1.42 0.5	4.27 0.8	0.56 0.3	Alkalis, Heavy Acids, Drugs, Fine Chemicals	73.77
3.28 0.6	1.04 0.3	1.36 0.3	2.46 0.7	0.67 0.5	0.02 —	2.82 1.0	4.06 0.8	1.30 0.6	Tar and Wood Distillation	93.50
0.41 0.1	0.08 —	0.14 —	0.07 —	0.06 —	0.06 0.1	10.56 3.6	2.09 0.4	0.08 —	Dye Manufacturing	88.68
1.50 0.3	15.28 4.0	4.10 1.0	1.44 0.4	1.20 0.9	0.87 1.6	4.52 1.5	4.68 0.9	4.47 2.2	Fertilisers, Dips and Disinfectants	85.90
1.07 0.2	0.15 —	11.82 2.8	0.65 0.2	1.55 1.1	0.04 0.1	7.44 2.5	18.71 3.7	0.08 —	Explosives, etc.	66.40
2.40 0.4	0.98 0.3	1.17 0.3	0.76 0.2	0.22 0.2	0.01 —	0.89 0.3	5.27 1.0	0.45 0.2	White Lead, Paints and Varnishes	80.60
0.52 0.1	5.11 1.3	0.72 0.2	0.13 —	0.15 0.1	0.08 0.1	3.47 1.2	1.49 0.3	0.62 0.3	Vegetable Oils and Oil Cake	92.48
1.61 0.3	1.90 0.5	1.04 0.2	2.08 0.6	0.26 0.2	— —	0.80 0.3	3.91 0.8	0.37 0.2	Animal Fats, etc.	86.83
7.14 1.3	4.74 1.2	2.20 0.5	1.47 0.4	0.02 —	0.02 —	3.74 1.3	1.84 0.4	0.35 0.2	Glues, Gums and Gelatine	74.25
2.56 0.5	0.83 0.1	0.95 0.2	0.55 0.1	0.15 0.1	0.08 0.1	1.22 0.4	2.46 0.5	0.58 0.3	Soap, Candles and Glycerine	64.90
0.26 —	1.60 0.4	0.11 —	13.85 3.6	0.02 —	0.01 —	33.52 11.4	6.08 1.2	0.83 0.4	Mineral Oil Refining	95.20
4.59 0.8	0.70 0.2	1.21 0.3	0.91 0.2	0.07 —	0.01 —	1.37 0.5	0.75 0.1	0.48 0.2	Blue, Polishes and Ink	58.63
0.12 —	0.15 —	0.27 0.1	0.17 —	0.12 0.1	— —	0.49 0.2	4.67 0.9	0.05 —	Matches	43.20
30.88 5.7	1.84 0.5	0.18 —	8.85 2.3	1.67 1.2	0.02 —	0.24 0.1	15.84 3.0	0.04 —	Blast Furnaces	98.38
0.92 0.2	4.08 1.1	0.04 —	12.38 3.3	2.88 2.0	0.01 —	0.08 —	13.52 2.7	0.08 —	Puddling Furnaces and Rolling Mills, etc.	97.68
6.04 1.1	25.90 6.8	— —	2.06 0.6	1.64 1.3	— —	0.09 —	3.42 0.7	— —	Slag and Slag Wool Manufacturing	98.25
0.43 0.1	0.12 —	0.15 —	42.40 11.5	0.16 0.1	— —	0.12 —	3.80 0.8	0.09 —	Copper Manufacturing	96.60
0.40 0.1	1.11 0.3	1.54 0.4	17.71 4.8	0.78 0.6	0.01 —	2.55 0.9	3.22 0.6	6.12 3.0	Extr. and Ref. of Other Non-Ferrous Metals	91.87
14.17 2.6	1.54 0.4	0.60 0.1	2.52 0.7	0.29 0.2	0.15 0.3	10.24 3.5	10.74 2.1	0.64 0.3	Iron and Steel Foundries	94.72
1.86 0.3	0.18 —	0.49 0.1	0.84 0.1	0.05 —	— —	2.08 0.7	5.74 1.1	0.31 0.2	Brass, etc., Foundries, and Cast Metal Finishing	88.35
3.02 0.6	6.91 1.8	5.61 1.3	2.67 0.7	2.70 1.9	1.85 2.5	2.82 1.0	4.84 1.0	4.77 2.3	Forging	96.91
0.04 —	0.08 —	0.04 —	94.50 25.8	0.72 0.5	— —	0.02 —	0.08 —	0.25 0.1	Tinplate Manufacturing	89.38

Table I—REGIONAL DISTRIBUTION C

Code Numbers in the Census	Description of Industry	Total No. of persons employed in the Industry	Greater London	South-East (excluding Greater London)	North I	North II	North III	North IV	Midland I
138	Galvanised Sheet Manufacturing .	11,588	1.29 0.1	0.18 —	8.77 0.9	5.08 1.9	0.18 —	88.67 2.3	12.73 1.2
139	Iron and Steel Tube Manufacturing	83,249	2.06 0.1	0.24 —	0.23 0.1	0.47 0.2	2.17 0.3	0.82 0.1	58.50 5.2
140	Non-Ferrous Tube and Pipe Manufacturing	19,254	6.26 0.3	0.66 0.1	1.07 0.2	0.12 —	7.92 1.0	6.00 0.4	78.00 7.1
141	Wire, Wire Netting and Wire Rope	26,711	6.23 0.3	0.60 0.1	6.03 1.4	2.32 0.9	23.49 3.0	81.48 2.1	13.37 1.3
151-2	Steam Locomotives and Railway Plant	76,083	5.33 0.3	7.73 0.7	11.04 2.5	0.30 0.1	6.33 0.9	28.62 1.9	4.82 0.5
153	Agricultural Engineering	16,126	2.21 0.1	18.38 1.6	1.84 0.4	2.76 1.0	9.81 1.2	6.00 0.4	11.02 1.1
154-5	Textile Machinery and Accessories	60,062	0.29 —	0.21 —	0.04 —	0.42 0.2	22.58 2.8	64.85 4.4	0.30 —
156	Heating and Ventilating Engineering	18,653	30.62 1.6	6.33 0.6	2.75 0.6	9.09 3.4	3.52 0.4	12.13 0.8	9.48 0.9
157	Machine Tool Manufacturing (Metal Working)	18,382	4.76 0.2	2.09 0.2	2.01 0.5	0.05 —	20.85 2.6	25.48 1.7	33.52 3.3
160	Mining Machinery Manufacturing	6,075	2.75 0.1	1.42 0.1	9.03 2.1	0.33 0.1	23.45 3.0	10.85 0.7	13.51 1.3
150, 153-9, 161-9	Other Engineering (not Marine or Electrical)	335,653	20.98 1.1	7.91 0.7	5.74 1.3	1.13 0.4	8.30 1.0	13.51 0.9	12.38 1.2
170	Electric Motors, Generators, Switch Gear, and Transformers	40,199	15.46 0.8	7.10 0.6	3.92 0.9	0.13 —	7.87 1.0	12.80 0.9	39.88 3.9
171-8	Other Electrical Manufactures	181,908	40.65 2.1	8.70 0.8	2.51 0.6	0.50 0.2	1.75 0.2	23.25 1.6	16.40 1.6
179	Electric Wiring and Contracting	56,496	29.13 1.5	12.12 1.1	3.23 0.7	2.26 0.9	6.24 0.8	13.69 0.9	8.21 0.8
180-3	Trams and Railway Rolling Stock	67,645	7.33 0.4	12.75 1.1	4.42 1.0	0.77 0.3	11.85 1.5	13.61 0.9	17.60 1.7
184-6	Self-Propelled Vehicles and Cycles	228,505	14.20 0.7	12.57 1.1	1.10 0.2	1.02 0.4	3.34 0.4	9.92 0.7	40.65 4.0
187-3	Carriage Bodies, Carts and Vans	50,031	24.53 1.3	20.15 1.8	1.71 0.4	1.24 0.5	4.18 0.5	10.73 0.7	15.67 1.5
189	Cycle and Motor Accessories	28,081	20.12 1.0	2.19 0.2	0.20 —	0.25 0.1	0.79 0.1	1.38 0.1	72.15 7.0
190-1	Aeroplanes, Airships and Balloons	21,877	29.02 1.5	25.85 2.3	0.32 0.1	3.34 1.4	2.22 0.3	5.79 0.4	24.62 2.4
199	Other Vehicles	5,641	23.01 1.4	8.89 0.8	1.54 0.4	0.16 0.1	12.69 1.6	5.82 0.4	31.37 3.0
200-9	Shipbuilding and Repairing	278,585	3.50 0.2	14.73 1.3	26.30 6.0	3.67 1.4	0.58 0.1	12.80 0.9	0.61 0.1
210	Cutlery	19,442	7.63 0.4	1.51 0.1	0.22 —	0.11 —	30.50 10.2	1.59 0.1	4.65 0.5
211-5	Small Tools, Needles and Pins	33,270	6.44 0.3	0.66 0.1	0.46 0.1	0.19 0.1	39.30 5.0	4.53 0.3	41.12 4.0

INDUSTRY IN GREAT BRITAIN—continued

Midland II	East	South-West	Wales I	Wales II	Scotland I	Scotland II	Scotland III	Scotland IV	Description of Industry	Male workers in the Industry as a percentage of the Total
0.08 —	0.08 —	0.26 0.1	32.18 8.7	5.14 3.7	0.01 —	0.56 0.2	4.99 1.0	0.08 —	Galvanised Sheet Manufacturing	98.07
2.21 0.4	0.08 —	0.08 —	8.51 2.3	0.08 —	0.02 —	0.23 0.1	29.32 5.8	0.08 —	Iron and Steel Tube Manufacturing	98.46
0.49 0.1	0.01 —	0.30 0.1	0.14 —	2.09 1.5	— —	0.11 —	1.72 0.3	0.07 —	Non-Ferrous Tube and Pipe Manufacturing	88.20
2.92 0.5	1.40 0.4	0.26 0.1	2.17 0.6	0.06 —	— —	4.25 1.5	5.18 1.0	0.18 0.1	Wire, Wire Netting and Wire Rope	84.70
6.59 1.2	0.37 0.1	14.08 3.3	2.13 0.6	0.04 —	0.01 —	0.14 —	11.66 2.3	0.31 0.2	Steam Locomotives and Railway Plant	98.06
6.14 1.1	29.90 7.9	5.86 1.4	0.33 0.1	0.25 0.2	0.63 1.2	1.01 0.3	2.27 0.5	1.57 0.8	Agricultural Engineering	94.68
5.95 1.1	0.06 —	0.04 —	0.01 —	0.02 —	0.16 0.3	2.29 0.8	1.18 0.2	1.52 0.7	Textile Machinery and Accessories	92.26
7.10 1.3	4.61 1.2	1.92 0.4	1.23 0.3	0.17 0.1	0.09 0.2	1.99 0.7	6.84 1.4	2.10 1.0	Heating and Ventilating Engineering	93.38
2.68 0.5	0.14 —	0.09 —	0.21 0.1	— —	— —	0.04 —	6.94 1.4	1.14 0.6	Machine Tool Manufacturing (Metal Working)	98.94
3.04 0.6	0.20 0.1	7.11 1.7	3.65 1.0	0.15 0.1	0.03 0.1	1.66 0.6	22.65 4.5	0.18 0.1	Mining Machinery Manufacturing	94.67
7.08 1.3	5.43 1.4	2.50 0.6	0.92 0.2	0.19 0.1	0.11 0.2	1.79 0.6	11.27 2.2	0.84 0.4	Other Engineering (not Marine or Electrical)	90.32
4.32 0.8	2.87 0.8	0.28 0.1	0.33 0.1	0.17 0.1	0.02 —	2.53 0.9	2.13 0.4	0.15 0.1	Electric Motors, Generators, Switchgear, and Transformers	77.70
3.03 0.6	1.06 0.3	0.71 0.2	0.58 0.2	0.12 0.1	0.01 —	0.16 0.5	0.54 0.1	0.03 —	Other Electrical Manufactures	68.00
3.92 0.7	2.24 0.6	3.36 0.3	2.19 0.6	0.90 0.6	0.32 0.6	3.91 1.3	7.08 1.4	1.29 0.6	Electric Wiring and Contracting	92.65
13.32 2.5	0.51 0.1	7.59 1.8	3.70 1.0	0.10 0.1	0.01 —	0.60 0.2	5.56 1.1	0.37 0.2	Trams and Railway Rolling Stock	96.86
4.97 0.9	3.07 0.8	2.63 0.6	0.85 0.2	0.45 0.3	0.43 0.9	1.27 0.4	2.52 0.5	0.93 0.5	Self-Propelled Vehicles and Cycles	90.47
4.18 0.3	5.08 1.3	4.07 0.9	1.59 0.4	0.99 0.7	0.14 0.3	1.61 0.5	3.22 0.6	0.93 0.5	Carriage Bodies, Carts and Vans	96.16
1.22 0.2	0.58 0.2	0.25 0.1	0.11 —	0.08 0.1	0.01 —	0.23 0.1	0.39 0.1	0.07 —	Cycle and Motor Accessories	56.22
0.18 —	3.34 0.9	4.41 1.0	0.21 0.1	0.08 0.1	0.01 —	0.04 —	0.06 —	— —	Aeroplanes, Airships and Balloons	90.45
6.19 1.1	0.76 0.2	0.62 0.1	1.76 0.5	0.04 —	— —	0.71 0.2	1.45 0.3	0.02 —	Other Vehicles	67.80
0.06 —	1.19 0.3	5.32 1.4	2.27 0.6	0.49 0.3	0.03 0.1	2.57 0.9	23.90 4.8	1.42 0.7	Shipbuilding and Repairing	98.37
2.39 0.4	0.52 0.1	0.32 0.1	0.11 —	0.04 —	0.01 —	0.11 —	0.24 —	0.03 —	Cutlery	62.80
3.14 0.6	0.14 —	0.17 —	0.17 —	0.04 —	0.05 0.1	0.91 0.3	2.08 0.4	0.17 0.1	Small Tools, Needles and Pins	73.80

Table I—REGIONAL DISTRIBUTION OF

Code Numbers in the Census	Description of Industry	Total No. of persons employed in the Industry	Greater London	South-East (excluding Greater London)	North I	North II	North III	North IV	Midland I
222	Boilers and Tanks	30,551	18.57 0.7	2.51 0.2	4.08 0.9	1.87 0.7	18.86 2.4	12.78 0.9	10.80 1.1
223	Bolts, Nuts, Rivets and Screws	25,098	5.34 0.3	1.08 0.1	1.53 0.3	0.18 0.1	5.28 0.7	8.07 0.5	68.60 6.7
224-6	Brass and Yellow Metal Light Goods	14,886	11.61 0.6	0.46 —	0.42 0.1	0.18 0.1	8.56 1.1	3.16 0.2	78.56 7.2
227	Constructional Engineering	43,474	21.35 1.1	2.78 0.2	4.77 1.1	6.38 2.4	4.61 0.6	12.27 0.8	18.92 1.8
241	Tin Boxes, Canisters and Containers	20,052	34.46 1.8	4.45 0.4	3.18 0.7	14.18 5.3	3.62 0.5	15.79 1.1	7.76 0.8
242	Other Sheet Metal Work (not Brass)	44,926	19.84 1.0	4.18 0.4	1.44 0.3	1.16 0.4	6.15 0.8	11.29 0.8	46.30 4.5
243-4	Small Arms	4,929	42.00 2.1	3.97 0.4	0.47 0.1	0.51 0.2	1.24 0.2	1.62 0.1	44.60 4.3
220-1, 223-40, 245-9	Other Metal Industries	159,528	16.08 0.8	4.37 0.4	1.17 0.3	0.44 0.2	7.21 0.9	11.02 0.7	47.40 4.6
250-9	Precious Metals, Jewellery and Plate	53,671	21.78 1.1	4.89 0.4	0.91 0.2	0.83 0.3	20.65 2.6	5.21 0.4	36.92 3.6
260-1	Cotton, Carding and Spinning	285,846	0.16 —	0.06 —	0.08 —	0.05 —	6.29 0.8	83.81 5.7	0.52 0.1
262	Cotton Weaving	343,052	0.09 —	0.05 —	0.01 —	0.59 0.2	6.45 0.8	89.82 6.0	0.16 —
268	Velvet and Fustian Cutting	3,263	0.25 —	0.09 —	— —	— —	6.98 0.9	60.57 4.1	31.64 3.1
269	Other Cotton Manufacture	8,713	11.42 0.6	4.30 0.4	0.39 0.1	6.14 2.3	1.38 0.2	23.43 1.9	20.27 2.0
270-9	Wool, Worsted and Shoddy	248,468	0.53 —	0.68 0.1	0.28 0.1	0.42 0.2	80.55 10.2	3.63 0.2	1.56 0.2
280	Artificial Silk Spinning	21,062	4.18 0.2	0.76 0.1	0.08 —	0.09 —	3.67 0.5	31.73 2.1	36.10 3.5
281	Silk Throwing, Spinning and Weaving	51,251	2.67 0.1	4.09 0.4	0.05 —	0.15 0.1	17.10 2.2	20.52 1.4	18.15 1.8
290	Flax and Hemp Manufacturing	14,512	1.96 0.1	0.25 —	0.18 —	3.16 1.2	6.80 0.8	1.24 0.1	0.61 0.1
291	Jute Manufacturing	39,822	0.20 —	0.01 —	0.02 —	0.02 —	0.09 —	0.25 —	0.06 —
300	Asbestos Manufacturing	5,097	20.22 1.0	4.42 0.4	0.96 0.2	0.71 0.3	11.47 1.4	43.50 2.9	2.45 2.4
301-9	Other Fibres	5,813	18.34 0.9	4.41 0.4	1.07 0.2	4.68 1.3	11.40 1.4	18.23 1.2	4.18 0.4
310	Hosiery and other Knitted Goods	181,634	4.86 0.2	1.55 0.1	0.20 —	0.23 0.1	0.73 0.1	5.16 0.3	4.92 0.5
311	Lace Manufacturing	16,422	2.43 0.1	0.69 0.1	0.08 —	0.04 —	0.24 —	0.55 —	0.39 —
312	Carpets and Rugs	29,534	3.51 0.2	0.70 0.1	0.71 0.2	1.29 0.5	22.52 2.3	3.71 0.3	37.45 3.6

INDUSTRY IN GREAT BRITAIN—continued

Midland II	East	South-West	Wales I	Wales II	Scotland I	Scotland II	Scotland III	Scotland IV	Description of Industry	Male workers in the Industry as a percentage of the Total
8.90 0.7	8.60 0.9	1.01 0.2	0.78 0.2	0.10 0.1	1.49 2.8	1.06 0.4	23.32 4.6	0.27 0.1	Boilers and Tanks	94.81
0.52 0.1	—	0.08 —	0.49 0.1	0.04 —	0.01 —	0.05 —	8.78 1.7	0.02 —	Bolts, Nuts, Rivets and Screws	57.50
0.40 0.1	0.09 —	0.10 —	0.45 0.1	0.01 —	—	0.54 0.2	0.44 0.1	0.03 —	Brass and Yellow Metal Light Goods	58.60
8.66 0.7	2.49 0.7	0.84 0.2	8.17 0.9	0.27 0.2	0.08 0.1	1.64 0.6	16.67 3.3	0.21 0.1	Constructional Engineering	96.77
8.78 1.6	0.05 —	0.05 —	8.51 0.9	0.01 —	0.05 0.1	1.22 0.4	2.52 0.5	0.20 0.1	Tin Boxes, Canisters and Containers	80.86
2.39 0.4	1.25 0.3	0.98 0.2	0.76 0.2	0.20 0.1	0.11 0.2	0.72 0.2	8.26 0.6	0.44 0.2	Other Sheet Metal Work (not Brass)	73.21
0.77 0.1	1.06 0.3	0.98 0.2	0.26 0.1	0.16 0.1	0.04 0.1	1.02 0.3	0.59 0.1	0.75 0.4	Small Arms	90.55
1.71 0.3	0.42 0.1	0.96 0.2	1.77 0.5	0.20 0.1	0.08 0.1	4.42 1.5	2.02 0.4	0.18 0.1	Other Metal Industries	74.80
1.58 0.3	1.18 0.3	2.09 0.5	0.70 0.2	0.48 0.3	0.14 0.3	0.81 0.3	1.83 0.3	0.60 0.3	Precious Metals, Jewellery and	68.20
3.05 0.6	0.04 —	0.02 —	0.01 —	0.08 —	—	0.01 —	5.66 1.1	0.26 0.1	Cotton Carding and Spinning	41.65
1.64 0.3	0.01 —	0.08 —	0.01 —	0.01 —	—	0.08 —	1.49 0.3	0.06 —	Cotton Weaving	83.52
0.25 0.1	0.08 —	0.08 —	—	0.06 —	—	—	0.09 —	—	Velvet and Fustian Cutting	22.53
25.17 4.7	0.17 —	0.80 0.1	0.06 —	0.24 0.2	—	0.07 —	1.23 0.2	0.46 0.2	Other Cotton Manufacture	84.98
1.84 0.3	0.08 —	1.75 0.4	0.21 0.1	0.29 0.2	4.02 7.4	1.51 0.5	1.42 0.3	1.27 0.6	Wool, Worsted and Shoddy	48.65
0.78 0.1	8.06 0.8	0.08 —	0.12 —	18.90 13.4	0.08 0.1	0.21 0.1	0.21 —	0.02 —	Artificial Silk Spinning	54.55
27.19 5.0	5.01 1.3	1.40 0.3	0.05 —	0.10 0.1	0.88 1.6	0.55 0.2	2.10 0.4	0.01 —	Silk Throwing, Spinning and Weaving	41.85
0.19 —	0.01 —	2.48 0.6	0.01 —	0.02 —	0.08 0.1	41.50 14.2	12.58 2.5	29.58 14.6	Flax and Hemp Manufacturing	32.15
0.05 —	0.01 —	0.01 —	0.01 —	—	0.01 —	87.50 29.9	0.46 0.1	11.36 5.6	Jute Manufacturing	84.20
11.18 2.1	0.71 0.2	0.51 0.1	0.75 0.2	0.10 0.1	0.02 —	0.24 0.1	2.78 0.5	0.10 —	Asbestos Manufacturing	63.27
3.44 0.6	15.82 4.2	4.49 1.0	1.07 0.3	0.07 —	0.08 0.1	1.22 0.4	10.96 2.2	0.86 0.4	Other Fibres	60.80
68.70 11.8	0.86 0.2	0.87 0.2	0.17 —	0.09 0.1	3.84 7.1	2.87 0.8	8.48 1.7	1.86 0.9	Hosiery and Other Knitted Goods	24.75
71.16 13.2	0.18 —	8.76 2.0	0.08 —	0.08 —	0.01 —	0.08 —	15.82 3.0	0.04 —	Lace Manufacturing	44.58
0.17 —	0.40 0.1	0.78 0.2	0.15 —	0.05 —	0.07 0.1	5.07 1.7	22.92 4.6	0.49 0.2	Carpets and Rugs	41.55

Table I—REGIONAL DISTRIBUTION OF

Code Numbers in the Census	Description of Industry	Total No. of persons employed in the Industry	Greater London	South-East (excluding Greater London)	North I	North II	North III	North IV	Midland I
818	Rope, Cord and Twine . . .	18,698	10.14 0.6	2.06 0.2	8.88 2.0	2.54 1.0	4.90 0.6	20.88 1.4	5.01 0.5
815	Canvas Goods, Tents, Tarpaulins .	10,701	26.18 1.3	5.76 0.5	2.06 0.5	2.08 0.8	2.80 0.4	20.65 1.4	7.11 0.7
814, 816-9	Other Textiles (not Dress) . . .	88,804	25.85 1.3	2.57 0.2	0.88 0.1	0.80 0.1	2.48 0.3	25.90 1.8	18.84 1.3
820-8	Textile Finishing	111,421	2.00 0.1	1.01 0.1	0.08 —	0.48 0.2	19.25 2.4	49.65 3.4	2.28 2.2
824	Textile Making-up and Export Packing	4,974	0.86 —	0.26 —	0.06 —	0.08 —	7.62 1.0	87.00 5.9	0.98 —
880-2	Tanning, Currying, Fellmongering	55,059	34.95 1.8	5.78 0.5	1.04 0.2	2.60 1.0	7.82 1.0	19.24 1.3	5.88 0.6
886-9	Saddlery, Harness and other Leather (except Apparel)	86,410	37.45 1.9	5.19 0.5	1.41 0.3	1.48 0.6	4.86 0.6	10.06 0.7	23.26 2.3
840-1	Tailoring	802,995	29.15 1.5	5.42 0.5	1.59 0.4	1.45 0.5	19.27 2.4	17.61 1.2	7.89 0.8
842-8	Dress, Blouse, Shirt, etc., Making	286,620	41.57 2.1	6.01 0.5	1.60 0.4	1.82 0.5	5.98 0.8	18.11 1.2	6.56 0.6
847	Millinery Manufacturing	80,176	53.80 2.7	6.08 0.5	1.75 0.4	1.24 0.5	5.58 0.7	14.52 1.0	6.55 0.6
848-51	Hat and Cap Manufacturing	40,497	15.95 0.8	37.07 3.3	0.88 0.1	0.48 0.2	1.86 0.2	36.20 2.5	5.81 0.5
852	Glove Manufacturing (not Knitted or Rubber)	18,285	7.18 0.4	9.48 0.8	0.57 0.1	0.97 0.4	0.79 0.1	5.54 0.4	20.47 2.0
858-4	Boots and Shoes (not Rubber)	216,238	12.84 0.6	4.97 0.4	1.87 0.3	1.54 0.6	4.42 0.6	10.44 0.7	8.71 0.8
856	Clothing Renovating and Repairing	2,288	53.87 2.7	11.40 1.0	0.52 0.1	1.48 0.6	2.88 0.4	12.40 0.8	8.40 0.3
844-6, 855, 859	Other Clothing (including Umbrellas, etc.)	87,685	36.15 1.8	16.17 1.4	0.76 0.2	0.40 0.2	2.92 0.4	12.82 0.9	8.84 0.8
860	Grain Milling	40,817	12.22 0.6	11.18 1.0	3.82 0.8	6.25 2.4	5.05 0.6	22.58 1.5	8.22 0.8
862	Cattle, and Poultry Foods (not Oil Cake)	6,248	36.67 1.9	7.89 0.7	1.89 0.3	3.71 1.4	1.68 0.2	22.72 1.5	6.52 0.6
864-5	Bread, Flour, Confectionery, Biscuits	258,117	17.70 0.9	12.00 1.1	3.21 0.7	2.87 1.1	5.44 0.7	17.52 1.2	8.49 0.8
866	Sugar Making and Refining	21,147	31.50 1.6	2.25 0.2	0.88 0.1	1.86 0.5	3.86 0.4	26.71 1.8	4.10 0.4
867, 869	Sugar Confectionery, Cocoa, Chocolate	86,151	26.65 1.4	3.74 0.3	3.50 0.8	3.21 1.2	15.48 2.0	11.76 0.9	20.19 2.0
861, 868, 870-9	Other Food Manufacturing	114,468	27.52 1.4	8.92 0.8	2.41 0.5	3.01 1.1	3.51 0.4	14.01 1.0	7.77 0.8
880-8	Malting, Brewing and Distilling	98,626	20.15 1.0	12.66 1.1	3.08 0.7	1.48 0.6	7.06 0.9	10.55 0.7	15.74 1.5
885	Mineral and Aerated Waters Manufacturing	21,789	22.07 1.1	9.53 0.8	4.02 0.9	2.52 0.9	7.75 1.0	16.81 1.1	9.42 0.9

INDUSTRY IN GREAT BRITAIN—continued

Midland II	East	South-West	Wales I	Wales II	Scotland I	Scotland II	Scotland III	Scotland IV	Description of Industry	Male workers in the Industry as a percentage of the Total
8.24 0.6	6.25 1.6	6.80 1.6	0.70 0.2	0.28 0.2	0.02 —	10.88 3.7	14.41 2.9	3.04 1.5	Rope, Cord and Twine	41.90
1.14 0.2	3.78 1.0	2.30 0.5	1.32 0.4	0.16 0.1	0.07 0.1	8.30 2.3	11.90 2.4	4.48 2.2	Canvas Goods, Tents, Tarpaulins	41.90
21.87 4.0	0.69 0.2	1.11 0.3	0.40 0.1	0.08 0.1	0.04 0.1	0.91 0.3	3.92 0.8	0.12 0.1	Other Textiles (not Dress)	25.05
13.45 2.5	0.04 —	0.08 —	0.02 —	0.08 —	0.35 0.6	1.93 0.7	3.36 1.7	1.07 0.5	Textile Finishing	77.00
2.03 0.4	0.08 —	0.06 —	0.08 —	— —	— —	0.68 0.2	0.76 0.2	0.18 0.1	Textiles, Making-up and Export Packing	67.90
3.92 1.6	2.28 0.6	3.59 0.8	0.27 0.1	0.85 0.6	0.50 0.9	1.58 0.5	4.51 0.9	0.28 0.1	Tanning, Currying, Fellmongering	75.92
3.24 0.6	3.11 0.8	2.73 0.6	1.07 0.3	0.52 0.4	0.23 0.4	1.15 0.4	3.37 0.7	0.84 0.4	Saddlery, Harness and other Leather (except Apparel)	57.44
4.53 0.3	2.30 0.6	2.76 0.6	1.36 0.4	0.49 0.3	0.20 0.4	1.08 0.4	3.92 0.8	0.78 0.4	Tailoring	42.63
5.15 1.0	1.71 0.5	3.61 0.3	1.82 0.5	0.81 0.6	0.19 0.4	0.86 0.3	3.99 0.8	0.73 0.4	Dress, Blouse, Shirt, etc., Making	7.23
2.89 0.5	1.17 0.3	1.61 0.4	1.27 0.3	0.63 0.4	0.18 0.3	0.96 0.3	1.49 0.3	0.51 0.3	Millinery Manufacturing	7.40
0.58 0.1	0.17 —	0.20 —	0.16 —	0.01 —	0.04 0.1	0.09 —	2.05 0.4	0.04 —	Hat and Cap Manufacturing	42.43
3.68 0.7	1.56 0.4	47.70 11.1	0.40 0.1	0.23 0.2	0.02 —	0.11 —	0.34 0.1	0.99 0.5	Glove Manufacturing (not Knitted or Rubber)	35.33
38.65 7.1	7.54 2.0	2.66 0.6	1.33 0.4	0.65 0.5	0.21 0.4	0.98 0.3	3.01 0.6	1.03 0.5	Boots and Shoes (not Rubber)	72.78
2.40 0.4	2.40 0.6	1.31 0.3	0.18 —	0.26 0.2	0.04 0.1	1.32 0.7	5.42 1.1	0.52 0.3	Clothing Renovating and Repairing	55.82
13.00 2.4	3.00 0.8	2.24 0.5	0.71 0.2	0.25 0.2	0.02 —	0.36 0.1	2.56 0.5	0.13 0.1	Other Clothing (including Umbrellas, etc.)	21.02
3.31 0.6	3.64 2.3	5.04 1.2	5.47 1.5	0.93 0.7	0.60 1.1	2.46 0.8	2.71 0.5	1.39 0.9	Grain Milling	39.94
1.87 0.3	6.87 1.3	1.78 0.4	0.77 0.2	0.69 0.5	0.06 0.1	2.94 1.0	1.57 0.3	3.33 1.7	Cattle and Poultry Foods (not Oil Cake)	30.70
3.57 0.7	3.49 0.9	4.31 1.0	3.09 0.8	1.21 0.9	0.33 0.7	4.63 1.6	3.97 1.3	2.30 1.4	Bread, Flour, Confectionery, Biscuits	64.40
4.97 0.9	16.23 4.3	0.18 —	0.19 0.1	0.05 —	0.02 —	1.39 0.6	6.71 1.3	0.11 0.1	Sugar Making and Refining	36.70
1.52 0.3	2.21 0.6	1.36 0.3	1.31 0.4	0.11 0.1	0.01 —	2.57 0.9	6.10 1.2	0.45 0.2	Sugar Confectionery, Cocoa, Chocolate	35.14
2.26 0.4	3.91 2.4	5.32 1.2	0.79 0.2	0.30 0.2	0.69 1.3	1.66 0.6	5.05 1.0	7.37 3.9	Other Food Manufacturing	54.30
4.57 0.8	5.59 1.5	3.97 0.9	2.41 0.7	0.42 0.3	0.04 0.1	6.33 2.2	4.07 0.8	1.92 0.9	Malting, Brewing and Distilling	35.27
4.14 0.8	3.30 0.9	2.69 0.6	3.94 1.1	1.09 0.8	0.61 1.1	4.19 1.4	6.23 1.2	2.21 1.1	Mineral and Aerated Waters Manufacturing	72.57

Table I—REGIONAL DISTRIBUTION OF

Code Numbers in the Census	Description of Industry	Total No. of persons employed in the Industry	Greater London	South-East (excluding Greater London)	North I	North II	North III	North IV	Midland I
384, 386-9	Cider, Perry and Wine Bottling, etc.	8,814	31.26 1.6	3.17 0.3	2.77 0.6	1.23 0.5	5.20 0.7	17.00 1.2	15.20 1.5
390	Tobacco, etc., and Snuff . . .	52,918	32.87 1.7	3.94 0.3	1.52 0.3	0.48 0.2	1.15 0.1	16.88 1.1	21.05 2.1
400	Sawmills and Joinery Works . . .	50,261	22.88 1.2	12.08 1.1	4.68 1.1	4.60 1.7	8.24 1.0	10.86 0.7	7.74 0.8
402	Cooperages	5,747	18.12 0.9	2.35 0.2	1.81 0.4	3.88 1.5	5.19 0.7	17.90 1.2	12.26 1.2
408	Wooden Boxes and Packing Cases Manufacturing	12,428	34.58 1.3	1.75 0.2	0.44 0.1	4.56 1.7	6.31 0.8	16.51 1.1	11.19 1.1
401, 404-9	Other Wood Working (not Furniture)	73,605	11.31 0.6	9.76 0.9	1.75 0.4	4.14 1.6	5.65 0.7	8.40 0.6	8.70 0.8
410	Cabinets, Furniture and Upholstery	133,792	36.85 1.9	18.19 1.2	2.75 0.6	1.24 0.5	6.16 0.8	10.91 0.7	9.18 0.9
412	House and Shop Fitting	29,385	45.70 2.4	8.55 0.8	2.58 0.6	0.70 0.3	7.18 0.9	9.14 0.6	18.96 1.4
411, 418-9	Manufacturing of Bedding, Picture Frames, etc.	15,393	37.72 1.9	6.98 0.6	3.92 0.9	0.83 0.3	6.40 0.8	14.27 1.0	10.86 1.1
420	Paper and Board Manufacturing	61,267	10.05 0.5	28.32 2.5	2.69 0.6	1.20 0.5	2.98 0.4	16.50 1.1	5.76 0.6
430	Wallpaper Manufacturing	8,067	41.40 2.1	1.91 0.2	1.20 0.3	1.62 0.6	5.80 0.7	40.60 2.8	1.44 0.1
434-5	Pencils, Penholders, etc.	8,917	58.82 3.0	6.33 0.6	0.50 0.1	1.48 0.6	1.02 0.1	14.90 1.0	5.82 0.6
431-3, 439	Cardboard Boxes, Paper Bags, Stationery, etc.	73,011	37.38 1.9	10.28 0.9	0.90 0.2	0.57 0.2	3.89 0.5	16.64 1.1	11.21 1.1
440-59	Printing, Book-binding and Photography	345,325	38.05 1.9	10.45 0.9	2.45 0.6	1.69 0.6	6.22 0.8	12.11 0.8	8.46 0.8
460-9	Building and Decorating, etc.	1,122,794	24.58 1.3	16.62 1.5	3.11 0.7	2.33 0.9	5.63 0.7	11.45 0.8	9.82 1.0
470-1	Rubber Goods Manufacturing	64,117	20.87 1.1	3.26 0.3	0.47 0.1	0.19 0.1	0.85 0.1	27.28 1.9	21.50 2.1
480-9	Musical Instruments Manufacturing	33,664	69.85 3.6	3.31 0.7	1.07 0.2	0.34 0.3	3.43 0.4	4.34 0.3	4.63 0.5
490	Linoleum, Oilcloth, etc., Manufacturing	14,381	17.60 0.9	5.45 0.5	0.20 —	1.33 0.5	1.11 0.1	37.92 2.6	1.24 0.1
492	Celluloid and Similar Compositions	5,250	42.77 2.2	6.54 0.6	0.57 —	0.18 —	4.29 0.5	0.80 0.1	23.60 2.3
495	Brooms and Brushes	16,988	31.60 1.6	12.35 1.1	1.55 0.4	1.37 0.5	7.54 1.0	10.97 0.7	15.84 1.5
496	Photographic Plates, Films and Papers	5,018	68.30 3.5	21.04 1.9	0.36 0.1	0.16 0.1	0.33 —	3.67 0.2	4.85 0.5
497	Photographic and Cinematographic Apparatus	3,612	77.18 3.9	5.09 0.5	0.55 0.1	0.06 —	1.25 0.2	6.31 0.4	4.96 0.5
498	Other Scientific and Surgical Instruments (not Electrical)	32,992	52.68 2.7	6.70 0.6	1.49 0.3	0.72 0.3	7.66 1.0	7.91 0.5	7.12 0.7

INDUSTRY IN GREAT BRITAIN—continued

Midland II	East	South-West	Wales I	Wales II	Scotland I	Scotland II	Scotland III	Scotland IV	Description of Industry	Male workers in the Industry as a percentage of the Total
4.74 0.9	7.20 1.9	4.98 1.2	2.87 0.6	1.10 0.8	0.07 0.1	1.87 0.6	1.56 0.3	0.85 0.2	Cider, Perry, and Wine Bottling, etc.	68.12
12.41 2.3	0.96 0.3	3.14 0.7	1.18 0.3	0.12 0.1	0.02 —	1.01 0.3	8.21 0.6	0.11 0.1	Tobacco, etc., and Snuff	37.86
3.25 0.6	6.86 1.8	4.68 1.1	2.18 0.6	0.94 0.7	0.18 0.3	3.24 1.1	5.20 1.0	2.85 1.2	Saw Mills and Joinery Works	92.57
1.20 0.2	4.88 1.3	2.35 0.5	1.65 0.4	0.45 0.3	0.12 0.2	6.98 2.4	13.17 2.6	8.17 4.0	Cooperages	96.80
2.88 0.5	3.18 0.8	1.04 0.2	0.86 0.2	0.24 0.2	0.01 —	3.04 1.0	9.81 1.9	4.14 2.0	Wooden Boxes and Packing Cases Manufacturing	86.24
5.64 1.0	5.55 1.5	6.79 1.6	2.06 0.6	2.08 1.4	2.06 3.3	7.75 2.6	11.20 2.2	7.24 3.6	Other Wood Working (not Furniture)	92.97
4.88 0.8	2.18 0.6	2.55 0.6	1.27 0.3	0.48 0.3	0.17 0.3	2.14 0.7	5.59 1.1	1.07 0.5	Cabinets, Furniture and Upholstery	85.78
3.16 0.6	1.09 0.3	1.79 0.4	1.18 0.3	0.10 0.1	0.02 —	0.99 0.3	3.58 0.7	0.16 0.1	House and Shop Fitting	89.86
3.39 0.6	2.29 0.6	2.65 0.6	1.33 0.4	0.18 0.1	0.05 0.1	2.27 0.8	5.89 1.2	0.99 0.5	Manufacturing of Bedding, Picture Frames, etc.	68.27
2.42 0.4	1.90 0.5	3.95 0.9	0.91 0.2	0.65 0.5	0.42 0.8	11.93 4.1	5.75 1.1	4.57 2.3	Paper and Board Manufacturing	75.20
2.28 0.4	0.20 0.1	0.47 0.1	0.20 0.1	0.04 —	0.01 —	0.82 0.3	0.97 0.2	0.06 —	Wallpaper Manufacturing	72.10
4.97 0.9	0.18 —	0.85 0.1	0.40 0.1	0.08 —	—	2.65 0.9	2.41 0.5	0.12 0.1	Pencils, Penholders, etc.	45.55
7.57 1.4	1.57 0.4	1.10 0.3	0.85 0.1	0.08 —	0.04 0.1	3.51 1.2	3.69 0.7	1.34 0.7	Cardboard Boxes, Paper Bags, Stationery, etc.	32.00
4.22 0.8	2.49 0.7	2.82 0.7	1.41 0.4	0.50 0.4	0.17 0.3	3.45 1.2	4.60 0.9	0.87 0.4	Printing, Book-binding and Photography	70.60
4.57 0.8	3.61 1.0	5.62 1.3	2.27 0.6	1.41 1.0	0.43 0.8	2.47 0.8	4.27 0.8	1.90 0.9	Building and Decorating, etc.	98.72
3.60 0.7	0.28 0.1	4.08 1.0	0.86 0.1	0.07 —	0.02 —	9.79 3.3	6.28 1.2	0.16 0.1	Rubber Goods Manufacturing	64.58
1.94 0.4	1.36 0.4	1.33 0.3	0.90 0.2	0.21 0.1	0.02 —	0.41 0.1	0.96 0.2	0.22 0.1	Musical Instruments Manufacturing	80.14
0.15 —	0.07 —	0.10 —	0.08 —	0.01 —	0.03 0.1	33.82 11.5	0.69 0.1	0.24 0.1	Linoleum, Oilcloth, etc., Manufacturing	87.20
7.49 1.4	7.86 2.1	0.6 —	— —	0.02 —	—	0.46 0.2	0.17 —	5.28 2.6	Celluloid and Similar Compositions	62.98
2.80 0.5	6.35 1.7	3.54 0.8	1.16 0.3	0.14 0.1	0.04 0.1	1.44 0.5	2.91 0.6	0.41 0.2	Brooms and Brushes	61.23
0.24 —	0.14 —	0.10 —	0.08 —	— —	—	0.08 —	0.62 0.1	0.02 —	Photographic Plates, Films and Papers	55.25
1.69 0.3	0.08 —	0.33 0.1	0.39 0.1	0.17 0.1	—	0.06 —	1.88 0.4	0.03 —	Photographic and Cinematographic Apparatus	55.88
2.36 0.4	2.16 0.6	1.19 0.3	0.88 0.2	0.14 0.1	0.03 0.1	1.55 0.5	6.84 1.4	0.43 0.2	Other Scientific and Surgical Instruments (not Electrical)	72.72

Table I—REGIONAL DISTRIBUTION C

Code Numbers in the Census	Description of Industry	Total No. of persons employed in the Industry	Greater London	South-East (excluding Greater London)	North I	North II	North III	North IV	Midland I
499	Toys, Games and Sports Requisites	20,181	44.70 2.3	6.07 0.5	2.10 0.5	0.26 0.1	5.39 0.7	11.04 0.7	20.88 2.0
491, 498-4, 500-9	Other Manufactures	39,859	47.40 2.4	4.99 0.4	2.70 0.6	0.66 0.2	5.25 0.7	10.48 0.7	14.76 1.4
510-6	Gas Works	126,186	32.12 1.6	12.66 1.1	4.15 0.9	2.06 0.3	6.07 0.8	12.14 0.8	9.85 1.0
518-21	Water Works and Hydraulic Power	32,479	20.05 1.0	15.00 1.3	6.42 1.5	3.71 1.4	11.48 1.4	14.13 1.0	9.61 0.9
528-9	Electricity Supply	86,795	23.66 1.2	11.70 1.0	4.56 1.0	2.03 0.8	8.92 1.1	15.71 1.1	10.34 1.0
580	Railways	556,426	18.52 0.9	9.36 0.8	3.91 0.9	3.53 1.3	3.01 1.0	13.63 0.9	9.45 0.9
540	Motor Garages, Livery Stables, etc.	98,814	20.52 1.5	15.12 1.3	2.62 0.6	2.46 0.9	4.31 0.5	9.28 0.6	8.97 0.9
541	Cartage and Haulage Contracting	185,741	26.90 1.3	11.12 1.0	3.90 0.9	2.33 0.9	6.62 0.8	14.57 1.0	9.81 1.0
542-4	Motor Coach and Omnibus Services	139,761	26.97 1.4	14.23 1.3	5.47 1.2	2.50 0.9	6.23 0.8	8.86 0.6	8.48 0.8
545-6	Tramway Services	84,448	22.00 1.1	4.89 0.4	3.73 0.8	1.83 0.7	12.95 1.6	23.39 1.6	9.14 0.9
549	Other Road Transport	4,563	18.32 0.9	24.80 2.2	2.57 0.6	2.57 1.0	3.93 0.5	6.30 0.4	10.40 1.0
550-1	Shipping Service	186,270	18.73 1.0	11.01 1.0	7.94 1.3	5.86 2.2	1.10 0.1	26.33 1.3	1.80 0.2
554	Tug, Barge, Lighter, Boat Service	21,141	31.13 1.6	17.20 1.5	4.80 1.1	3.13 3.1	4.07 0.5	11.17 0.8	3.77 0.9
560-4	Harbours, Docks, Piers, etc., Light-houses	78,106	18.60 1.0	10.05 0.9	6.16 1.4	5.63 2.1	1.38 0.2	28.33 2.0	3.33 0.3
566-8	Canal Authorities and Conservancy Boards	5,108	15.57 0.3	14.09 1.3	2.23 0.5	3.04 1.1	12.58 1.6	18.25 1.2	13.80 1.3
569	Loading and Discharging Vessels .	58,338	39.97 2.0	4.15 0.4	3.23 0.7	7.73 2.9	0.17 —	20.73 1.4	2.85 0.3
580	Aerodrome and Aviation Service .	1,612	59.50 3.0	15.75 1.4	0.99 0.2	4.23 1.6	0.87 0.1	5.89 0.4	3.85 0.4
586-7	Storage	13,911	37.25 1.9	4.33 0.4	1.99 0.5	1.32 0.7	1.93 0.2	27.93 1.9	4.93 0.5
590	Messenger Service and Portage .	4,725	35.32 1.3	3.60 0.3	1.29 0.3	1.33 0.7	3.55 0.4	19.30 1.3	5.16 0.5
591	Telegraphs and Telephones (not Government)	9,202	62.32 3.2	3.43 0.7	2.55 0.6	1.32 0.7	1.41 0.2	3.66 0.6	1.39 0.2
600-70	Distributive Trades	2,915,096	24.32 1.2	11.45 1.0	4.10 0.9	2.61 1.0	6.70 0.3	14.77 1.0	3.53 0.3
680-99	Commerce, Banking, Insurance, Finance	419,776	33.32 2.0	11.42 1.0	2.94 0.7	1.79 0.7	5.06 0.6	12.30 0.9	7.09 0.7
700	Defence	251,044	14.94 0.3	47.35 4.2	0.90 0.2	4.03 1.5	1.01 0.1	1.97 0.1	2.44 0.2

INDUSTRY IN GREAT BRITAIN—continued

Midland II	East	South-West	Wales I	Wales II	Scotland I	Scotland II	Scotland III	Scotland IV	Description of Industry	Male workers in the Industry as a percentage of the Total
1.24 0.2	0.74 0.2	0.69 0.2	0.12 —	0.02 —	0.86 0.7	3.78 1.3	2.09 0.4	0.95 0.5	Toys, Games and Sports Requisites	54.84
2.56 0.5	1.92 0.5	0.95 0.2	0.78 0.2	0.18 0.1	0.11 0.2	1.02 0.3	5.97 1.2	0.86 0.2	Other Manufactures	50.75
4.48 0.8	2.44 0.6	4.46 1.0	2.10 0.6	0.09 0.5	0.22 0.4	2.08 0.7	8.58 0.7	0.87 0.4	Gas Works	96.84
4.23 0.8	2.25 0.6	3.08 0.7	2.96 0.8	1.19 0.8	0.18 0.3	2.05 0.7	2.92 0.6	0.72 0.4	Water Works and Hydraulic Power	97.98
4.64 0.9	3.08 0.8	3.78 0.9	2.58 0.7	0.87 0.6	0.21 0.4	2.12 0.7	5.19 1.0	0.75 0.4	Electricity Supply	96.80
7.14 1.3	4.86 1.1	4.17 1.0	5.53 1.5	1.52 1.1	0.56 1.0	3.08 1.1	5.31 1.1	1.87 0.9	Railways	97.05
3.37 0.6	3.04 0.8	7.05 1.6	2.73 0.7	2.10 1.5	0.61 1.1	2.80 0.8	3.85 0.8	2.70 1.3	Motor Garages, Livery Stables, etc.	95.64
3.99 0.7	3.56 0.9	4.28 1.0	2.50 0.7	1.05 0.7	0.39 0.7	2.36 0.8	4.50 0.9	2.06 1.0	Cartage and Haulage Contracting	97.95
5.10 0.9	2.65 0.7	3.38 0.8	3.70 1.0	1.37 1.0	0.38 0.7	3.26 1.1	6.12 1.2	1.23 0.6	Motor Coach and Omnibus Services	94.08
3.63 0.7	1.12 0.3	1.72 0.4	2.66 0.7	0.14 0.1	0.01 —	3.55 1.2	3.48 1.7	0.87 0.4	Tramway Services	96.85
4.61 0.9	7.00 1.3	9.67 2.3	3.25 0.9	2.39 1.7	0.53 1.0	1.40 0.5	1.62 0.3	0.72 0.4	Other Road Transport	87.07
0.14 —	1.58 0.4	2.64 0.6	6.86 1.9	1.47 1.0	0.11 0.2	3.09 1.1	3.24 1.6	2.47 1.2	Shipping Service	95.51
2.15 0.4	3.72 1.0	3.47 0.8	2.02 0.5	0.67 0.5	0.02 —	0.72 0.2	1.00 0.2	0.88 0.4	Tug, Barge, Lighter, Boat Service	97.58
0.08 —	5.31 1.4	2.49 0.6	9.44 2.6	1.06 0.8	0.04 0.1	2.17 0.7	3.92 0.8	1.55 0.8	Harbours, Docks, Piers, etc., Light-houses	98.20
4.95 0.9	2.88 0.8	1.72 0.4	3.31 0.9	0.65 0.5	— —	0.65 0.2	1.33 0.3	— —	Canal Authorities and Conservancy Boards	97.55
0.03 —	2.20 0.6	0.85 0.2	5.95 1.6	0.06 —	0.01 —	4.70 1.6	6.25 1.2	0.99 0.6	Loading and Discharging Vessels	98.84
2.36 0.4	2.17 0.6	1.99 0.5	0.62 0.2	0.62 0.4	0.12 0.2	— —	0.81 0.2	0.19 0.1	Aerodrome and Aviation Service	89.20
1.26 0.2	1.08 0.3	1.27 0.3	1.75 0.5	0.08 0.1	0.04 0.1	2.34 0.8	11.35 2.3	0.54 0.3	Storage	83.50
2.56 0.5	1.80 0.6	3.26 0.8	0.85 0.2	1.59 1.1	0.23 0.4	3.53 1.2	3.39 0.7	7.15 3.5	Messenger Service and Portage	99.02
0.31 0.1	0.79 0.2	4.62 1.1	1.57 0.4	0.90 0.6	0.09 0.2	1.22 0.4	2.46 0.5	0.52 0.3	Telegraphs and Telephones (not Government)	90.90
4.17 0.3	3.62 1.0	4.11 1.0	3.16 0.9	1.15 0.8	0.46 0.9	3.12 1.1	5.68 1.1	2.02 1.0	Distributive Trades	68.25
3.10 0.6	2.33 0.6	2.92 0.7	2.56 0.7	0.93 0.7	0.27 0.5	2.40 0.8	4.14 0.8	1.37 0.7	Commerce, Banking, Insurance, Finance	77.25
1.03 0.2	3.79 1.0	16.17 3.8	0.58 0.2	0.93 0.7	0.05 0.1	2.31 0.8	0.90 0.2	0.97 0.5	Defence	97.38

Table I—REGIONAL DISTRIBUTION OF

Code Numbers in the Census	Description of Industry	Total No. of persons employed in the Industry	Greater London	South-East (excluding Greater London)	North I	North II	North III	North IV	Midland I
710-9	Central Civil Government . . .	859,049	37.19 1.9	12.55 1.1	2.75 0.6	1.97 0.7	4.52 0.6	9.40 0.6	7.56 0.7
720-9	Local Government . . .	1,019,868	18.80 0.9	11.22 1.0	4.94 1.1	2.94 1.1	8.20 1.0	14.81 1.0	9.77 0.9
730-49	Professions . . .	666,152	28.86 1.4	16.10 1.4	2.85 0.6	2.20 0.8	5.11 0.6	10.62 0.7	7.96 0.8
750-9	Entertainment and Sport . . .	197,463	30.65 1.6	12.01 1.1	3.88 0.9	2.28 0.9	6.41 0.8	14.75 1.0	7.54 0.7
760	Domestic Service . . .	1,625,930	18.80 1.0	21.17 1.9	3.62 0.8	3.28 1.2	4.94 0.6	8.76 0.6	9.00 0.9
771-8	Hotels, etc.	666,679	31.45 1.6	14.00 1.2	3.25 0.7	2.88 1.1	5.24 0.7	12.49 0.8	7.13 0.7
779	Laundries, Job Dyeing, etc. . .	179,681	34.20 1.7	16.12 1.4	2.50 0.6	1.77 0.7	4.82 0.6	11.78 0.8	7.42 0.7
780-9	Other Personal Service . . .	174,087	27.92 1.4	11.92 1.1	3.50 0.8	2.87 0.9	6.95 0.9	15.37 1.0	9.05 0.9
001, 109, 118, 134, 149, 292, 556, 790, 809,	Other Industries and Industry not stated	189,954	22.80 1.1	10.52 0.9	3.70 0.8	2.74 1.0	5.17 0.7	11.95 0.8	8.55 0.8

INDUSTRY IN GREAT BRITAIN—continued

Midland II	East	South-West	Wales I	Wales II	Scotland I	Scotland II	Scotland III	Scotland IV	Description of Industry	Male workers in the Industry as a percentage of the Total
3.05 0.6	3.14 0.8	4.35 1.0	2.92 0.8	1.89 1.0	0.51 0.9	3.05 1.0	3.36 0.7	2.81 1.1	Central Civil Government	75.18
4.82 0.9	4.23 1.1	4.83 1.0	4.19 1.1	1.61 1.1	0.54 1.0	2.59 0.9	5.28 1.0	2.24 1.1	Local Government	69.07
3.49 0.6	3.69 1.0	5.17 1.2	2.73 0.7	1.58 1.1	0.53 1.0	4.10 1.4	4.75 0.9	2.81 1.1	Professions	51.40
3.38 0.6	3.31 0.9	3.32 0.8	2.88 0.8	0.93 0.7	0.24 0.4	2.72 0.9	4.48 0.9	1.28 0.6	Entertainment and Sport	68.22
4.06 0.8	5.31 1.4	7.35 1.7	2.85 0.8	2.00 1.4	0.81 1.5	2.88 0.8	3.05 0.6	2.49 1.2	Domestic Service	18.49
3.15 0.6	3.42 0.9	5.35 1.2	2.89 0.6	1.86 1.3	0.84 0.6	2.10 0.7	3.32 0.7	1.65 0.8	Hotels, etc.	48.07
2.94 0.5	2.43 0.6	3.90 0.9	1.45 0.4	0.77 0.5	0.47 0.9	2.48 0.8	4.59 0.9	2.32 1.1	Laundries, Job Dyeing, etc.	22.23
4.43 0.8	3.06 0.8	3.72 0.9	2.79 0.8	0.90 0.6	0.27 0.5	2.40 0.8	4.08 0.8	1.21 0.6	Other Personal Service	64.57
3.03 0.6	3.47 0.9	4.32 1.0	3.31 0.9	1.79 1.3	0.74 1.4	6.40 2.2	7.31 1.5	4.63 2.3	Other Industries and Industry not stated	76.00

ERRATA

APPENDIX I—TABLE I

Code No.	Industry	Region	Should be
014	Gardening	Scotland IV	2.1
060	Bricks, Tiles, etc.	Scotland III	5.60
064	Glass	South-East	2.63
064	Glass	Midlands I	23.68
			2.3
090-1	White Lead, Paint, etc.	South-East	4.77
171-8	Other Electrical Manufactures	Scotland II	0.1
211-5	Small tools, etc.	South-East	0.96
241	Tin boxes, etc.	Greater London	34.60
324	Textile Making-up, etc.	North IV	86.87
340-1	Tailoring	Greater London	29.35
360	Grain Milling	Midland II	3.51
			0.7
364-5	Bread, etc.	Scotland I	0.58
			1.1
367, 369	Sugar Confectionery, etc.	North IV	0.9
402	Cooperages	East	4.40
			1.2
470-1	Rubber Goods	North IV	1.8
492	Celluloid, etc.	North I	0.1
		South-West	0.06
541	Cartage and Haulage Contracting	Greater London	1.3
700	Defence	North III	1.61
			0.2

TABLE 2—COMPARISON OF THE REGIONAL DISTRIBUTION OF

The regions are defined and

The net value of the output of each industry in each region is expressed as a percentage of the Owing to the restriction as to publication of information concerning individual firms, regional figures

The 1935 census figures are from the preliminary results

Description of Trade	Greater London			Lancs., etc.			West Riding			Northumber-land, etc.			Warwicks, etc.		
	1924	1930	1935	1924	1930	1935	1924	1930	1935	1924	1930	1935	1924	1930	1935
I.—Textile Trades:															
Cotton Spinning . . . . .	...	...	...	83.9	82.6	80.5	5.0	5.8	7.0	...	...	...	...	...	...
Cotton Weaving . . . . .	...	...	...	88.0	89.0	84.2	7.5	4.5	...	...	...	...	...	...	...
Woolen and Worsted . . . . .	...	...	...	4.1	5.4	4.9	75.5	72.8	72.8	...	...	...	8.7	4.7	5.1
Silk and Rayon . . . . .	...	...	...	15.0	17.4	29.2	7.7	5.6	11.4	...	...	...	35.5	24.8	27.1
Jute . . . . .	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Hosiery	3.2	2.9	...	4.2	5.7	7.6	0.4	0.3	...	...	...	...	2.0	4.2	...
Textile Finishing . . . . .	...	...	...	55.6	58.8	52.0	20.3	18.7	20.3	...	...	...	...	...	...
Lace . . . . .	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
II.—Leather Trades:															
Tanning and Dressing	19.0	16.0	...	29.3	32.0	30.1	11.1	9.1	...	...	...	...	6.2	4.9	...
III.—Clothing Trades:															
Tailoring and Dressmaking	41.2	41.4	43.8	16.9	16.7	15.6	13.2	15.7	14.8	1.0	1.0	...	3.7	3.6	3.7
Boot and Shoe	9.8	9.6	11.4	7.6	8.3	8.7	2.8	2.3	...	...	...	...	5.3	3.9	...
Hat and Cap	20.8	14.8	...	37.2	36.0	40.0	...	...	...	...	...	...	4.5	5.2	...
IV.—Paper, Printing and Stationery Trades:															
Paper Manufacturing	15.8	19.5	27.5	21.9	18.0	17.3	3.9	2.5	...	1.0	1.6	...	2.8	3.4	...
Printing, Bookbinding, etc.	46.9	45.2	46.5	10.7	10.0	9.0	5.8	5.4	6.2	1.5	1.4	...	5.9	6.1	6.2
Newspapers and Periodicals	55.0	53.6	55.0	13.8	16.5	14.9	4.9	5.1	...	2.7	2.4	...	3.0	3.3	...
Stationery	49.0	51.7	59.0	11.7	10.8	...	3.3	3.0	...	...	...	...	6.1	6.3	...
Cardboard Box	31.0	35.5	36.9	13.0	13.8	...	4.2	3.3	...	...	...	...	5.1	5.7	...
V.—Food, Drink and Tobacco Trades:															
Grain Milling	18.2	21.9	...	24.8	26.6	...	6.6	3.8	...	3.2	3.3	...	2.8	2.2	...
Bread and Cake . . . . .	...	30.0	31.1	...	13.8	13.8	...	2.3	...	2.1	2.2	...	7.1	...	8.8
Biscuit . . . . .	...	34.0	...	13.6	...	18.7	2.6	2.3	...	...	...	...	...	2.4	...
Cocoa and Sugar Confectionery	22.1	24.1	23.0	7.7	6.8	...	13.0	13.5	19.0	2.7	3.3	...	22.3	23.6	...
Preserved Foods	43.6	41.4	46.1	10.2	10.0	...	...	...	...	3.0	4.1	...	11.4	11.1	...
Brewing and Malting	23.8	23.8	24.1	13.7	12.0	...	3.7	9.1	...	1.9	1.8	...	21.1	14.1	21.3
VI.—Chemical and Allied Trades:															
Chemicals, Dyestuffs and Drugs	25.1	24.3	23.4	37.0	34.7	31.1	3.9	5.7	...	6.3	11.5	9.7	4.4	3.6	...
Soap, Perfumery and Candles	25.1	31.8	39.5	54.9	49.6	43.3	4.0	3.3	...	...	...	...	1.3	1.0	...
Paint, Colour and Varnish	40.6	39.3	41.7	12.2	13.0	...	2.5	2.4	...	3.2	3.4	...	11.7	12.4	...
VII.—Timber Trades:															
Timber (Sawmilling)	26.9	31.1	33.7	9.5	8.6	...	6.1	4.6	...	4.7	4.4	...	6.4	6.3	...
Furniture and Upholstery	49.4	48.1	56.7	10.5	10.6	...	5.5	5.2	...	2.3	2.3	...	7.7	7.2	...
VIII.—Clay and Building Materials															
Brick and Fireclay	3.7	4.3	...	10.2	9.5	11.2	10.9	9.6	10.6	6.8	4.2	5.1	16.4	13.8	17.3
China and Earthenware	5.1	4.3	...	3.6	2.6	...	0.7	1.4	...	...	...	...	74.0	76.9	80.9
Glass	19.4	27.9	32.4	44.7	37.2	23.8	11.3	10.4	16.2	5.7	4.6	...	10.2	12.1	...

INDUSTRIES IN 1924, 1930 AND 1935 (Census of Production)

mapped in Appendix IV

net value of the total production of the industry, in each of the three years 1924, 1930, and 1935, are not always given by the Census of Production. The Table is, therefore, necessarily incomplete, published in the Board of Trade Journal, December 23, 1937.

Rest of England			South Wales and Mon.			Rest of Wales			Scotland West-Central			Rest of Scotland			Description of Trade
1924	1930	1935	1924	1930	1935	1924	1930	1935	1924	1930	1935	1924	1930	1935	
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	I.—Textile Trades:
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Cotton Spinning
6.1	5.1	5.6	...	...	...	...	...	...	3.2	3.0	3.7	7.0	8.0	6.7	Cotton Weaving
14.5	37.5	22.8	...	...	...	...	...	...	...	...	...	...	...	...	Woolen and Worsted
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Silk and Rayon
...	...	...	...	...	...	...	...	...	...	...	...	100.0	100.0	100.0	Jute
75.0	74.0	71.0	...	...	...	...	...	...	5.5	3.5	4.6	9.6	9.2	7.0	Hosiery
9.1	8.8	9.3	...	...	...	...	...	...	8.3	6.9	6.6	3.2	3.2	...	Textile Finishing
76.6	70.4	76.2	...	...	...	...	...	...	...	...	...	...	...	...	Lace
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	II.—Leather Trades:
26.4	30.0	32.8	...	...	...	...	...	...	...	...	...	...	...	...	Tanning and Dressing
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	III.—Clothing Trades:
15.9	15.7	18.6	0.6	0.4	...	0.1	0.1	...	4.9	3.9	3.5	2.1	1.4	...	Tailoring and Dressmaking
70.6	72.5	74.8	...	...	...	...	...	...	1.5	1.4	...	1.8	1.6	...	Boot and Shoe
38.4	42.0	37.9	...	...	...	...	...	...	...	...	...	...	...	...	Hat and Cap
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	IV.—Paper, Printing and Stationery Trades:
36.1	33.2	28.1	...	...	...	...	...	...	3.0	5.3	...	18.4	15.7	14.9	Paper Manufacturing
18.3	21.6	19.8	0.7	0.6	...	0.2	0.1	...	4.9	4.9	4.9	5.3	4.9	4.3	Printing, Bookbinding, etc.
10.0	9.1	8.3	1.7	1.2	...	0.2	0.1	...	4.4	5.0	...	4.4	3.6	...	Newspapers and Periodicals
21.1	21.4	...	...	...	...	...	...	...	2.6	1.4	...	5.7	5.2	...	Stationery
42.4	37.2	31.0	...	...	...	...	...	...	2.6	2.1	...	1.4	2.2	...	Cardboard Box
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	V.—Food, Drink & Tobacco Trades:
30.9	30.2	32.5	...	...	...	...	...	...	2.7	1.5	...	4.4	3.7	...	Grain Milling
...	17.0	15.5	...	...	...	...	...	...	...	7.8	8.5	...	14.7	9.2	Bread and Cake
17.1	...	...	1.5	1.2	...	0.2	0.2	...	10.6	...	...	11.0	...	...	Biscuit
17.2	24.4	...	...	...	...	...	...	...	5.1	8.5	...	...	8.5	...	Cocoa and Sugar Confectionery
20.3	16.9	15.5	...	...	...	...	...	...	5.1	3.7	...	3.6	2.2	...	Preserved Foods
...	22.9	20.5	...	...	...	...	...	...	8.0	7.1	...	1.0	1.7	...	Brewing and Malting
21.1	28.3	25.3	2.4	1.5	...	0.3	0.4	...	(a)	(a)	...	(a)	(a)	...	VI.—Chemical and Allied Trades:
...	...	...	...	...	...	...	...	...	3.2	2.3	...	2.4	2.9	...	Chemicals, Dyestuffs and Drugs
10.4	14.0	13.3	...	...	...	...	...	...	1.2	0.6	...	1.4	2.0	...	Soap, Perfumery and Candles
10.9	9.3	...	...	...	...	...	...	...	4.4	3.2	...	2.1	1.7	...	Paint, Colour and Varnish
17.2	19.4	...	...	...	...	...	...	...	...	...	...	...	...	...	VII.—Timber Trades:
81.2	82.0	25.5	2.5	2.0	...	0.6	0.5	...	3.7	3.4	...	8.5	7.1	...	Timber (Sawmilling)
14.8	18.6	11.7	...	...	...	...	...	...	5.8	4.5	...	3.4	2.1	...	Furniture and Upholstery
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	VIII.—Clay and Building Materials:
36.4	42.3	36.1	3.7	1.8	...	2.9	2.3	...	3.7	2.2	...	5.3	4.6	...	Brick and Fireclay
11.5	9.9	...	...	...	...	...	...	...	2.5	3.3	...	1.3	1.5	...	China and Earthenware
...	...	...	...	...	...	...	...	...	2.7	2.0	...	3.8	2.7	...	Glass

TABLE 2—COMPARISON OF THE REGIONAL DISTRIBUTION OF

Description of Trade	Greater London			Lancs., etc.			West Riding			Northumber-land, etc.			Warwicks, etc.		
	1924	1980	1985	1924	1980	1985	1924	1980	1985	1924	1980	1985	1924	1980	1985
IX.—Miscellaneous Trades:															
Rubber	14.8	15.6	19.1	26.8	24.5	31.8	...	...	...	...	...	...	...	38.6	29.0
Scientific Instruments	68.1	67.0	71.7	7.4	5.1	...	5.8	8.9	...	...	...	...	7.6	6.2	...
Plastics and Fancy Articles	68.0	61.6	58.9	...	...	...	6.8	7.4	...	...	...	...	9.8	15.9	...
X.—Mines and Quarries:															
Coal Mines	—	—	—	12.6	7.2	8.0	16.8	18.2	18.6	18.1	18.8	17.8	7.8	7.9	9.0
XI.—Iron and Steel Trades:															
Iron Smelting and Rolling	—	—	—	8.8	9.4	9.0	25.8	31.9	30.4	11.1	16.6	12.8	12.0	9.9	10.2
Iron and Steel Foundries	4.0	8.9	...	10.1	18.1	10.4	8.4	6.9	7.7	8.1	5.8	5.0	19.4	28.5	26.8
Tinplate . . . . .	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Hardware, Hollow Ware, etc.	25.6	29.5	31.0	9.0	8.2	...	4.8	4.9	...	1.2	2.6	...	48.7	40.6	41.1
Chain, Nail, Needle, Pin, etc.	4.8	5.2	...	9.0	8.9	...	7.4	8.2	...	0.8	1.4	...	68.1	64.4	64.8
Wrought Iron and Steel Tubes . . . . .	...	...	...	...	...	...	...	...	...	...	...	...	58.9	51.9	64.0
Tool, Implement and Cutlery	2.7	8.0	...	8.4	2.5	...	61.2	60.8	51.8	...	...	...	21.2	17.6	...
XII.—Engineering, Shipbuilding and Vehicle Trades:															
Mechanical Engineering	11.9	14.9	18.6	28.2	20.8	18.0	14.4	10.2	10.9	6.9	6.2	5.7	8.1	10.7	11.4
Electrical "	44.0	41.4	47.9	25.9	24.8	19.8	1.5	1.9	...	1.8	2.7	2.8	17.0	17.2	18.4
Shipbuilding	11.2	8.4	...	11.7	12.0	18.4	0.4	0.7	...	26.8	27.1	17.7	0.1	0.1	...
Motor and Cycle Manufacturing and Repair	20.8	21.5	26.2	11.4	9.8	4.8	1.9	2.5	...	0.4	0.8	...	47.8	45.8	44.8
Aircraft	47.2	47.6	34.8	...	...	...	...	...	...	...	...	...	...	...	...
XIII.—Non-Ferrous Metal Trades:															
Copper and Brass Smelting and Rolling	7.4	17.2	...	7.4	7.8	...	8.8	1.9	...	2.1	2.6	...	65.6	62.0	62.8
Finished Brass	7.0	10.6	...	8.9	4.9	...	9.7	8.9	...	1.5	2.8	...	70.7	65.6	66.8
Plate and Jewellery	15.0	17.5	...	1.0	1.0	...	28.2	25.8	...	...	...	...	59.6	54.7	54.2
All Industries, Factory and non-Factory	17.1	21.2	24.8	20.8	17.8	15.5	12.6	10.6	10.1	5.9	5.8	4.8	11.6	12.2	12.8

(a) Estimated figures. The combined figures for the whole of Scotland in 1924 and 1980 were 7.0 per cent and 4.4 per cent respectively.

INDUSTRIES IN 1924, 1930 AND 1935—continued

Rest of England			South Wales and Mon.			Rest of Wales			Scotland West-Central			Rest of Scotland			Description of Trade
1924	1930	1935	1924	1930	1935	1924	1930	1935	1924	1930	1935	1924	1930	1935	
...	8.6	6.6	...	8.7	5.4	...	IX.—Miscellaneous Trades: Rubber Scientific Instruments Plastics and Fancy Articles
11.7	11.7	...	...	...	...	...	...	...	6.0	5.1	...	0.5	0.4	...
18.2	11.6	...	...	...	...	...	...	...	...	...	...	...	...	...
11.0	15.4	15.5	19.9	20.2	17.0	1.6	1.4	...	4.9	4.0	5.0	7.6	7.1	7.4	X.—Mines and Quarries: Coal Mines
...	(b) 24.1	18.7	15.8	...	8.1	2.4	(c) 12.6	11.7	11.7	XI.—Iron and Steel Trades: Iron Smelting and Rolling Iron and Steel Foundries Tinplate Hardware, Hollow Ware, etc. Chain, Nail, Needle, Pin, etc. Wrought Iron and Steel Tubes Tool, Implement and Cutlery
28.4	21.0	20.8	...	...	...	...	...	...	8.9	8.7	6.4	14.6	14.4	11.8
...	...	...	86.0	90.8	90.0	...	...	...	...	...	...	...	...	...
6.2	9.2	9.0	1.9	2.4	...	...	...	...	2.1	1.6	...	1.0	0.9	...
6.8	5.4	...	...	...	...	...	...	...	5.8	4.0	...	0.5	0.9	...
...	
...	
18.8	20.6	20.0	0.7	0.6	...	0.1	0.1	...	18.4	13.8	10.6	8.1	2.9	2.5	XII.—Engineering, Shipbuilding and Vehicles Trades: Mechanical Engineering Electrical Shipbuilding Motor and Cycle Manufacturing and Repair Aircraft
8.5	10.9	8.1	...	...	...	...	...	...	0.7	0.4	...	1.0	0.6	...
14.2	18.8	15.1	5.8	8.8	...	0.4	0.8	...	26.7	29.5	28.0	4.6	4.6	...	
15.1	17.7	19.6	0.2	0.8	...	0.0	0.1	...	1.7	1.6	...	1.0	0.9	...	
28.4	40.4	51.9	...	...	...	...	...	...	...	...	...	...	...	...
3.4	3.1	...	7.1	3.6	2.4	2.1	...	0.5	0.4	...	XIII.—Non-Ferrous Metal Trades: Copper and Brass Smelting and Rolling
(d) 4.2	3.8	...	...	...	...	...	...	...	1.7	1.8	...	1.4	1.9	...
...	Finished Brass, Plate and Jewellery
15.9	19.0	20.2	5.8	8.8	8.2	0.6	0.6	0.7	5.0	4.9	4.5	5.2	4.6	4.4	All Industries, Factory and non- Factory

(b) Combined figure for whole of Wales. (c) Combined figure for whole of Scotland. (d) Includes South Wales and Monmouthshire.

Table 3—CHANGES BETWEEN JUNE 1923 AND JUNE 1938 IN THE NUMBERS OF INSURED WORKPEOPLE (AGED 16-64) IN EMPLOYMENT IN CERTAIN INDUSTRIES IN THE UNITED KINGDOM

Industry	Index Numbers at June of each year (1923=100)											Estimated Numbers June 1938
	1927	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	
Coal Mining	79.7	74.0	69.2	56.8	52.7	54.8	53.0	54.8	52.9	59.4	59.5	701,713
Iron Ore and Ironstone Mining	85.7	92.5	84.2	47.9	45.8	39.3	58.8	51.9	60.7	68.1	64.3	9,326
Lead, Tin and Copper Mining	135.8	118.4	98.4	45.3	38.8	37.3	86.0	88.6	85.5	102.9	94.5	3,583
Stone Quarrying and Mining	132.8	134.2	131.3	136.1	122.2	121.7	128.0	130.2	141.9	151.2	153.2	45,181
Slate Quarrying and Mining	142.0	125.2	106.8	113.9	96.2	118.6	123.9	124.1	124.7	124.0	121.8	9,110
Other Quarrying and Mining	69.4	66.1	63.6	55.7	47.5	45.4	44.6	41.8	42.7	41.5	40.8	9,604
Sand, Clay, Gravel and Chalk Pits.	124.5	132.9	133.4	122.1	105.8	116.7	128.7	136.0	142.8	156.1	143.8	16,389
Coke Ovens and By-Product Works	76.4	79.9	71.6	58.1	56.3	64.4	78.8	89.4	91.1	97.4	91.8	12,310
Artificial Stone and Concrete	167.7	174.4	167.0	174.6	187.5	198.8	209.9	231.2	255.6	297.7	307.4	26,984
Cement, Lime Kilns and Whitening	121.1	123.8	117.7	101.8	87.5	86.6	91.8	95.3	100.3	111.4	118.2	16,985
Brick, Tile, Pipe, etc., Making	147.3	140.7	139.9	138.4	129.6	143.0	160.2	169.6	176.4	185.5	184.3	98,400
Pottery, Earthenware, etc.	97.1	102.9	93.5	80.7	77.8	86.9	93.1	94.1	95.8	104.8	97.4	61,047
Glass (excl. Bottles and Scientific Glass)	99.4	111.3	107.2	91.8	92.5	102.1	109.6	108.7	117.0	126.9	120.2	27,379
Glass Bottles	126.7	122.8	115.5	117.8	120.0	126.6	135.8	130.4	137.2	143.6	137.9	16,652
Chemicals	97.3	111.5	102.5	90.0	92.9	97.5	105.5	103.0	107.5	115.1	116.8	104,291
Explosives	108.1	111.9	108.6	88.6	89.7	91.0	95.5	98.6	110.4	137.1	134.2	29,082
Paint, Varnish, Red Lead, etc.	139.0	144.8	143.7	147.4	144.0	155.2	169.2	178.9	184.6	184.6	183.3	22,979
Oil, Glue, Soap, Ink, Matches, etc.	104.4	102.2	101.3	100.2	103.9	105.7	94.1	95.0	96.3	102.6	103.8	70,655
Pig Iron (Blast Furnaces)	88.5	80.7	72.6	49.3	42.6	39.2	51.0	51.6	56.4	64.4	58.6	14,379
Iron and Steel Smelting and Rolling	97.1	89.6	78.8	54.5	54.0	62.7	79.2	77.0	89.4	101.6	85.9	138,586
Brass, Copper, Zinc, Tin, Lead, etc.	104.3	110.2	100.5	80.7	81.9	98.7	99.3	104.9	120.0	142.5	136.1	45,745
Tinplate	83.8	87.6	82.8	67.8	57.8	79.2	72.5	65.6	69.9	90.6	44.4	12,211
Iron and Steel Tubes	117.9	130.0	116.8	84.7	80.2	93.4	118.6	126.5	130.9	146.2	127.7	26,192
Wire, Wire Netting and Wire Rope	88.6	97.2	88.3	76.5	77.8	84.5	93.3	89.0	102.0	114.4	103.3	12,619
General Engineering	103.2	105.8	98.7	81.6	77.3	78.4	87.7	91.0	101.8	115.8	116.8	591,480
Electrical Engineering	132.8	144.4	143.8	141.8	141.4	137.5	150.2	156.0	174.7	199.6	199.3	111,422
Marine Engineering, etc.	94.3	105.9	101.1	57.4	42.2	46.2	65.2	66.1	86.5	97.7	104.6	52,815
Constructional Engineering	124.3	127.5	117.5	111.7	96.0	96.4	126.6	133.1	160.8	184.0	212.2	42,367
Motor Vehicles, Cycles and Aircraft	126.8	134.4	125.2	115.5	114.4	127.9	143.2	149.9	172.1	196.4	209.4	360,836
Carriages, Carts, etc.	79.4	74.0	72.3	64.2	61.9	60.4	52.2	52.9	48.2	51.3	49.0	11,568
Railway Carriages, and Wagons, etc.	109.8	105.5	104.3	84.9	78.0	74.9	88.1	92.5	101.6	104.7	119.4	55,926

Table 3—CHANGES BETWEEN JUNE 1923 AND JUNE 1938 IN THE NUMBERS OF INSURED WORKPEOPLE (AGED 16-64) IN EMPLOYMENT IN CERTAIN INDUSTRIES IN THE UNITED KINGDOM—*continued*

Industry	Index numbers at June of each year (1923=100)											Estimated Numbers June 1938
	1927	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	
Shipbuilding and Repairing	109.1	108.9	97.5	58.8	46.4	45.8	55.5	61.5	78.7	91.6	95.2	139,968
Stove, Grate, Pipe and General Iron Founding	116.2	120.8	114.9	104.4	99.2	108.2	122.4	122.6	135.2	148.4	130.2	86,678
Electrical Wiring and Contracting	139.5	160.8	173.8	199.6	210.6	236.2	298.0	318.2	350.9	389.0	396.8	88,169
Electric Cable, Apparatus, Lamps, etc.	120.0	139.3	146.6	144.4	158.5	168.0	189.3	203.1	220.3	265.4*	254.2*	163,698
Hand Tools, Cutlery, Saws, Files	115.8	118.3	104.0	84.4	88.3	93.0	106.7	106.6	114.6	128.6	107.8	26,496
Bolts, Nuts, Screws, Rivets, Nails, etc.	95.2	95.5	90.2	75.7	75.8	83.3	90.2	96.3	102.8	110.8	104.5	25,216
Brass and Allied Metal Wares	108.4	108.4	94.8	82.6	84.2	83.7	95.9	110.8	106.8	116.6	101.2	25,368
Heating and Ventilating Apparatus	136.2	165.1	166.1	152.0	149.3	160.2	207.1	231.7	273.4	353.9	360.0	18,254
Watches, Clocks, Plate, Jewellery, etc.	95.5	92.6	88.9	77.9	77.0	85.4	86.9	82.8	87.5	88.8	87.0	36,415
Other Metal Industries	117.3	123.2	118.6	111.4	112.6	123.2	136.6	148.7	161.8	175.6	165.7	238,314
Cotton Spinning and Weaving	118.9	109.0	75.1	74.4	79.8	85.2	81.9	78.4	80.0	83.4	56.8	251,184
Woollens and Worsted	89.8	85.2	75.3	66.4	70.7	82.2	74.9	78.2	82.3	84.5	67.7	164,731
Silk and Rayon	148.5	199.6	179.4	151.2	167.1	173.8	186.4	207.7	215.7	222.1	187.0	63,546
Linen	113.5	102.1	87.3	81.3	76.8	85.0	93.8	85.5	83.7	94.4	69.4	46,591
Jute	99.4	98.2	74.2	56.8	56.3	68.3	58.6	64.8	61.9	67.7	51.4	17,992
Hemp, Rope, Cord, Twine, etc.	105.5	102.3	88.8	85.1	83.3	87.2	90.3	95.4	99.1	105.6	93.6	15,414
Hosiery	113.2	121.2	110.7	109.1	118.9	121.3	126.1	124.2	132.7	136.2	124.4	103,094
Lace	102.9	98.4	90.9	84.9	89.6	86.9	88.1	92.5	87.7	89.2	72.2	11,355
Carpets	94.5	98.9	92.9	86.8	102.2	104.3	118.4	115.5	119.6	125.0	106.8	25,884
Other Textiles	109.7	115.1	104.9	101.7	104.2	113.1	123.3	120.3	130.3	146.7	140.0	51,029
Textile Bleaching, Printing, Dyeing, etc.	105.2	102.8	83.2	76.0	84.5	87.9	87.7	86.3	86.3	89.0	66.7	65,986
Leather Tanning, Currying and Dressing	106.0	103.2	98.7	93.2	96.1	107.0	111.2	110.7	118.0	122.0	105.4	38,411
Leather Goods	95.3	96.0	86.5	76.1	82.9	87.6	93.7	92.1	96.3	101.8	94.5	23,312
Tailoring	110.8	109.9	107.9	109.5	107.5	110.9	107.0	107.5	109.3	113.6	108.5	190,776
Dressmaking and Millinery	93.0	91.7	89.0	88.5	87.7	84.3	89.2	88.5	86.9	89.7	89.3	98,233
Hats and Caps	101.8	107.8	103.6	98.7	100.2	101.0	100.5	91.3	92.3	88.7	76.9	24,206
Shirts, Collars, Underclothing, etc.	113.0	126.1	124.4	125.9	126.6	133.2	147.6	147.4	155.0	154.7	155.2	95,761
Other Dress Industries	89.4	91.6	89.3	84.1	88.8	90.4	92.3	90.4	99.8	99.0	92.0	26,311
Boots, Shoes, Slippers and Clogs	102.5	93.1	89.9	87.7	85.6	93.1	89.4	90.6	93.8	96.8	83.1	111,792
Bread, Biscuits, Cakes, etc.	96.6	96.2	97.5	97.4	100.3	104.5	106.7	108.4	108.9	115.6	115.7	163,446
Grain Milling	106.7	107.0	101.4	97.5	105.6	117.0	120.5	115.9	124.0	121.2	119.0	30,699

* Basis of classification slightly changed.

Table 3—CHANGES BETWEEN JUNE 1923 AND JUNE 1938 IN THE NUMBERS OF INSURED WORKPEOPLE (AGED 16-64) IN EMPLOYMENT IN CERTAIN INDUSTRIES IN THE UNITED KINGDOM—*continued*

Industry	Index Numbers at June of each year (1923=100)											Estimated Number June 1938
	1927	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	
Cocoa, Chocolate and Sugar Confectionery	109.6	104.6	102.0	92.7	95.4	99.5	95.7	101.0	102.9	111.1	118.5	71.4
Other Food Industries	119.7	122.0	120.7	119.8	120.0	130.2	131.2	131.8	137.9	142.6	141.2	119.8
Drink Industries	113.0	111.7	109.8	107.7	101.7	106.8	108.8	108.4	112.8	116.9	119.8	108.8
Tobacco and Snuff	99.5	108.2	107.8	102.5	106.1	104.8	103.1	95.2	97.2	99.3	98.8	40.4
Sawmilling and Machined Woodwork	109.0	110.7	104.5	97.4	98.4	99.0	109.5	110.1	115.8	118.6	117.2	56.7
Wood Boxes and Packing Cases	112.2	111.2	103.4	98.7	92.0	90.1	92.7	83.7	91.4	100.9	94.7	9.7
Furniture Making, Upholstery, etc.	125.8	135.2	134.2	130.8	126.9	130.6	140.9	145.1	155.5	163.5	157.3	132.4
Other Woodworking	94.1	92.1	88.6	83.0	80.2	83.9	86.3	83.5	92.0	92.2	93.2	21.9
Paper and Paper Board	99.5	106.7	102.7	98.4	105.0	112.4	113.5	115.5	119.2	127.2	116.7	58.0
Cardboard Boxes, Paper Bags and Stationery	105.8	110.2	105.9	107.1	109.5	113.9	120.4	122.7	127.4	137.2	134.3	63.1
Wall Paper Manufacturing	115.6	133.9	132.0	129.8	122.0	130.3	158.5	152.9	153.0	163.8	162.5	6.9
Stationery and Typewriting Requisites (not Paper)	123.4	136.5	134.0	126.1	130.7	152.4	131.5	133.2	135.5	198.3	232.9	10.2
Printing, Publishing and Bookbinding	114.0	119.7	122.2	120.1	122.1	123.0	122.5	121.9	124.1	127.6	127.6	268.5
Rubber	110.4	122.8	118.1	109.4	106.9	116.1	111.5	110.4	103.8	122.1	113.3	56.2
Oilcloth, Linoleum, etc.	118.9	118.8	111.8	99.6	97.0	114.8	105.1	105.6	117.5	109.8	100.6	11.1
Brushes and Brooms	123.8	116.7	122.6	113.1	120.4	142.2	136.2	140.6	127.7	133.1	134.6	10.4
Scientific and Photographic Apparatus	142.2	159.2	152.7	142.3	139.4	161.2	174.0	184.7	203.7	224.7	241.3	33.9
Toys, Games and Sports Requisites	104.0	115.4	123.0	115.5	113.6	121.0	144.9	150.2	151.8	160.9	157.8	16.3
Other Industries	126.4	133.5	125.9	120.9	122.2	123.8	144.3	145.4	150.8	153.5	145.5	140.2
Total Mining and Quarrying	81.8	76.5	71.7	59.5	54.9	56.5	55.9	57.1	56.2	62.8	62.7	795.4
Total Building and Contracting	123.5	123.0	125.3	131.5	117.8	124.6	135.6	144.0	156.4	160.9	163.2	1,141.2
Total Transport and Distribution	119.2	125.9	127.2	130.4	133.0	134.6	133.5	139.2	144.6	143.4	147.6	2,690.6
Total Manufacturing Industries	108.9	110.4	102.1	93.3	93.5	99.1	104.3	106.0	112.8	121.7	114.9	5,636.5
Gas, Water and Electricity Supply	101.8	100.8	101.1	104.4	101.8	107.6	116.5	118.1	126.5	132.3	134.2	205.1
Total Miscellaneous Services	121.0	130.2	131.0	137.2	133.8	146.4	152.6	159.2	166.1	173.6	177.3	856.3
Commerce, Banking, Insurance and Finance	100.5	103.4	104.2	104.2	107.4	109.5	114.2	115.8	116.8	120.8	121.9	263.1
National and Local Government	96.8	100.3	105.1	110.5	107.2	107.4	107.8	110.5	116.0	122.6	126.2	460.1
*TOTAL, All Industries and Services	103.6	110.5	106.1	101.7	100.7	105.0	109.5	111.7	117.6	124.6	121.5	12,075.2

* Includes Fishing.

APPENDIX II

The Location Factor.

Some basis of reference is necessary for measuring the location of industry. While it is easy to make a general statement that Lancashire is the seat of the cotton industry, or to refer to the North Staffordshire Potteries, such statements are liable to be misleading. There are, for example, other centres of the cotton industry at Paisley, and of earthenware and pottery manufacture in London, in Devonshire and near Bristol. Thus, the larger and better-known concentrations may overshadow those which, though smaller, are equally important to their own districts.

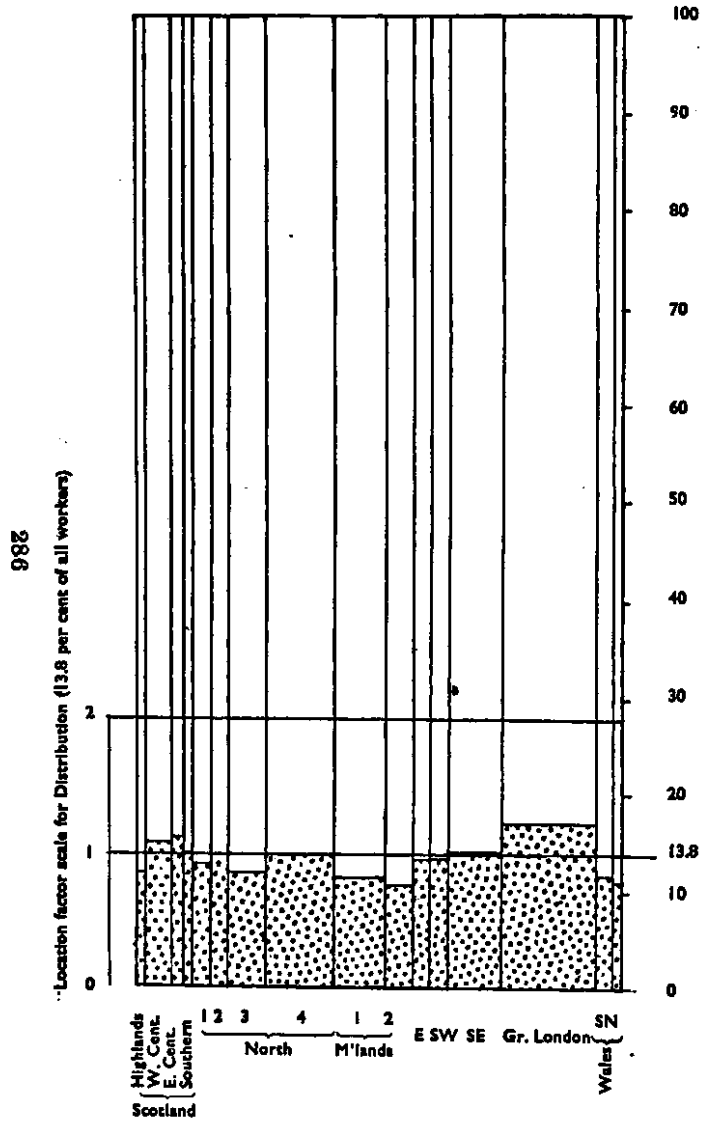
In any attempt at greater precision, however, certain difficulties are usually encountered, and of these the chief is the definition of the boundaries of the areas where industry is situated. This may offer no great difficulty in particular cases, but when one system of regions is required to serve for all industries, a considerable amount of compromise is generally found to be necessary. It might, for example, be quite easy to draw lines on a map enclosing the areas where hosiery manufacture was carried on. It would probably be found, however, that these lines cut across corresponding areas for other industries. If the regions are further required to conform to some existing administrative system, the problem becomes incapable of exact solution, and compromise becomes essential.

Two such compromises have been made by the Census of Population and the Census of Production, both of which supply statistical information as to the regional distribution of industries.

The industry tables of the former give the numbers of persons recorded in 1931 as occupied in various industries in each of the sixteen regions into which Great Britain has been divided. The Census of Production gives the gross and net values of the outputs of various industries, but before 1935 it distinguished only ten regions. The 1935 Census of Production, however, has sub-divided the former "Rest of England" region into six and the "Rest of Scotland" into three, so that it now distinguishes seventeen areas altogether.

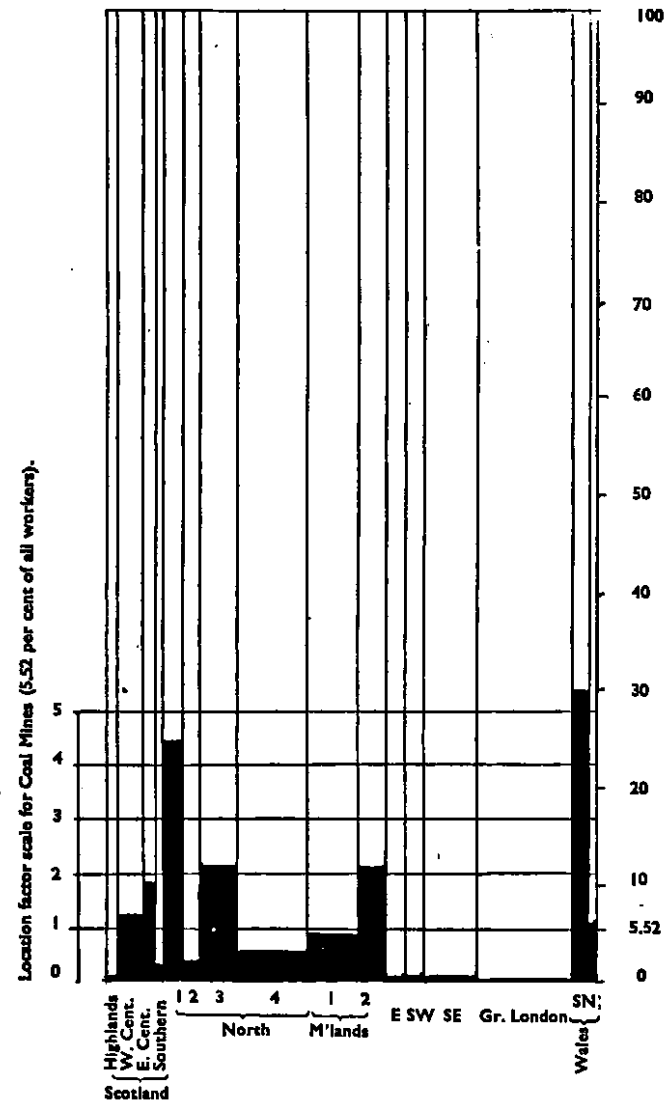
Although the most recent Census of Population is that of 1931, as against 1935 for the Census of Production, the former possesses certain advantages for the present purpose as it is more complete. The Census of Production figures exclude any output from firms employing ten persons or less, and, moreover, the complete regional figures for certain industries are not given, owing to the risk of disclosing information relating to the businesses of individual firms. It may be argued that in most of the major industries the error resulting from the exclusion of firms employing less than eleven persons will be inconsiderable, but in certain other cases—for example, bread-baking—quite a substantial proportion of the industry is carried on by

Figure 15—REGIONAL DISTRIBUTION OF WORKERS IN DISTRIBUTIVE TRADES, 1931



Note: The shaded area is slightly less than the area with the corresponding shade in figure 5 (page 39) since the latter includes workers in commerce and finance.

Figure 16—REGIONAL DISTRIBUTION OF COAL MINERS, 1931



Note: The black area is slightly less than the black area in figure 5 (page 39) since the latter includes miners other than coal miners.

small firms in that range of size, and the Census of Production figures in such cases bear correspondingly less relation to the actual total production.

In the Industries Tables of the Census of Population the working population of Great Britain is broken up into 22 main industrial groups, with 437 sub-heads, for every county and large town. The counties are grouped into 16 regions.

The first column of figures in Table I gives the numbers employed in the 437 industrial sub-orders, grouped under 167 heads. The upper figures in the 16 successive columns show the percentage distribution of these totals among the 16 regions. It will be seen, for example, that 28 per cent of all glass bottle workers were enumerated in North III (the West Riding), 27 per cent in North IV (Lancashire and Cheshire) and 27 per cent in Greater London, while no other region had as many as 4 per cent. It is clear, however, that it would not be true to say that glass bottle makers were equally concentrated in these three regions, for Greater London contains nearly 20 per cent of the total working population, and the West Riding only 8 per cent. Thus, the concentration of glass bottle manufacture in London is hardly greater than that of any representative industry, while in the West Riding it is $3\frac{1}{2}$ times as great. This suggests that a measure of concentration of an industry in a region can be found by dividing the percentage for that industry by the percentage for all industries in the region. Thus, the percentages of glass bottle workers in North III, North IV and Greater London are 28.12, 26.90 and 27.00 respectively. These regions contain respectively 7.93, 14.79 and 19.56 per cent of the national total of all workers, as may be seen from the first line of Table I. The measures of concentration of glass bottle workers in the three regions are therefore:

$$\text{North III } \frac{28.12}{7.93} = 3.5 \quad \text{North IV } \frac{26.90}{14.79} = 1.8 \quad \text{Gr. London } \frac{27.00}{19.56} = 1.4$$

This measure, which is known as the Location Factor,* has been worked out for the 167 industrial groups given in Table I, for the 16 census regions. The figures are printed in italics in the table.

A fuller appreciation of the significance of the Location Factor may, perhaps, be reached by a graphical approach. In fig. 5 on page 39 the total working population is divided up by regions and industries. The width (and, therefore, the area) of each column is proportional to the total working population in the region. The columns are divided horizontally according to industries. Thus, the height of each division represents the percentage of workers in a given industry to all workers in the region, and the area of a division represents the actual number of workers.

Fig. 15 opposite is exactly similar to fig. 5, except that the working population is simply divided into those engaged in distribution (shaded) and others (white). This industrial group (600-670 in the table) makes up 13.8 per cent of the occupied population of the country. Thus, if these workers were evenly distributed over all

* Proposed in 'Statistical Methods in Economics and Political Science,' (pp 827-8) by P. Sargent Florence, and developed in an article by the same author in the *Economic Journal*, December 1937.

regions the shaded area would be a rectangle on the base line, reaching to a height of 13.8 on the vertical percentage scale. In a region where exactly 13.8 per cent of the workers were engaged in distribution the location factor for the industry would be 1. Where there are less than 13.8 per cent it is less than 1. If there were as many as 27.6 per cent (13.8×2) the factor would be 2. Thus it is possible to construct a scale to measure the location factor, in which each unit is equal to 13.8 units on the percentage scale.

In fig. 16 the distribution of coal-miners is shown in the same way. Since coal-miners make up 5.5 per cent of all workers in Great Britain the unit on the location factor scale is equal to 5.5 units on the percentage scale. It will be seen that coal-miners in South Wales reach to a height of nearly $5\frac{1}{2}$ on the location factor scale; and in the same way the factor for each region (shown in Table I) can be read off on the scale.

We have seen how the location factor is arrived at. The total of the shaded area in each of these figures represents the total number of workers in the industry, and is equal to the rectangle bounded by the base, and line 1 on the location factor scale. If we wish to compare the factors for the two industries the values must be read off each on its own scale. Comparison between industries would be easier if the location factor scale were uniform throughout. This would mean that the total shaded area was the same for each industry, and the total number of workers was represented by the same area. The diagrams would show the regional distribution of an industry, but give no indication of its size.

The diagrams in fig. 6 on pages 40-41, show the regional distribution of workers in a large number of industries. The height of a column on the vertical scale gives the location factor, and the area of the column gives the percentage of the national total of workers who are located in that region. The total black area is the same for each industry, and represents the total number of workers in the industry.

These figures bring out the limitations as well as the advantages of this method of measurement. The chief drawback is that the regions for which the data are presented in a convenient form vary greatly in size. It can readily be seen from the figures that if Scotland were represented by one broad column instead of four narrow ones, high concentrations in some localities would be masked, and it may well be inferred that some of the broader columns do mask high concentrations within the region. Moreover, if an industry is highly concentrated in a locality which is divided amongst two regions the concentration may well be totally lost to the picture.

It will be seen that most artificial silk spinners were to be found in Midlands I and North IV, where the location factors were 3.5 and 2.1 respectively. Only one-fifth of the workers were in Wales II, but the factor there was as high as 13.4, because the region contained very few other gainfully occupied persons. More than four-fifths of all cotton spinners were in North IV, but the location factor was only 5.7 because there were many other industries and occupations in the region. u. 5

One-fifth of all the occupied population was living in the Greater London region, thus its average share of any industry was one-fifth of the total, and it could not have more than five times its share. It can be seen from the figures that if all the workers in one industry were concentrated in Greater London they would only reach just above 5 on the location factor scale. On the other hand if they were all concentrated in Wales II they would reach 71. (In the case of slate quarrying they do actually reach 61 in that region.) Thus, the location factor alone may sometimes be misleading, just as the percentage distribution among regions alone may be, but each provides a useful check on the other, and for this reason they are presented together in Table I. Fig. 6 also has the effect of combining the two. Owing to the varying size of regions there is, in fact, little significance in the numerical value of factors greater than 8; but all factors as great as 8 can be rightly regarded as significant phenomena.

All these considerations do not detract from the value of the location factor as a method of measurement: they only show that the broad regions distinguished in the census are not entirely suitable material. Measurements based on these regions do, however, give a useful approximation, and if a closer measure is desired the material is available.

While fig. 6 gives a picture of the regional distribution of various industries, the same basic material will provide a picture of the industrial composition of a region.

It is common knowledge that some regions such as South Wales and Tyneside are highly specialised, while in others such as the Midlands a large diversity of industries are represented. By means of the location factor we can go a step beyond common knowledge, and make an approximate measure of the extent to which a region is specialised or diversified.

In the diagrams in fig. 17, each of the 167 industrial groups distinguished in Table I is represented by a dot. The position of the dot on the horizontal scale depends on its location factor. Thus the figure shows the distribution of location factors of the industries in the region. All factors of 8 and over have been grouped together for the reasons explained above. A large number of dots on the zero point on the horizontal scale shows that many industries are absent or practically absent from the region, while dots at 8 and over indicate that the region tends to be highly specialised, and a large number of dots about 1 shows that the region is diversified and typical of the country as a whole. It will be seen that the West Midlands is well diversified, but also highly specialised in a few industries, while South Wales has very few dots between 1 and 8.

These figures do not in themselves give any indication of the general prosperity of a region, but they give a measure of its vulnerability to external forces. A region which has its employment concentrated in a few industries may be very prosperous at any given moment, but if these industries suffer from adverse external conditions, alternative occupation is lacking.

Figure 17—DISTRIBUTION OF THE LOCATION FACTORS OF THE 167 INDUSTRY GROUPS

CENSUS REGIONS 1931

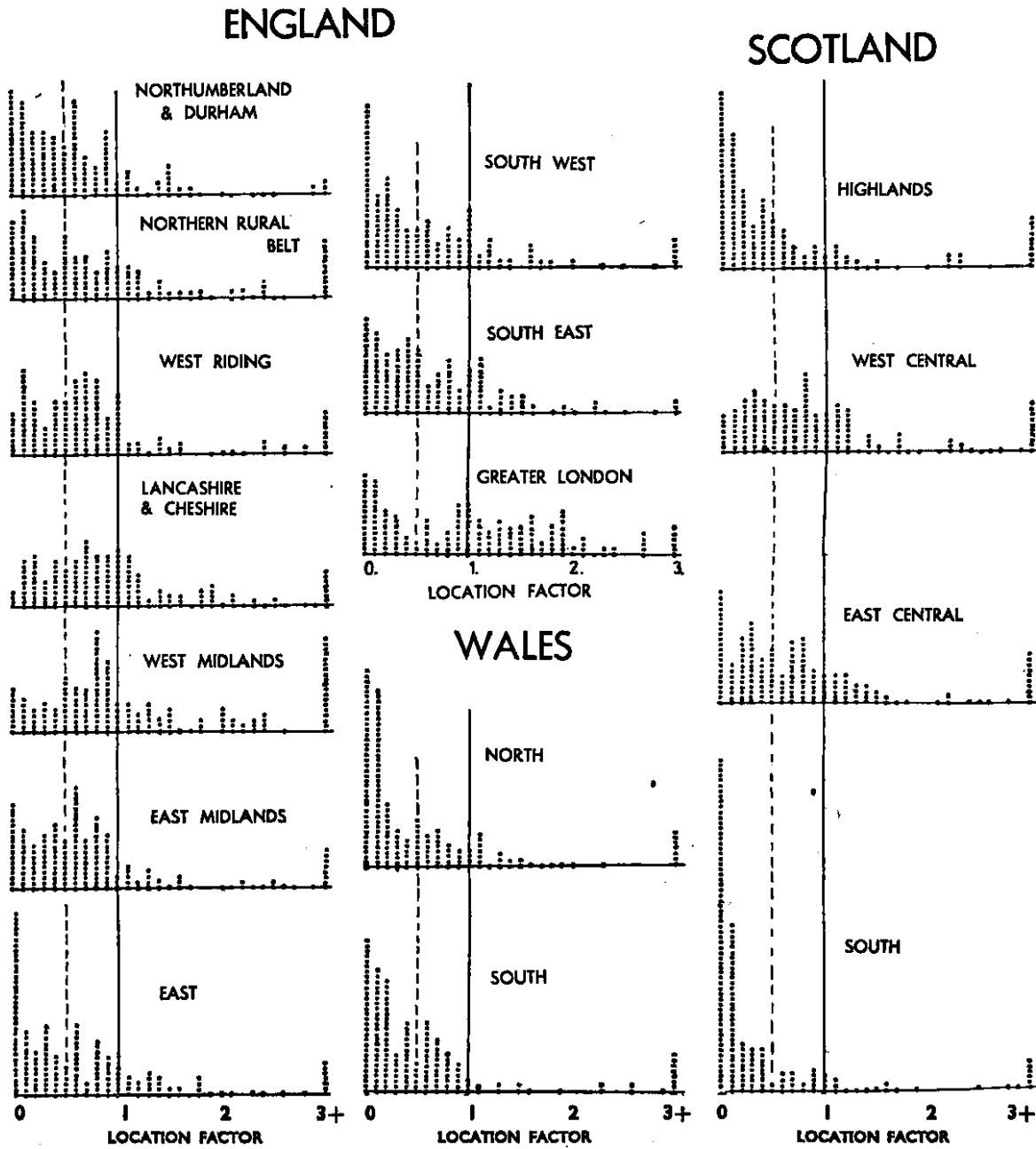


Fig. 17 is an elaboration of the table on page 48. Like this table it is subject to the qualification that each industry is counted as one unit, whether it is as large as agriculture, with over a million employed, or as small as aerodrome and aviation service, with 1,612.

The Coefficient of Localisation

The diagrams in fig. 6 (pages 40-41) give a general picture of the degree of localisation of each industry; but if we wish to determine whether industry A is more localised than industry B it is necessary to devise a unit of measurement. If an industry is evenly distributed over the whole country, its location factors will be close to 1 in each region, whereas if it is highly localised they will be large in some regions, and zero in others. An obvious measure of comparison, therefore, is the sum of the differences from 1. If they are small it is widespread, if they are large it is localised. But this measure would take no account of the varying size of regions. To overcome this a weighted average is taken. The difference from 1 (whether negative or positive) is multiplied by the total number of workers in the region, and the sum of these products is divided by the total workers in the country. This method produces a coefficient which varies from 0 to 2, but since it is easier to appreciate the significance of coefficients varying from 0 to 1, the final figure is reduced by half,* or since the sum of the positive products is equal to the sum of the negative products, the result can be obtained by taking the positive products only, divided by total workers. The same figure can be more simply arrived at by subtracting the regional percentage of all workers (top figures in Table I) from the regional percentage of the workers in the industry in question (higher row of figures against the industry in the table), in all the regions where the latter is the greater, i.e. where the location factor is greater than 1. The sum of these differences (divided by 100) is the coefficient of localisation.†

The significance of the coefficient of localisation may also be more readily appreciated by a graphical approach. Taking the graphs in fig. 6 (pages 40-41) it is desired to measure how nearly the black area coincides with the rectangle included between the base line and the line representing location factor 1. We have seen that the black is in each case equal in area to this rectangle. In other words, the black would always just fit under line 1. That is to say, the black area above the line must be just equal to the white area below it, and either quantity can be used as a measure of the deviation. If we make a rectangle on the base line, equal to the

*This standard has now been agreed upon, but in the writings cited above the coefficient varies from 0 to 2.

† EXAMPLES: (1) The regional percentage shown in Table I for Coal Mining is greater than that for all industries in North I and III, Midlands II, Wales I and II, and Scotland II and III. The sum of the differences is $14.77 + 8.98 + 6.24 + 16.42 + 0.08 + 2.44 + 0.84 = 49.77$.

The coefficient of localisation of Coal Mining is .4977.

(2) The regional percentage for Distributive Trades (code number 600-670) is greater than that for all industries in Greater London and the South-East, and Scotland II and III. In all the other regions it is just lower. Subtracting the percentage for all industries from that for Distributive Trades in the above regions, we have $4.76 + 0.19 + 0.19 + 0.65 = 5.79$.

The coefficient is .058.

black area above line 1 (i.e. take the black area above line 1 and spread it out on the base line) the height to which it reaches on the location factor scale is the *coefficient of localisation*.

For an industry such as distribution, where the location factor is nearly 1 in each region, there is very little black area above the line, and thus the coefficient is very low. If the industry were perfectly evenly spread it would be 0. At the other extreme, it would not be possible for the whole of the black to be above line 1, since each column starts at the base line. But if the whole of an industry were located in one small region, it would be represented by a long thin column, of which all but the base was above the line, and since the whole column would make a rectangle which just reached to 1 on the scale, the rectangle made from the part of the column above the line would very nearly reach to 1. The nearest actual case is tin-plate manufacture, where 94½ per cent of the workers are in South Wales, and the coefficient is .91. Other industries which, on the basis of the census regions, have high coefficients are lace .81, cotton weaving .75, and cotton carding and spinning, hosiery, cutlery and pottery, all over .72. At the other extreme are mineral waters .06, bread and flour .07, and beer brewing .11. Personal services naturally have for the most part even lower coefficients.

It will be seen that even this coefficient depends on the arbitrary boundaries of regions. For instance, the location factor for ship-building in North IV is nearly 1, but if Merseyside were taken as a separate region the factor there would be much higher. North IV would then be represented not by a single block not quite reaching the line 1, but by two blocks; one tall and thin, reaching to say 5 or 6, the other flat and short of line 1. This would, of course, raise the coefficient. Conversely, if in the case of slate quarrying the whole of Wales were taken as one region, the workers would be distributed over a broader base, the white gap below the line in South Wales would be filled up, and the area above the line correspondingly reduced. Thus the coefficient would be lowered.

The material is available for surmounting this difficulty by calculating the coefficients on the basis of very small localities. They have been worked out on the basis of separate counties, for a sample of industries by Mr. A. J. Wensley, who is doing further research on this subject with Professor P. Sargant Florence at Birmingham University. He found that the differences between coefficients based on counties and on the census regions were in most cases not great.

The Coefficient of Linkage

A similar technique to that of the coefficient of localisation can be used to measure the linkage of industries: that is, the extent to which two industries tend to be located in the same regions (owing to related technical processes, or mutual dependence on the same factor). This is done by taking the weighted average of the difference between the location factors in each region. The calculation for any two industries A and B may be made more shortly by subtracting the regional percentage of workers in industry A (top row of figures against the industry in Table I)

from that for industry B in each region where the latter is the greater, and summing the results. The final figure is divided by 100, giving a coefficient which varies from 0-1.*

Expressed graphically: if the diagram in fig. 6 (pages 40-41) for industry A is laid on top of that for industry B, and all the black area in B which is not covered by the black area in A is spread out on the base line, the height to which it reaches on the location factor scale is the *linkage coefficient*. If the location of the two industries is identical there will be no black area in B not covered by A, and the coefficient will be 0. If industry B is entirely located in regions where industry A is entirely absent then the whole of the black area in B will be uncovered. We have seen that the whole of the black area for an industry, when it is spread out on the base line, just reaches to 1 on the location factor scale. Thus the coefficient will be 1. The coefficient varies from 0 to 1, a low figure representing a close linkage. This measure is, of course, also affected to some extent by the arbitrary boundaries of regions.

* **EXAMPLES:** (1) Subtracting the percentages given in Table 1 for Cotton Carding and Spinning (code number 260-261) from those for Cotton Weaving (code number 262), in each region where the latter is the greater, we have

$$0.54 \text{ (North II)} + 0.16 \text{ (North III)} + 5.51 \text{ (North IV)} + 0.01 \text{ (South-West)} + 0.07 \text{ (Scotland II)} = 6.29.$$

The coefficient is .0629; that is to say, the linkage is very close.

It will be seen that the result would be the same if the process were reversed, and Weaving were subtracted from Carding and Spinning, thus:

$$0.07 + 0.01 + 0.02 + 0.36 + 1.41 + 0.08 + 0.02 + 4.17 + 0.20 = 6.29.$$

(2) Subtracting Textile Machinery (code 154-155) from Cotton Carding and Spinning, we have:

$$18.96 \text{ (North IV)} + 0.22 \text{ (Midlands I)} + 0.01 \text{ (Wales II)} + 4.48 \text{ (Scotland III)} = 23.67.$$

The coefficient is .24; that is to say, there is a fairly close linkage, but not so close as that between Cotton Carding and Spinning and Cotton Weaving.

APPENDIX III

(See pages 171 to 173)

(a) Districts whose Resident Population rose by 30 per cent or more, 1921-31

	Resident Popula- tion 1921	Per Cent Rise*	Acres	Persons per Acre	
				1921 Resident	1931 Enumer- ated
LONDON'S OUTER RING					
<i>Middlesex</i>					
Kingsbury	1,852	818.5	1,829	1.0	9.1
Wembley	16,110	205.5	4,564	3.5	10.6
Hendon R.D.	15,942	174.7	9,230	1.7	4.7
Hayes and Harlington	9,797	144.9	5,518	1.8	4.3
Hendon	56,998	106.0	10,471	5.4	11.0
Wealdstone	18,520	99.9	1,061	12.7	25.5
South Mimms R.D.	8,211	80.6	6,129	0.5	0.9
Ruislip and Northwood	9,000	80.8	6,585	1.4	2.4
Heston and Isleworth	47,290	61.6	6,851	6.9	11.0
Uxbridge	20,759	52.3	10,298	2.0	8.1
Harrow-on-the-Hill	19,628	48.3	2,129	9.2	12.4
Southgate	38,900	43.2	3,596	10.8	15.5
Yiewsley and Drayton	9,258	41.8	5,277	1.8	2.5
Feltham	11,664	40.7	5,089	2.3	3.2
Sunbury	9,858	34.1	5,468	1.8	2.4
Friern Barnet	17,510	31.5	1,304	13.4	17.7
Ealing	90,633	31.8	9,133	9.9	12.9
<i>Herts</i>					
Welwyn Garden City	745	1,059.1	2,460	0.3	3.5
Welwyn R.D.	2,445	52.2	5,430	0.5	0.7
Bushey	8,020	43.6	3,081	2.7	3.6
Barnet R.D.	4,500	42.8	9,215	0.5	0.7
Chorleywood	2,331	40.7	1,989	1.2	1.7
East Barnet Valley	13,490	39.2	2,644	5.1	7.0
Rickmansworth	7,982	34.7	4,727	1.7	2.3
Hatfield R.D.	8,374	34.7	22,091	0.4	0.5
St. Albans R.D.	14,580	34.1	37,070	0.4	0.5
<i>Bucks</i>					
Beaconsfield	3,512	33.7	4,504	0.8	1.1
Amersham R.D.	21,980	32.6	45,700	0.5	0.6
<i>Essex</i>					
Dagenham	9,096	885.7	6,554	1.4	13.6
Hornchurch	10,854	166.6	6,783	1.6	4.2
Chingford	9,430	137.5	2,310	3.4	7.8
Romford	19,490	36.4	5,627	3.5	6.4
Ilford	85,500	55.1	8,493	10.1	15.4
Barking Town	36,250	44.6	3,309	9.5	13.5
Loughton	5,630	31.8	3,962	1.4	1.9

(a) Districts whose Resident Population rose by 30 per cent or more, 1921-31

	Resident Popula- tion 1921	Per Cent Rise*	Acres	Persons per Acre	
				1921 Resident	1931 Enumera- ted
<i>Essex Coast</i>					
Benfleet	5,990	101.5	6,856	0.9	1.9
Canvey Island	1,752	92.8	4,851	0.4	0.8
Rayleigh	3,588	76.2	5,644	0.6	1.1
Tilbury	9,750	71.5	1,859	5.8	9.1
Billericay R.D.	23,900	67.2	49,898	0.5	0.8
Romford R.D.	9,500	60.8	16,876	0.6	0.9
Rochford R.D.	10,995	58.2	38,465	0.8	0.4
Orsett R.D.	14,895	88.8	29,158	0.5	0.7
Southend-on-Sea C.B.	90,500	81.5	7,055	12.8	17.0
<i>Kent</i>					
Bexley	21,510	56.8	4,942	4.4	6.7
Bromley R.D.	25,540	56.5	23,889	0.9	1.4
Sidcup	8,920	45.4	2,048	4.4	6.0
Beckenham	32,970	35.0	3,889	8.5	11.8
Crayford	12,050	32.4	2,455	4.9	6.5
Bromley	34,810	31.8	4,697	7.4	9.7
<i>Surrey</i>					
Merton and Morden	17,520	140.9	3,237	5.4	12.7
Carshalton	14,000	108.8	2,924	4.8	9.8
Coulsdon and Purley	21,080	80.5	8,631	2.4	4.4
Maldens and Coombe	14,430	65.0	3,261	4.4	7.8
Beddington and Wallington	16,110	63.4	3,042	5.8	8.6
Sutton and Cheam	28,651	61.9	3,744	7.6	12.4
Epsom R.D.	25,909	61.4	30,671	0.9	1.3
Mitcham	35,550	60.5	2,935	12.1	19.4
Surbiton	19,830	54.7	3,049	6.8	9.6
Ham	1,509	53.5	1,869	0.8	1.2
Epsom	18,820	45.4	4,423	4.8	6.1
LONDON REGION					
Slough	20,140	65.8	6,145	3.5	5.5
Letchworth	10,210	41.8	3,652	2.8	4.0
OTHER CENTRES					
<i>West Riding</i>					
Worksop R.D. (Notts.)	5,060	186.0	23,515	0.2	0.5
Thorne R.D.	11,100	183.2	38,419	0.3	0.8
Thurnscoe	5,060	110.8	1,254	4.0	8.3
Doncaster R.D.	26,423	85.9	77,865	0.8	0.6
Ardwick le Street	12,020	69.8	3,605	3.3	5.6
Norton R.D. (Derby)	4,553	46.5	7,298	0.6	0.9
Pontefract R.D.	18,030	33.2	33,970	0.5	0.6
Maltby	7,715	31.7	4,792	1.6	2.1
Thurstonland and Farnley	2,971	32.4	3,891	0.8	1.0

(a) Districts whose Resident Population rose by 30 per cent or more, 1921-31

	Resident Popula- tion 1921	Per Cent Rise*	Acres	Persons per Acre	
				1921 Resident	1931 Enumer- ated
<i>York</i>					
Flaxton R.D.	9,760	47.6	36,790	0.8	0.4
Bishopthorpe R.D.	2,091	40.8	6,411	0.8	0.5
<i>Liverpool</i>					
Wirral R.D. (Cheshire)	18,074	59.8	32,717	0.6	0.9
Ellesmere Port and Whitby (Ches.)	13,850	42.1	3,449	3.9	5.5
Bebington and Bromboro' (Ches.)	19,873	38.5	3,446	5.6	7.8
Great Crosby (Lancs.)	18,560	38.4	1,867	7.3	9.8
<i>Manchester</i>					
Barton-upon-Irwell R.D. (Lancs.)	10,184	55.1	6,762	1.5	2.3
Irlam (Lancs.)	9,600	34.3	4,717	2.0	2.7
Whitfield (Lancs.)	7,080	31.7	1,408	5.0	6.5
Cheadle and Galtry (Cheshire) .	11,070	67.8	5,082	2.2	3.6
Hazel Grove and Bromhall (Ches.)	10,160	31.0	5,447	1.9	2.4
<i>Other Lancashire</i>					
Warrington R.D.	12,260	32.1	18,955	0.7	0.9
Clitheroe R.D.	6,710	34.1	32,170	0.2	0.3
<i>Newcastle</i>					
Seghill	1,981	31.1	1,425	1.4	1.8
<i>Middlesborough</i>					
Billingham	8,089	121.7	3,089	2.7	5.9
Redcar	15,450	31.7	4,102	3.8	5.9
<i>Mansfield</i>					
Southwell R.D.	19,970	60.9	118,371	0.2	0.3
Warsop	7,880	45.1	6,183	1.2	1.7
Skegby R.D.	9,090	44.7	12,406	0.7	1.1
<i>Nottingham</i>					
West Bridgford	13,260	35.0	1,122	11.8	15.9
<i>Derby</i>					
Alvaston and Boulton	1,587	115.5	1,321	1.1	2.5
<i>Leicester</i>					
Blaby R.D.	16,728	96.5	29,221	0.6	1.1
Thurmaston	2,240	67.2	1,762	1.3	2.1
Billesdon R.D.	7,230	49.7	52,482	0.1	0.2
Oadby	3,253	43.8	2,164	1.5	2.2
<i>Peterborough</i>					
Old Fletton	5,700	30.8	3,029	1.9	2.5

(a) Districts whose Resident Population rose by 30 per cent or more, 1921-31

	Resident Popula- tion 1921	Per Cent Rise*	Acres	Persons per Acre	
				1921 Resident	1931 Enumer- ated
<i>Birmingham</i>					
Solihull R.D.	20,521	50.2	41,606	0.5	0.7
<i>Nuneaton</i>					
Foleshill R.D.	10,844	69.8	15,098	0.7	1.2
Nuneaton R.D.	3,298	64.6	11,206	0.8	0.5
<i>Northampton</i>					
Northampton R.D.	7,860	52.7	16,228	0.5	0.7
<i>Norwich</i>					
St. Faith's R.D.	10,980	80.1	48,988	0.2	0.8
<i>Oxford</i>					
Wheatley	919	87.1	990	0.9	1.8
Headington R.D.	4,976	86.9	22,639	0.2	0.8
<i>Newport</i>					
St. Mellons R.D.	11,540	62.9	25,786	0.5	0.7
<i>Portsmouth-Southampton</i>					
Catherington R.D.	3,721	88.6	18,144	0.3	0.5
Havant R.D.	6,560	75.0	10,885	0.6	1.1
Hursley R.D.	4,491	41.2	16,756	0.3	0.4
MILITARY					
Farnborough (Hants.)	12,590	88.0	2,881	5.4	7.0
<i>Richmond</i>					
Richmond M.B.	3,779	80.1	2,520	1.5	1.9
Richmond R.D.	9,230	97.8	78,597	0.1	0.2
RESORTS					
<i>Scarborough</i>					
Scalby	1,890	94.4	3,856	0.4	0.8
<i>Skegness</i>	5,128	57.0	3,862	1.3	2.4
<i>Herne Bay</i>					
Blean R.D.	8,280	81.2	26,882	0.3	0.4
<i>Deal</i>					
Eastry R.D.	13,340	87.0	48,688	0.3	0.4
<i>Hastings</i>					
Hastings R.D.	1,829	89.2	9,614	0.2	0.8
<i>Brighton</i>					
Newhaven R.D.	2,688	101.8	19,565	0.1	0.8

(a) Districts whose Resident Population rose 30 per cent or more, 1921-31

	Resident Popula- tion 1921	Per Cent Rise*	Acres	Persons per Acre	
				1921 Resident	1931 Enumer- ated
<i>Worthing</i>					
East Preston R.D.	5,857	48.7	28,487	0.2	0.4
Worthing M.B.	38,278	84.6	7,227	4.6	6.4
<i>Bournemouth</i>					
Milton	8,019	69.6	4,780	0.6	1.1
Christchurch	6,916	82.1	2,852	2.9	8.9
Bournemouth C.B.	85,127	80.6	11,218	7.6	10.4
<i>Poole</i>					
Poole R.D.	4,085	87.2	14,789	0.27	0.84
Poole M.B.	42,900	82.5	7,964	5.4	7.2
<i>Paignton</i>	12,480	44.2	5,188	2.4	8.5
<i>Prestatyn</i>	8,259	86.6	1,640	2.0	2.8
<i>Blackpool</i>					
Thornton Cleveleys	5,846	87.0	8,001	1.8	8.4
Blackpool C.B.	78,800	84.9	5,189	14.2	19.6
<i>Morecambe and Heysham</i>					
<i>Matlock</i>					
North Darley	8,219	84.8	5,142	0.6	0.8

* The per cent rise is calculated on the 1931 estimated resident population. It sometimes differs from the rise in persons per acre, since the latter is based on enumerated population in 1931. The Census was taken in April.

(b) Districts whose Resident Population lost 20 per cent or more, by migration, 1921-31

	Resident Population 1921	Net per cent Loss by Migration*	Acres	Persons per Acre	
				1921 Resident	1931 Enumerated
SOUTH WALES					
<i>Monmouthshire</i>					
Abertillery	89,660	29.7	6,481	6.1	4.9
Nantyglo and Blaina	16,860	29.3	3,860	4.4	3.4
Chepstow	5,190	26.0	1,350	3.8	3.2
Rhymney	11,940	22.2	2,689	4.5	4.0
Ebbw Vale	36,150	22.0	6,869	5.3	4.6
Tredegar	25,650	20.7	8,148	3.1	2.8
Bedwelty	81,700	20.5	7,274	4.4	4.1
<i>Glamorgan</i>					
Maesteg	29,570	24.0	6,706	4.4	3.8
Rhondda	166,600	23.4	23,886	7.0	5.9
Ogmore and Garw	80,850	23.1	17,924	1.7	1.5
Mountain Ash	44,240	22.7	10,504	4.2	3.7
Glyncorwg	11,000	22.1	13,925	0.7	0.7
Pontypridd	48,180	20.7	8,141	5.9	5.2
<i>Pembroke</i>					
Pembroke M.B.	15,580	25.2	4,679	3.3	2.6
Neyland	2,739	22.7	484	5.7	4.5
DURHAM					
Auckland R.D.	62,400	24.3	57,332	1.1	0.9
Spennymoor	18,530	22.7	3,388	5.5	4.8
Tow Law	4,108	22.3	477	8.6	7.5
Bishop Auckland	14,390	21.2	691	20.8	17.8
Tanfield	10,570	22.0	4,779	2.2	1.9
Jarrow	36,200	21.2	784	46.2	40.8
WEST CUMBERLAND					
Cleator Moor	8,460	27.2	2,947	2.4	2.2
Arlesdon and Frizington	5,230	23.6	5,554	0.9	0.8
MIDDLESBOROUGH					
Loftus	9,120	24.0	6,397	1.4	1.2
Skelton and Brotton	15,860	21.3	15,557	1.0	0.9
DALTON-IN-FURNESS					
	12,470	20.9	7,994	1.6	1.3
NEW HUNSTANTON					
	3,724	21.0	1,064	3.5	2.9

* The per cent fall is calculated on the 1931 estimated resident population. It sometimes differs from the fall in persons per acre, since the latter is based on enumerated population in 1931. The Census was taken in April.

APPENDIX IV

Regions used by the Registrar General for Population Statistics

<i>Short Title of Region</i>	<i>Comprising</i>
South-East	Bedfordshire, Berkshire, Buckinghamshire, Essex, Hertfordshire, Kent, London, Middlesex, Oxfordshire, Hampshire, Surrey, Sussex, Isle of Wight.
Greater London	City of London and Metropolitan Police district (about 15 miles radius from Charing Cross). (N.B.—In the Census the figures for Greater London are also included in the South-East region, but have been subtracted here.)
North I	Northumberland and Durham.
North II	Cumberland, Westmorland, and the North and East Ridings of Yorkshire.
North III	The West Riding of Yorkshire and the City of York.
North IV	Cheshire and Lancashire.
Midland I	Gloucestershire, Herefordshire, Shropshire, Staffordshire, Warwickshire and Worcestershire.
Midland II	Derbyshire, Leicestershire, Northamptonshire, Nottinghamshire, Soke of Peterborough.
East	Cambridgeshire (including Isle of Ely), Huntingdonshire, Lincolnshire, Norfolk, Rutlandshire, Suffolk.
South-West	Cornwall, Devonshire, Dorsetshire, Somersetshire, Wiltshire.
Wales I	Brecknockshire, Carmarthenshire, Glamorganshire, Monmouthshire.
Wales II	Anglesey, Caernarvonshire, Cardiganshire, Denbighshire, Flintshire, Merionethshire, Montgomeryshire, Pembrokeshire, Radnorshire.
Scotland I	Berwickshire, Dumfriesshire, Kirkcudbright, Peebles, Roxburgh, Selkirk, Wigtownshire.

<i>Short Title of Region</i>	<i>Comprising</i>
Scotland II	Clackmannanshire, City of Dundee, East Lothian, City of Edinburgh, Fife, Mid-Lothian, Stirlingshire, West Lothian.
Scotland III	Ayrshire, Dumbartonshire, Lanarkshire, Renfrewshire.
Scotland IV	The Rest of Scotland.

Regions used in the Board of Trade Census of Production :

1. Greater London London, Surrey, Middlesex, North-West Kent (including Gravesend), Hertfordshire (South of Stevenage), Buckinghamshire (southern half).
2. Lancashire, Cheshire and the Glossop and New Mills District of Derbyshire Lancashire, Cheshire, Derbyshire (Glossop and New Mills District), Saddleworth District of Yorkshire.
3. West Riding of Yorkshire Yorkshire, except Snaith, Goole, Stamford Bridge, Hunmanby and the area to the east thereof, and portions included in areas 2 and 4.
4. Northumberland and Durham and the North Riding of Yorkshire Northumberland, Durham, North Riding of Yorkshire, except south of a line joining Masham, Northallerton and Loftus.
5. Warwickshire, Worcestershire and Staffordshire Warwickshire, Worcestershire and Staffordshire.
6. Rest of England.
7. South Wales and Monmouthshire Monmouthshire, Glamorganshire Breconshire, Radnorshire, Carmarthenshire Pembrokeshire, Bryn-Amman, Llanelly, Kidwel
8. Rest of Wales.
9. West Central Scotland Lanark, Renfrew, Dumbarton (excluding detached portion), Argyll, Bute, Ayr (north-west of Kilmarnock).
10. Rest of Scotland.

Of the above, areas 6 and 10 have been further subdivided for the 1935 Census, as follows :

<i>New Area Numbers</i>	<i>Districts Covered</i>
6. East Midlands	Derbyshire (excluding portion in Area 2), Leicestershire, Rutland, Nottinghamshire, Northamptonshire (excluding Peterborough), Northern Buckinghamshire.
7. West Midlands	Shropshire, Herefordshire, Gloucestershire.

<i>New Area Numbers</i>	<i>Districts Covered</i>
8. South-East (excluding Greater London)	Kent (excluding north-east portion), Bedfordshire, Oxfordshire, Berkshire, Hampshire, Sussex.
9. South-West	Wiltshire, Dorsetshire, Somersetshire, Devonshire, Cornwall.
10. East	Yorkshire (east of and including Snaith, Goole, Stamford Bridge and Humamby), Lincolnshire, Huntingdonshire, Peterborough, Cambridgeshire, Norfolk, Suffolk, North-East Essex, Hertfordshire (north of and including Stevenage).
14. Scotland—West Central (formerly Area 9)	Lanark, Renfrew, Dumbarton (excluding detached portion), Argyll, Bute, Ayr (north-west of Kilmarnock).
15. East Central	Lothians, Stirling, Clackmannan, Kinross, Fife, City of Dundee, detached part of Dumbarton.
16. Southern Scotland	Ayr (excluding portion in Area 14), Dumfries, Kirkcudbright, Peebles, Selkirk, Roxburgh, Wigtown, Berwick.
17. Northern Scotland	Rest of Scotland (i.e. Perth, Aberdeen, Angus, Kincardine, Banff, Moray, Nairn, Inverness, Ross and Cromarty, Sutherland, Caithness, Shetland and Orkney).

The figures for these new regions cannot be compared with any former figures, while they are not themselves sufficiently complete to form the basis of an analysis of industry by regions. They have not, therefore, been used in this report. The new regions are, however, shown in the accompanying map.

A few minor changes were also made between 1930 and 1935 in the boundaries of regions 1-5. Where any comparison has been made between 1935 and previous years, the figures have been adjusted accordingly.

Divisions Into which Great Britain is divided, for the purpose of the administration of the Unemployment Insurance Acts.

<i>Division</i>	<i>Area of Division</i>
London Division	Administrative County and City of London, the County of Middlesex, and the areas in Essex, Hertford, Kent and Surrey covered by Employment Exchanges, etc., at: Barking, Barnet, Bexley Heath, Bromley (Kent), Buckhurst Hill, Canning Town, Croydon, Caterham Valley, Dagenham, Dartford, East Ham, Epping, Epsom, Erith, Grays, Ilford, Kingston-on-Thames, Leyton and Walthamstow, Orpington, Penge, Redhill, Richmond, Romford, Sidcup, Stanford-le-Hope, Stratford, Sutton, The Dittons, Tilbury and Wimbledon. (The Division covers the City of London and, approximately, the Metropolitan Police District.)

<i>Division</i>	<i>Area of Division</i>
South-Eastern Division	. The areas in Essex, Hertford, Kent and Surrey (except Camberley) which are outside the London Division: and the counties of Bedford, Berks (except the Abingdon and Faringdon districts), Buckingham, Cambridge (including the Isle of Ely), Huntingdon, Norfolk, Suffolk and Sussex and the Soke of Peterborough.
South-Western Division	. The Counties of Cornwall, Devon, Dorset, Gloucester, Hants, Oxford, Somerset and Wilts, and the Abingdon and Faringdon districts of Berks, and the Camberley district of Surrey.
Midlands Division	. The Counties of Derby (except the Buxton, Chapel-en-le-Frith, Glossop, Hadfield and New Mills districts), Hereford, Leicester, Northampton (excluding the Soke of Peterborough), Nottingham, Rutland, Salop, Stafford, Warwick and Worcester.
North-Eastern Division	. The Counties of Lincoln and Yorkshire (except the Barnoldswick, Bentham, Saddleworth and Cleveland districts).
North-Western Division	. The Counties of Cheshire and Lancashire, and the Buxton, Chapel-en-le-Frith, Hadfield, New Mills and Glossop districts of Derbyshire, and the Barnoldswick, Bentham and Saddleworth districts of Yorkshire.
Northern Division	. The Counties of Northumberland (excluding the Berwick district), Durham, Cumberland and Westmorland, and the Cleveland district of Yorkshire (the Middlesbrough, South Bank, Guisborough, Loftus, Redcar, Saltburn and Stokesley areas).
Scotland	. . . . . Scotland, and the Berwick district of Northumberland.
Wales	. . . . . Wales and Monmouthshire.

Unemployment statistics are classified according to the location of the employment exchange which may in some cases serve areas over the border of the division.

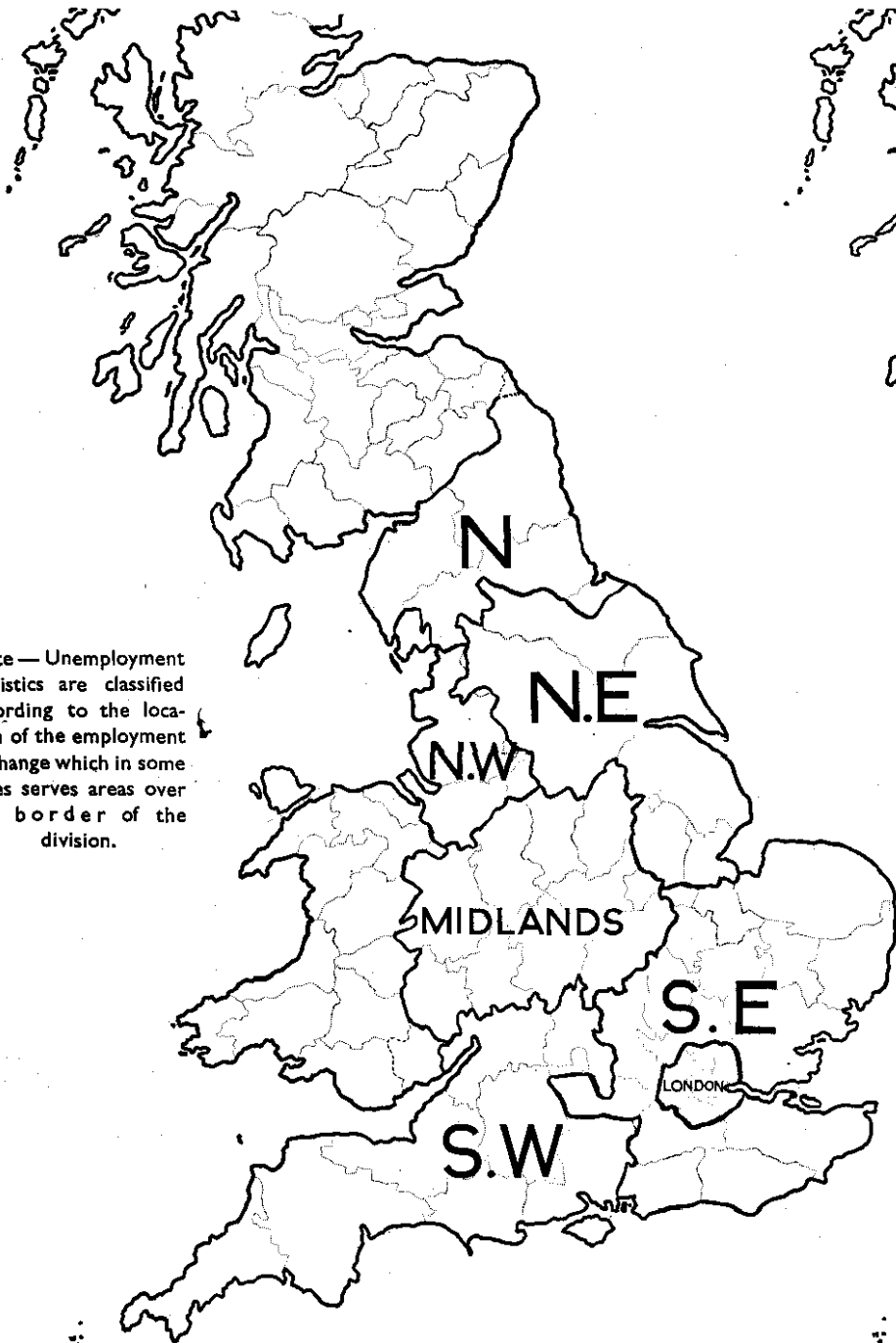
February 1939.

MINISTRY OF LABOUR DIVISIONS

POPULATION CENSUS REGIONS (USED BY THE REGISTRAR GENERAL)

CENSUS OF PRODUCTION AREAS, 1935

Note—Unemployment statistics are classified according to the location of the employment exchange which in some cases serves areas over the border of the division.



- ENGLAND**
- 1 Greater London
 - 2 Lancashire, Cheshire and the Glossop and New Mills District of Derbyshire
 - 3 West Riding of Yorkshire (except parts in 2 and 10), part of North Riding
 - 4 Northumberland, Durham and North Riding of Yorkshire (except part in 3)
 - 5 Warwickshire, Worcestershire, Staffordshire
 - 6 East Midland District
 - 7 West Midland District
 - 8 South Eastern District (excluding Greater London)
 - 9 South Western District
 - 10 Eastern District
 - 11 Cumberland and Westmorland
- WALES**
- 12 South Wales (including Monmouthshire)
 - 13 Rest of Wales
- SCOTLAND**
- 14 West Central District
 - 15 East Central District
 - 16 Southern Counties
 - 17 Northern Counties

NOTE—Before 1935 Regions 6-11 were all included in Region 6. "Rest of England"

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