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These maps of Great Britain are produced in two sheets, are on the Transverse Mercator Projection, and carry the new National Grid lines at ten kilometre intervals.

The series was initiated at the suggestion of the Advisory Maps Committee of the Ministry of Works and Planning (now the Ministry of Housing and Local Government) whose members included representatives of the British Association National Atlas Committee.

The planning maps already published or in preparation on this scale have been sponsored by the Ministry of Housing and Local Government and the Department of Health for Scotland and form a related series depicting the primary physical, economic, human and social facts concerning the country as a whole. They are listed within. For convenience of reference, maps prepared independently by the Ministry of Agriculture, the Geological Survey and by research organisations such as the Land Utilisation Survey are included in the list overleaf.

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Introduction

In many fields of administration, business and town and country planning there is an increasing awareness of the intimate relationships between most towns and their surrounding rural territory. Towns normally cater not only for their own populations, but act also as collecting, marketing and distributing centres for those of outlying villages. The object of this map is to show the territories or hinterlands served by towns functioning as centres, and this text explains in greater detail than can be given in the notes on the face of the map what it shows and the method by which it was constructed.

Towns vary considerably in their importance to the surrounding countryside, according to the facilities and services which they can offer. It is possible in fact to recognise five orders of centres, of which the lowest is the village, supplying only the simplest needs usually to a very small territory. Above this is the local town, typically a marketing and shopping centre, to which rural populations make regular, perhaps weekly, visits. Above this again is the regional centre to which less frequent visits are made for more specialised purchases such as furniture or to obtain specialist medical treatment. Still higher is the provincial centre, one of the nine or ten major cities of the country, and the highest order of all is the metropolis itself, which provides the most highly specialised services of all to the country as a whole and even beyond it.

This "hierarchy" may be stated as follows:—

Order	*Types of Centre*	*Examples*
1st Order	Metropolis	London
2nd Order	Provincial Centre	Aberdeen, Birmingham
3rd Order	Regional Centre	Exeter, Perth
4th Order	Local Centre	Ely, Forres, Pickering Aberfeldy, Llanidloes
5th Order	Village	

The relationship of the fourth to third and second order centres is exemplified by Fig. 1, a diagram of part of south-west England which indicates that the more important towns, such as Taunton, serve wider areas as Third order centres than as Fourth, while the hinterland of Bristol as a Second order centre is superimposed on its own and on other Third order and, in turn, Fourth order hinterlands. If this "superimposed" relationship is understood it is easier, when using the map, to appreciate the important fact that it is concerned only with the *local* (or fourth order) centres and the areas which towns serve in that capacity, and that the hinterlands shown for the larger towns are those they serve as fourth order centres, irrespective of whether or not those towns are also third or second order centres.

The term "hinterland" is used to denote the area outside a centre which focuses on it and is preferred to "sphere of influence", "urban field", or "umland", terms used elsewhere for the same concept.

2. Sources of Information

The most direct method of recognizing centres and of delimiting their hinterlands is to ask the inhabitants of a given rural territory to which centres they turn for various specific services. Such a survey was made in 1946 by the Cambridge Regional Office of the Ministry of Town and Country Planning (now of Housing and Local Government), its carefully prepared questionnaire being answered by selected responsible residents in every village throughout the region. From their replies the hinterlands of every centre in this region were delimited. A comparable and comprehensive survey of Wiltshire was made from 1946-50 by H. E. Bracey under the auspices of the Bristol University Reconstruction Research Group; the areas of influence of the towns were investigated for a great number of specialised services—including such items as secondary education, public utilities, newspapers, etc.

The time involved in such surveys renders them more suitable for coping with certain specific problems within a limited region, than for the speedy and economical portrayal of nation-wide conditions which is achieved by the present map. The basic assumption behind this map is that in the course of twenty or more years' experience the bus operators have discovered the most profitable routes by a process of trial and error—a process which in effect is equivalent to an elaborate but empirical questionnaire to discover the public demand for transport to various centres.

(i) Stage Carriage Services

There is abundant evidence that in the United Kingdom in general buses (together with trolley buses and trams) are the most widely used form of public transport, and so far as one type of journey, the journey to work, is concerned, buses were shown by the Social Survey (1) to be used far more than non-public methods of transport (e.g. car and bicycle) in all regions except East Anglia, where the bicycle led by a small margin.

The assumption has therefore been made that the bus can be taken as representative of all kinds of transport, so far as all but long-distance journeys are concerned, and these are not relevant to the subject of the present map. The only exception was in the north and west of Scotland where steamer services sometimes take the place of bus services and were therefore treated as such.

It was essential that all stage carriage services should be taken into account, but that express routes and such special services as factory and school buses, excursions, etc., should be eliminated. Winter services were

(1) Social Survey (Report No. 31 (N.S.)) "Getting to Work", January, 1943.

Further valuable evidence of the importance of bus transport, not only in connection with journey to work, but for a wide variety of purposes, is provided by the London Traffic Survey conducted in 1949 for London Transport Executive. Although based on London conditions, there is no reason to believe that its main findings would not apply to other areas.

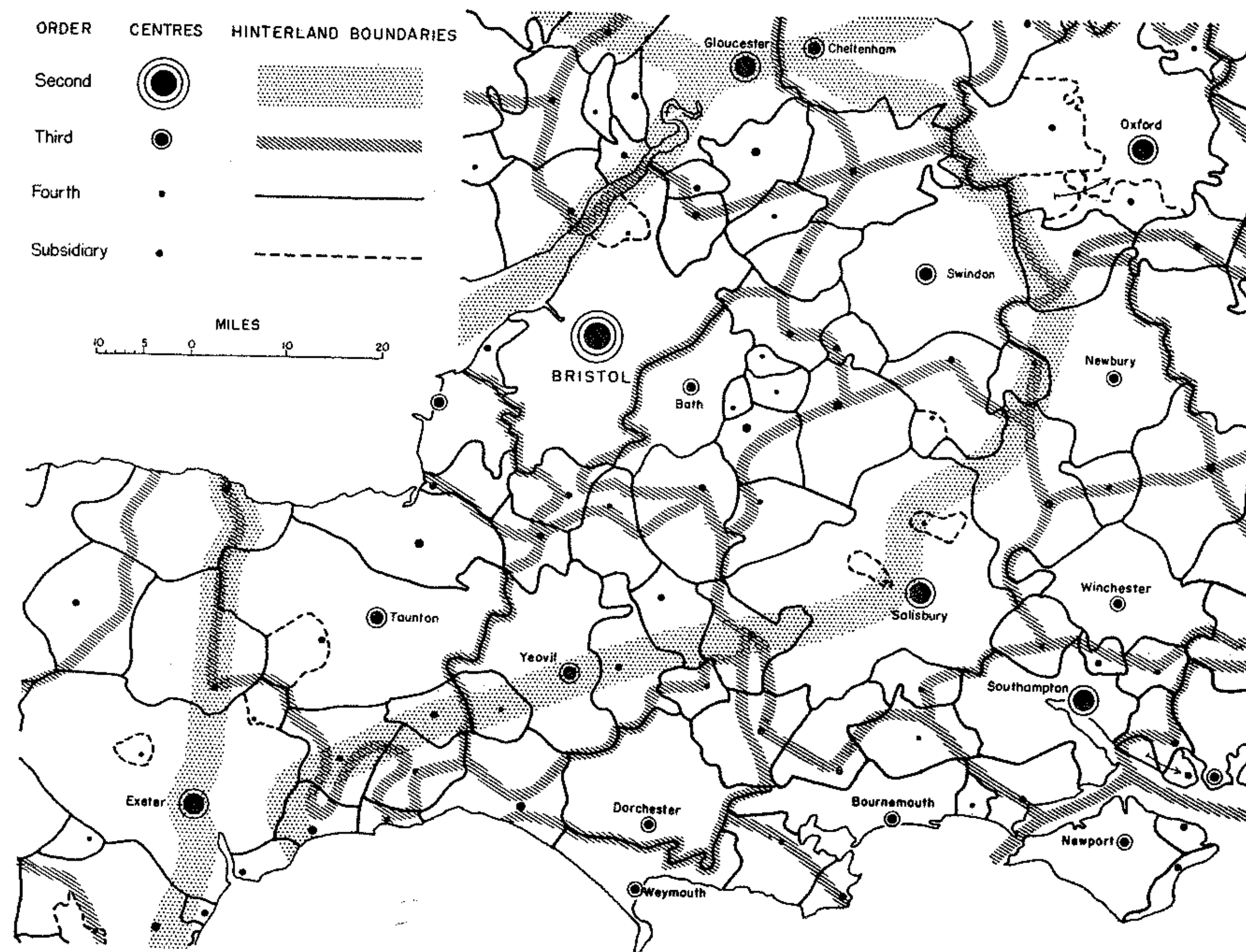

Fig. 1. The Bristol Area: second and third order hinterlands in relation to those of the fourth (or local) order.

judged preferable to summer, in order to eliminate seasonal services. It was found that the bus services on market days gave the most reliable indication of the territory served by a given centre.

The large operating concerns publish time-tables and a number of local time-tables are published independently. The details of the services of a large number of small concerns are normally difficult to obtain, but it is obligatory for operators of public service vehicles to deposit operating time-tables with the Traffic Area Licensing Authorities of the Ministry of Transport and Civil Aviation, who kindly co-operated to ensure that no stage carriage service was overlooked.

(ii) Population

For Scotland use was made of the 1951 parish population figures which were already available.

For England and Wales the populations of urban administrative areas were taken from unpublished estimates of the civilian population for 1951 provided by the Registrar General. (In the vast majority of cases these differ very little either from the 1951 census figures or from the published Registrar General's Estimates of the Population of England and Wales at 30th June, 1951, which are of Home Population, i.e. including British and other armed forces stationed in the area). Parish populations where required were estimated by reference to unpublished figures provided by the Registrar General.

Reference to detailed 1951 census information which has subsequently become available shows that it would have made no significant difference to the size of the symbols on the map.

3. Method of Compilation

(i) Centre and Boundaries

A centre is defined as a town or village having at least one regular stage carriage service operating only to and from places smaller than the centre itself. If every bus serving a place starts from, or passes through, a larger settlement then the smaller place does not qualify as a centre. This definition, like all definitions, occasionally produces an anomalous result; but the anomalies among nearly one thousand centres are very few. Their occurrence most commonly points to an area which has no one clearly dominant centre; several areas in the Western Highlands of Scotland exemplify this. In a few cases a town fails to emerge as a centre because its " pull " is effectively masked by a much larger centre to which travel is particularly easy. Wymondham in Norfolk is such an example. Bus routes into Wymondham do not terminate there, but continue into Norwich, and as a result it does not qualify as a centre (even a subsidiary one) because none of its routes serve only places smaller than itself. Such a situation has occurred because the large and old established centre of Norwich has developed a markedly radial system of bus routes, with few or no " cross " routes favouring the emergence of smaller centres.

For every centre as defined above, a diagram was plotted to show the bus route network and when these diagrams were superimposed on one another it was easy to draw boundary lines between places which had better bus facilities to one centre and those which had better facilities for reaching another centre. This is illustrated by Figure 2 which shows how the boundary between the areas served by Reading and Newbury was delimited. (The routes relevant to the fixing of this boundary are complete, but certain others have been truncated in order to make the illustration more compact). It is understandable that in some cases there will be zones of mixed allegiance, but the boundaries as defined above may be likened to watersheds, some of which are clear cut crestlines between valleys while some are poorly defined swellings in a lowland.

In certain instances the area focusing on a minor centre is not easily and completely distinguished from

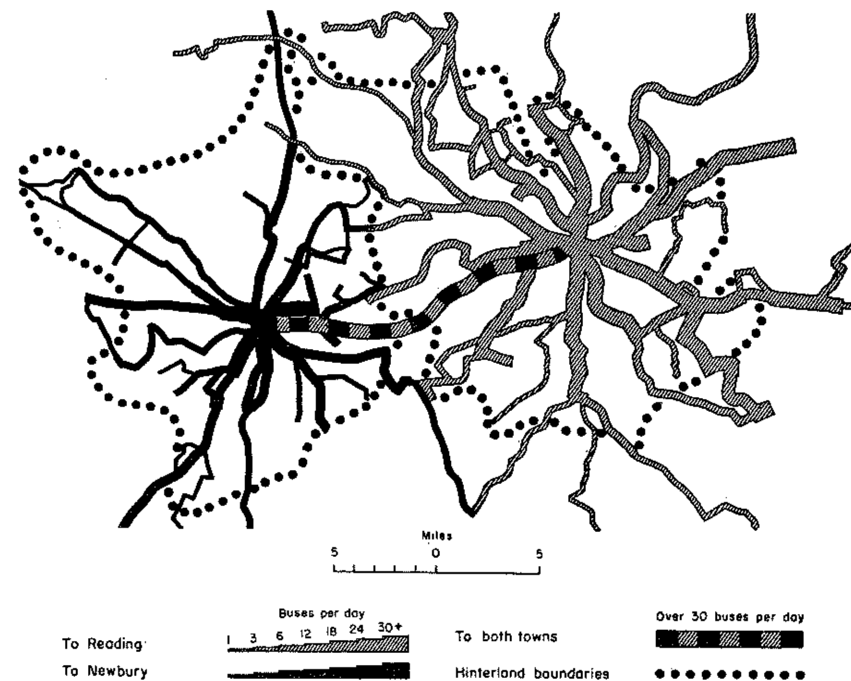

Fig. 2. Method of delimiting hinterlands between Reading and Newbury.

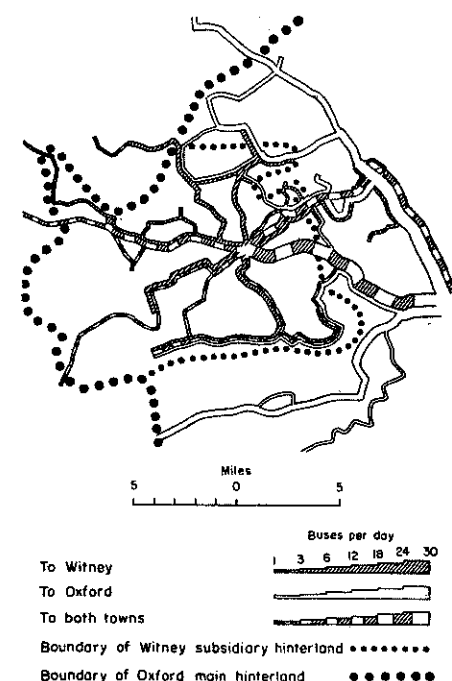

Fig. 3. Witney: a centre subsidiary to Oxford.

that focusing on a larger centre; it may even be almost completely surrounded by the major area. The centre in such cases has been described as a *subsidiary centre;* it is well illustrated by Dalkeith, subsidiary to Edinburgh, or Witney, subsidiary to Oxford. (See Figure 3). Aberdeen is remarkable in having a large number of subsidiary centres within its major area.

The map identifies a total of 935 centres of which 785 are defined as main centres and 150 as subsidiaries. Of this total, 695 (612 main, 83 subsidiary) are in England and Wales, 236 (170 main, 66 subsidiary) in Scotland, and 4 in the Isle of Man.

(ii) **Population**

(a) **of centres**

In estimating populations of centres the general rule adopted was to regard the population of the centre as equivalent to the civilian population of the appropriate administrative urban area. Where centres have no urban administrative status (uncommon in England and Wales but common in Scotland), their populations have been taken as that of the appropriate parish, where this is sufficiently small. Where the parish (or other administrative area containing the centre) is too extensive to give a realistic approximation to the centre population, an estimate has been made of the proportion of the population living in the centre. In England and Wales (where parish populations for 1951 were not available by the time the map was prepared) it was estimated by reference to electoral rolls.

In the vast majority of cases the population of only one administrative area has entered into the population of a centre; any smaller urban areas adjoining or near the centre have been counted as within its hinterland. Two nearby towns are sometimes contained within a single administrative area (Borough, Burgh, or Urban District), especially in England, and except as mentioned below they have been regarded for present purposes as a single centre. Examples are: Reigate and Redhill; Sandown and Shanklin; Bude and Stratton. In such cases the symbol has been placed on the dominant town unless it was possible so to place it that it indicates both settlements.

To this general rule of " one administrative area: one centre " there are three classes of exceptions. Firstly, in 14 cases two or more towns having separate urban status are, for the purposes of this map so closely connected by their built-up areas that they are best regarded as a single centre, even if there is some thinning out of the building pattern between the two. Examples are Torquay and Paignton, and Warwick and Leamington Spa. [1] Secondly, in the three instances of Glastonbury and Street, Hertford and Ware, and Cromer and Sheringham two towns tend to function as a single (" twin ") centre even though physically quite distinct and separate, because examination of bus services shows that it is not realistic to disentangle them and to distinguish their separate hinterlands.

Thirdly, there are a very few cases of single administrative areas containing two (or more) distinct settlements each of which functions as a centre for a distinct and separate hinterland. For example, the Urban District of Camborne and Redruth (Cornwall) contains the two separate centres of Camborne and Redruth, while in Rhondda Urban District (Glamorgan) no less than three centres have to be recognized (Rhondda, Tonypandy and Porth) as well as a subsidiary, Treorchy.

(1) The others are:—Aldershot and Farnborough; Bournemouth, Christchurch and Poole (part); Brighton and Hove; West Hartlepool and Hartlepool; Huntingdon and Godmanchester; Leighton Buzzard and Linslade; Malton and Norton; Rochester, Chatham and Gillingham; Nottingham, Beeston and Stapleford; Portsmouth and Havant and Waterloo (part); Saltcoats and Ardrossan; Leven, and Buckhaven and Methil.

(b) **of Hinterlands**

In calculating the populations of hinterlands some difficulty arose because their boundaries tend to run across those of administrative areas for which population figures are available. On the whole the task was easier in Scotland where the 1951 populations of individual parishes were available. However, parishes in Scotland are usually very large, especially in the sparsely-peopled districts of the Highlands, and sub-division of a whole parish population between two or more hinterlands was often necessary. This was done by reference to such evidence as the settlement pattern shown on Ordnance Survey maps on the scales of 2½ and 6 inches to the mile.

In England and Wales use was made of the Registrar General's Estimates of Population for June 1951, supplemented by unpublished estimates for parishes.

In a very few instances it happens that an urban administrative area is extensive and at the same time its hinterland is restricted, so that the entire hinterland is within that administrative area. In such cases the hinterland population is regarded as nil. South Shields and Broadstairs are examples.

The populations of both centres and hinterlands are of civilians only.

4. Methods of Presentation

The boundaries of the hinterland defined by the method described above are shown on the map by black lines, solid for those of main centres and pecked for those of subsidiary centres. It is not intended to imply by this that these boundaries represent sharp or well defined divisions; they are in fact zones of transition from the influences of one centre to that of another, in which the influences of the two centres almost balance or are in competition. For reasons of clarity in drawing the map, no attempt has been made to show these zones, which vary in width according to the particular circumstances of different areas, but the boundary lines are drawn along the middle of the zones. Some idea of the width of the transitional zone may be gleaned from the character of the boundary line itself; where it is fairly regular it may be assumed that the zone is narrow, and where it is very sinuous, the zone is likely to be broad. The first type is common; a good example is that between Forfar and Brechin or between Tiverton and South Molton. The second type may be seen, for example, between Cupar, Perth and Kirkaldy, between Sunderland, Durham and Spennymoor, or between Maidstone, Ashford and Faversham.

The significance of the lines themselves also varies with the density of population and the closeness of the network of communications. Where the population is dense there is generally a large number of points which can be fixed by the method used and through which the boundary lines can be drawn. In sparsely populated areas, on the other hand, the number of points at which a boundary can be fixed is much smaller and it is necessary to draw the remainder of the line more or less arbitrarily. To emphasise this variation in the significance of the information, the map shows the areas which are virtually uninhabited. Within these areas (which are the same as the areas left uncoloured on the maps of Population Changes in this series), the boundaries have been shown in a lighter tone. Where it has been possible to decide the hinterlands into which islands should be grouped, the hinterland boundaries have been continued over the sea by a broken line, the precise course of which has no significance.

The towns defined as centres are shown by symbols representing the population of the town itself and that of the area which it serves. Owing to the wide range in the size of the centres, it has been necessary to use two systems of symbols on the map, one for centres and hinterlands with a population of 3,000 or more and one for those of a population of less than 3,000. Under the first system, the centre is represented by a solid orange circle proportional in area to its population, (1) and the hinterland by a concentric green ring proportional in area to the hinterland population, the area of the whole symbol therefore being proportional to the combined population of the centre and hinterland together. In calculating the population of the hinterlands for these symbols the population of subsidiary centres and hinterlands has been included as part of the main hinterland. For this reason the symbols representing subsidiary centres are shown in outline only.

Where the population is less than 3,000 symbols of fixed size have been used: the centre is represented by an orange triangle and the hinterland by a green circle surrounding it. Where the population of the centre is larger than that of the hinterland, the triangle touches the circumference of the circle and where the population of the centre is less than that of the hinterland the triangle lies wholly within the circle.

It should be noted that in those cases where the population of the centre is less than 3,000, but the combined population (of centre and hinterland) exceeds 3,000, the outer circle is drawn to scale but the centre is shown by a triangle.

In the London area the complexity of bus routes (which reflects the complexity and close interdependence of this vast continuously built-up area) makes it impossible to select centres and define their hinterlands by the methods used in the country as a whole. Other, but related, criteria such as the points where the greatest number of passengers board or alight from buses enable centres and hinterlands to be drawn but in any case less significance attaches to these London hinterlands because the interdependence of the whole area is such that people converge on different foci for different purposes. In the metropolitan area therefore, no attempt has been made to show the individual Fourth Order hinterlands, but the population of the whole area (about 8,000,000) has been shown by a circle drawn to scale, so that the population of the entire country is represented on the map.

(1) This map may be compared with the map in this Ten Mile series showing Population of Urban Areas on which, however, the scale of the circles representing population is somewhat smaller, namely in the ratio of 3:8 compared with the Local Accessibility map.

5. Interpretation of the Map

In using this map it is important to distinguish between the facts which are presented by it and the deductions which may reasonably be made from it. From the method of compilation described above, it will be clear that the areas shown on the map are those within which there are more buses running to the centre of that particular area than to any other, and from this it follows that, in general, the centre is more accessible from its hinterland than is any other centre. This is the limit of the factual information given by the hinterland boundaries, but it is reasonable to deduce that because of its accessibility the town which has been designated as a centre in fact functions as such for approximately the area defined as its hinterland. The examination of particular cases in various parts of the country has proved that the hinterlands defined on this map correspond very closely to the areas from which people travel to the centres for various purposes such as major shopping, entertainment and higher education.

Mention should, however, be made of a number of anomalous cases, of which the largest group occurs in the west and north of Scotland. In this area some of the centres shown on the map have few, if any, facilities and cannot be regarded as service centres in the same

way as those in other parts of the country. Most of them are merely transhipment points where the means of transport changes from road to rail, road to steamer, or steamer to rail. Thus, while they are centres according to the definition used in compiling the map, the people using them probably more often pass through them to a larger centre than use the services they provide. Salen in Mull and Port Askaig in Islay are examples. Similar centres which are primarily centres of communication rather than service centres occur in other areas. Mintlaw in Aberdeenshire is an example.

It must therefore be emphasized that the population of a centre and the urban facilities which it possesses are not necessarily correlated with the size of its hinterland, and furthermore that it is not uncommon, especially in sparsely populated regions, for small places to function as centres although they cannot be classed even as "urban". Examples in England and Wales include Bellingham in Northumberland and Crymmych Arms in Pembrokeshire while others exist in the Highlands of Scotland. In such places the facilities offered often fall far short of those to be expected in towns, and they would accordingly not, for example in A. E. Smailes' "Urban Hierarchy in England and Wales", be classed as "towns" or "sub-towns". (1) Yet they are the undoubted accessibility centres of areas which may be very clearly bounded by mountain and moor. The definition and classification of "towns" and "sub-towns" and the recognition of centres and the delimitation of their hinterlands are two quite distinct, though mutually helpful processes. There are always clear reasons why certain places qualify for only one or other of these two classifications, but the most significant fact is that such places are relatively few in number. Thus in England and Wales no less than 562 out of the 679 places recognized by Smailes as towns and sub-towns are also centres on this map, and only 103 centres out of the total of 695 are not also recognized as towns in Smailes' classification.

(1) See selected bibliography at the end of this text. Smailes has paid careful attention to the minimum qualifications which are necessary, in his view, for a place to qualify as a *town*. These are broadly divisible into economic services such as shopping and entertainment, and community services such as schools, hospitals, etc. In addition to accepted importance as a shopping centre (reflected in the possession of at least 3 or 4 banks), there should also be one or more large multiple retail stores while the place should have some recognition as a district centre for a grammar school, hospital, possess a cinema and possibly a local newspaper. *Sub-towns* are places which although well equipped in some respects as towns, are deficient in others. Some have substantial shopping or entertainment importance, but little or no communal facilities such as hospitals or higher education.

To view this study in a fuller context the modern centres have been compared with those places recognized as towns in the 1851 Census. Of the 805 towns then listed in Great Britain only 757 should rightly be compared with the centres determined by the analysis of bus services, the remaining 48 being either within the Metropolitan area in which no centres are shown, or merged in some larger administrative area. Of these 757 towns 587 are now centres, and the correspondence is still closer in England and Wales, which shows 472 centres out of 567 towns. Among the minority failing to qualify as modern centres are some old-established country towns which have lost ground to neighbours whose geographical position has enabled them to take fuller advantage of changing conditions, and especially changes in transport. Thus in Gloucestershire Newent as a local centre has been eclipsed by Cheltenham, Ross on Wye, Ledbury and Tewkesbury. The eclipse of some such towns may not be permanent; a special study of Somerset by F. H. W. Green shows that some of them are again emerging. Very often their position at the junctions of two or more hinterlands suggests that they may be suitable locations for certain types of development which might incidentally grant them a new lease of life.

The close correspondence between the list of towns in 1851 and the modern list of centres is remarkable when account is taken of the radical economic and

social changes of the last hundred years. The discrepancies reflect chiefly the rise of newer industrial, holiday and dormitory towns, but by and large the countryside still looks to the same local centres as it did a hundred years ago.

It is also revealing to notice that a high proportion of present centres were towns in 1851. In Great Britain 559 out of 935 centres were towns in 1851 and in England and Wales 447 out of 695. The " newcomers " to the centres include a number of places of relatively recent growth, including such holiday centres as Clacton, Southend, Bournemouth and Weston-super-Mare and the inland spas of Malvern and Buxton. Swindon, Eastleigh and Wolverton are railway creations while Aldershot and Camberley owe their growth to the Army. Rhondda, Aberdare, Consett and Chester-le-Street are examples of the many industrial towns which have grown to importance since 1851. Another type of centre not recognized as a town in 1851 is the small centre in sparsely-peopled upland country such as the Highlands and Mid-Wales. As has already been pointed out many such centres are still in no sense urban, but their local importance to their hinterlands is unquestionable.

The recognition of this fundamental economic and social grouping of the urban and rural communities suggests many practical applications such as the drawing of boundaries of areas of administration of various kinds and as a factor in such commercial fields as advertising, market research and the like. In town and country planning only a few of the many ways in which this map is valuable can be suggested here. To quote one example, often the only direct indication (apart from local knowledge) of the true function and local importance of a small centre will be the extent of its hinterland; indeed it is usually the case that in densely populated areas the hinterlands are small while sparsely-peopled rural tracts show very extensive hinterlands, centring upon places which although tiny serve as focal points for large rural territories and whose importance is therefore much greater than would be indicated by their own populations.

Allied to this consideration is the important task in planning of assessing the adequacy of the multifarious facilities provided by a town, an assessment which cannot be made solely on the basis of the town's population, but must be made in relation to the whole population served, in both town and rural areas. The central shopping areas of many places may seem out of proportion to the town population, until their hinterland population is known. This is referred to in Green's article on south-western England (see bibliography) and since the results of the 1950 Census of Distribution have become available is emphasized in a useful study by J. B. Fleming " An analysis of shops and service trades in Scottish towns ".

Finally, in interpreting the map it is well to remember that while the boundaries of hinterlands are fairly stable and reflect the essential reality of these town and country relationships, they are by no means fixed for all time. Minor changes in bus services and routes leave them unaffected, for most new bus services merely intensify the existing network of routes. In the longer term, however, changes are known to be occurring; towns, like some other phenomena, develop or decline at differing rates, and this is inevitably reflected in their hinterlands. With such reservations in mind the map provides a clear picture of one important aspect of town and country relationships—the areas served by local centres.

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County Development Plans: A number of County Planning Authorities have found it valuable to include a study of urban hinterlands in the Survey and Analysis section of their Development Plans prepared in accordance with the Town and Country Planning Act, 1947. Among the many which could be mentioned are East Sussex, Cambridgeshire, Berkshire, and in Scotland, the Tay Valley Plan.

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