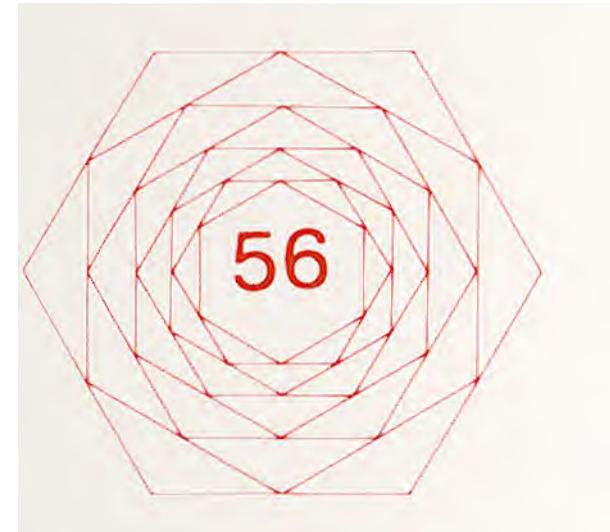


The UK Census of Population 1991



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1 INTRODUCTION

A Census of Population has been conducted every 10 years in Britain since 1801, with the exception of 1941, and the addition of 1966. Despite the relatively long time period between censuses, the census represents the largest detailed data collection exercise which provides almost complete coverage of the population. The breadth of topics covered, **and** the detailed information which is made available, make the census and its related datasets the single most **important source** of information about the population (Coleman and Salt, 1992). The late 1980s saw massive growth in the development of geographic information systems (GIS), including interest in population-related applications, (Martin, 1991; Rhind, 1991) and it is in the context of this growing use of computers and geographically referenced datasets that our discussion of the **1991** Census must be set. This changed environment is perhaps one of the most significant considerations in any discussion of the 1991 Census. Increases in readily available **computing** power have made possible the publication of more detailed cross-classifications of the census results than ever before, making it necessary to adjust the threshold levels which protect individual confidentiality. The computer-readable statistical abstracts have become an even more important part of the census output, and the range of census-related data products **and** software has again increased. More users will have access to extensive datasets on their own computers, and will seek to integrate the census with data obtained from other sources. These changes make it all the more important that census users are familiar with the potential and limitations of the census, and it is hoped that this CATMOG will go some way towards meeting that need.

Two previous titles in this series have dealt with the UK Census of Population. Dewdney (1981) explores the history and origins of the census, **and** gives details of the 1971 Census. Dewdney (1985) focuses specifically on the 1981 Census and issues of 1971-1981 comparability. **The** purpose of this volume is not to revisit the ground covered in the earlier **CATMOGs**, **but** to examine in detail the characteristics of the 1991 Census and its associated datasets. Attention will also be given to the comparison of data from 1981 and 1991. Indeed, the analysis of intercensal change is likely to be one of the major uses of the 1991 data. Census users who have a need for more detailed background material on the 1981 and previous censuses are referred to Rhind (1983), and on the 1991 Census to Dale and Marsh (1993) and Openshaw (1993). Another invaluable source document is the OPCS/GRO(S) official set of census definitions (OPCS, 1992a).

Separately administered censuses were also held in April 1991 in Northern Ireland, the Isle of Man and the Channel Islands. It is not possible to cover the detail of these censuses here. **The** Northern Ireland Census was conducted by the Census Office (Northern Ireland), and also took place on 21 April, as in mainland Britain. The questions covered were largely the same, with differences relating to ethnic group, religion and Irish language ability. Major differences between Northern Ireland and the rest of the UK are identified in the text.

The following two sections will address the actual mechanism by which the **1991** Census was conducted, and will then consider the wide variety of data products in some detail. Section **4** considers the geography of the census, and explains the newly established relationships between census and postcode geographies. Section 5 reviews in general terms the software tools which are available for retrieval and analysis of the census data, and outlines **the scope of the 1991** Census Initiative which forms a focus for much census-related academic research. Following a section devoted specifically to the comparison of 1981 and **1991** data, we **shall conclude with a**

discussion of issues of accuracy, and their implications for the use of 1991 Census data.

2 CONDUCTING THE CENSUS

(i) Planning

Responsibility for conducting the census rests with the Office of Population Censuses and Surveys (OPCS) in England and Wales and the General Register Office (GRO(S)) in Scotland. Planning of the census includes decisions about which questions should be included on the questionnaire; the organization of the administrative structure for the enumeration and processing of results, and the ways in which the processed data will be published.

Planning for the 1991 Census began in the early 1980s, soon after the completion of the 1981 Census. The success of the 1981 Census had been attributed to the principles of simplicity, acceptability and need (Wrigley, 1987). It was therefore decided that the 1991 Census should contain a broadly similar format and number of questions, allowing the data to meet the needs of users without placing an undue burden on the householders who are required to fill in the questionnaire. Consultation was carried out with government departments, local authorities, academic and other user groups in order to draw up a list of topics which should be covered, and a series of field tests were undertaken, culminating in a 'test census' in April 1989, which allowed a detailed checking of respondents' reactions to the census form. The 1989 test covered around 90,000 households in three areas of England and three areas of Scotland. The test was followed by a post enumeration survey in the same areas, which sought to evaluate respondents' reactions to the census questions, and the reasons for non-response (OPCS, 1989). Some modification is required to successive census questionnaires in order to accommodate broader changes in society during the intercensal period. One particularly significant issue was the proposed changes to 'relationship to head of household' and marital status, in order to better record 'concealed households' such as unmarried couples living together and single parent families within households. Other 1981 topics subject to review included the most appropriate indicators of household amenities, and the recording of ethnic origins. The 1989 post enumeration survey specifically asked about reactions to the ethnic question, and revealed sufficiently high levels of acceptability to justify its inclusion in the Census. In Northern Ireland, the ethnic question was not included, but a question relating to Irish language was added for the first time, using the same wording as that relating to the Gaelic language in Scotland. In addition, the traditional voluntary question about religion was included; 7.3% of the population did not answer this voluntary question.

In 1985, initial proposals were put forward, which would have resulted in a postcode-based census geography for England and Wales. This would have involved the mapping of boundaries for all postcodes, as had been performed in Scotland for 1981, such that the postcodes could be combined to form enumeration districts (EDs) which nested neatly within the higher level administrative boundaries. Despite the enormous benefits which might have been gained by such an approach, the cost of these proposals made them impossible to pursue in the late 1980s, and an alternative position was adopted in which postcodes would be recorded on census questionnaires, but ED planning would continue without reference to the postal geography. The option was retained to publish data for pseudo-enumeration districts (PEDs) which could be created by aggregating postcodes to form close approximations to the actual EDs but as discussed in section 4 below, these proposals were also eventually dropped. The evolution of the debate

regarding the geographical basis for the census may be followed in Wrigley (1990). In Scotland, new EDs were planned for data collection which were amalgamations of postcodes, and Output Areas (OAs) which were new zones for data output. As far as possible, the 1991 OAs contain the same postcodes as 1981 EDs, but a direct match is not always possible, and some 1981 EDs were split. Design of the Scottish census geography has been greatly enhanced by the production of a set of digital boundary data for unit postcodes, allowing the easy recombination of postcodes to produce the required areas (Thomas, 1991). The final definition of OAs will not be possible until the data processing stage.

Planning of the census geography thus involved careful re-examination of the 1981 large scale census maps, in order to determine a new set of EDs for the collection of the questionnaires, and publication of Small Area Statistics (SAS). Design of the 1991 EDs required a compromise between a number of often conflicting criteria. EDs must nest neatly within ward and higher level statutory boundaries, which are constantly subject to review and change, resulting in substantial alteration of the 1981 geography. Information from the 1981 Census was used to predict EDs which would prove difficult to enumerate, for example due to large numbers of multiply-occupied properties or English language difficulties. Advice was sought from local authorities regarding new residential development and demolition which had taken place in the intercensal period, and in the light of all this information, a new set of ED boundaries was drawn onto large scale Ordnance Survey maps. Selection of boundaries was guided by a number of principles: 1981 boundaries should be re-used wherever possible; EDs should not straddle physical obstacles such as railway lines or major roads; small rural communities should be contained within single EDs. Institutional addresses at which more than 100 persons were anticipated to be present on census night were identified as 'special EDs', and treated separately. Examples of the maps used, and a summary of the geography design process may be found in Clark and Thomas (1990). The resulting pattern produced a total of 130,000 EDs for 1991.

(ii) Enumeration

The census was conducted on Sunday 21 April 1991. Censuses have traditionally been conducted on Sundays in April in order to avoid the more severe effects of holiday and business travel which might be greater at other times of the year. Delivery and collection of the questionnaires was conducted by enumerators, each responsible for a single enumeration district. Most forms were delivered in the period 12-19 April, and most collected between 22 and 25 April. In many areas it was necessary to extend the collected period in order to overcome difficulties in contacting some households. Most of the staff involved in the collection of the census data were recruited as short-term employees solely for the collection exercise. The census staff, or 'field force' were arranged into four tiers, following the successful 1981 pattern (OPCS, 1992a). The staff comprised 135 'census area managers', each responsible for up to 25 'census officers', each of whom took control of a local area containing around 25,000 people and known as a census district. The census officers in turn recruited around 7,800 'assistant census officers' and 117,500 'enumerators'. Fuller details of the recruitment of staff and field methodology are given in Clark (1992).

The head of household was required to complete the questionnaire on behalf of all members of the household and to have the form ready for collection on Monday 22 April. Completion of a census questionnaire is compulsory under the Census Act 1920, and a fine of up to £400 payable for non-completion or the supply of false information. Despite this legal requirement, the 1991

Census suffered a greater degree of under-enumeration than previous censuses. Some of the reasons for this are discussed in more detail in section 7. The 1991 questionnaire contained 12 pages, and a specimen is included as Appendix (i). In addition to the head of household's responses, a number of items on the first page were completed by the enumerator, including the ED code and postcode. Where households were absent, a letter of explanation was left with a questionnaire requesting that households would complete a form on a voluntary basis and return it by post, but not all such forms were returned.

In communal establishments (a term including all establishments with some form of communal catering), special listing forms (form L) were issued on which all persons present on census night were recorded, together with individual forms (form I), containing the standard census questions. A number of special arrangements were made for the enumeration of persons not readily accessible to the conventional data collection organization. These included the enumeration of persons on ships in British waters, persons serving in British Naval Vessels and in extremely isolated locations (such as lighthouses!) In situations such as these, special arrangements were made with the relevant bodies, eg. Royal Navy or Trinity House. Workers from voluntary organizations such as the Salvation Army were appointed where possible to attempt enumeration of those sleeping rough. In all such special cases, a standard census questionnaire was still used.

(iii) Processing

The information contained in the individual census questionnaires remains confidential for 100 years, and all published census data are therefore made available for different levels of aggregation, based on the encoding of the forms conducted by the census offices. In order to ensure confidentiality, the names of individuals were not entered into the computer system used for production of the aggregate statistics. Household addresses were not included in the computerized record at all, although postcodes were encoded for the first time in England and Wales, as in Scotland since 1981. Special security safeguards were built in to the census computer, and vetted by the British Computer Society. In Northern Ireland, similar confidentiality conditions apply, and postcodes only were included in the coded records, as in the rest of the UK.

Not all items of information on every questionnaire are encoded in the computer database. The data input operation was divided into 100% and 10% processing. The 10% sample is a stratified sample containing one in ten enumerated households (but not wholly imputed households) and one in ten enumerated persons in communal establishments. Generally, those questions which have simpler responses and are therefore easier to encode were processed for 100% of questionnaires, but the more complex questions were processed only for a 10% sample, as in 1981. The division of questions between 100% and 10% processing is shown in table 1. The resulting database contains detailed information for each individual and each household, and it is from this that the area aggregations are produced. Following the production of the preliminary reports of population and household spaces, subsequent data outputs are based on the detailed coded data. Imputation of some records is also performed in order to estimate the number and characteristics of households for which no completed questionnaire was obtained. For those absent households from whom no questionnaire was received, 100% responses were imputed from the most recently stored record which matched four key variables which were either recorded or estimated by the enumerator, such as the number of persons resident, and the type of accommodation. A fuller discussion of the implications of the imputation procedure will be

found in section 6.

Production of the detailed local and small area data is subject to a number of restrictions, mainly related to confidentiality and completeness of the data. Small Area Statistics (available for each ED) are not released where the data relate to less than 16 households and 50 persons, and the Local Base Statistics (providing more statistical detail, but only available down to ward level) have thresholds of 320 households and 1000 persons. The statistics for sub-threshold areas are amalgamated with those of a neighbouring area. These thresholds are designed to lessen the risk of any individual becoming identifiable in the output data. In addition to the thresholds for data release, counts in the 100% SAS tables for EDs in England and Wales, and Output Areas in Scotland are modified by the quasi-random addition of a number in the range -1, to +1, and the LBS by a number in the range -2 to +2, reflecting the higher risk of inadvertent disclosure in the more detailed LBS cross-tabulations. The modification of data in the SAS and LBS tables is consistent, with the effect that a cell in the SAS may be affected by the modification of a number of more detailed cells in the corresponding LBS table. This means that aggregates of modified cells will differ from aggregates of unmodified cells, and data may appear inconsistent between two tables for the same area, or even between two cells within a single table. The basic counts in tables 1, 27 and 71, and the counts of establishments in table 3 remain unmodified. A full analysis of the implications of the data modification procedures is given in OPCS (1993a), which provides approximate confidence limits for the interpretation of modified cell values, and identifies all cells in the SAS and LBS which are derived from modified values. The process of data modification is also referred to as 'Barnardization' and 'blurring'.

Table 1: 100% and 10% processing of questions

100%	10%
sex and date of birth	relationship in household
marital status	hours worked
whereabouts on census night	occupation
usual address	name and business of employer
term-time address of students	workplace
usual address 1 year ago	journey to work
country of birth	higher qualifications
ethnic group	
long-term illness	
Welsh/Gaelic language	
economic activity previous week	
type of accommodation/sharing	
number of rooms	
tenure of household	
household amenities	
availability of cars/vans	
lowest floor level (Scotland)	

The initial schedule for the release of the computer-readable data suffered considerable delay due to a processing difficulty at OPCS, concerning the incorrect classification of some economically active people as students. The main series of county SAS files containing 100% data began to

appear in June 1992, with national coverage by the end of that year. Release of the 10% county files took place during the spring of 1993. The data from OPCS are in the form of large files of compacted information on magnetic tape, and it is necessary for the user to purchase appropriate software for the manipulation of these data, and load them into the required system file formats. No computer software for the manipulation of the census data is provided by the Census Office, but they cooperate with producers of such software.

3 THE CENSUS DATASETS

The results of the census are published in a wide variety of forms, including paper documents relating to specific themes or localities, and very large computer-readable datasets which cover the entire country. In addition, the 1991 datasets feature a number of additional products which provide census-related information, such as the directory giving a constitution of EDs by unit postcodes including those split by ED boundaries; paper lists of restricted enumeration districts, and maps of census data collection areas. In this section, the principal datasets are listed and described. Further detail relating to the major products is given in later sections.

(i) The published volumes

a) Preliminary Reports

The Preliminary Report for England and Wales was published in July 1991, with a separate volume for Scotland. The report contains preliminary counts of the population present which are compiled from summaries made by census officers of the enumerators' records. The figures given do not therefore correspond precisely with the detailed totals in the subsequent reports, but the report represents the first published output from the census. Population and household space figures are given down to the local authority district level, and comparative populations from 1961, 1971 and 1981 are included.

b) Area- and topic-based publications

The main paper published outputs from the census fall into two main categories: reports which give detailed information about particular geographical areas, and reports which give a national commentary on a specific census topic. All the main statistical reports are described in the series of 1991 Census User Guides, a list of which is given in Appendix (iii). Paper reports are not routinely produced at the enumeration district level, but a series of census monitors is available for regions; counties; regional and district health authorities; parliamentary and European constituencies; local authority areas; postcode sectors; wards; English civil parishes and Welsh communities. These pamphlets give important statistics for each area, with a brief commentary. Comprehensive local reports are published for local authorities and regional health authorities.

The topic reports are mainly prepared at the national level, and give national results with limited commentaries. Each report contains details of the 1991 Census relevant to the topic covered. There are one or more reports for each of the following themes: basic demographics (eg. 'sex, age and marital status'); sub-groups in the population (eg. 'children and young adults'); Welsh and Gaelic language; household and family composition; housing; migration; economic activity and workplace, and higher qualifications.

The published reports for Northern Ireland provide a similar range of topics. The **Preliminary** report appeared in July 1991, with information for each of the 26 local government districts, and a series of further reports include a summary; Belfast urban area; religion; economic activity; workplace and transport to work; housing and household composition; migration; education and Irish language. Small area statistics are in preparation as a statistical abstract (below), following these topic reports.

(ii) Statistical abstracts

a) Small area statistics (SAS) and local base statistics (LBS)

The 1991 standard statistical abstracts comprise two major sets of data: the Small Area Statistics (SAS) and the Local Base Statistics (LBS). The SAS are a subset of the **LBS, and are hence** fully comparable. These are computer-readable files produced on a county-by-county basis and are perhaps the most important data product arising from the **1991 Census. The SAS are available at** every level of census geography, down to and including the enumeration district or Output Area (Scotland) level. The SAS for each area contain approximately 9,000 items of information or counts. The LBS data provide the most detailed level of data cross-classification, with around 20,000 separately identifiable counts, but these are only made available at the ward level and above. The majority of these counts represent cross-tabulations of responses to two or more of the questions on the census form, and relate to a particular population or household base. Table 2 provides a summary of the availability of the SAS and LBS for different levels of areal aggregation. Users interested in comparison with the previous census should note that only one detailed computer-readable abstract (also known as the SAS) was provided in 1981, which corresponds most closely to the 1991 SAS. The 1981 SAS contained about 4,500 cells, and in 1971 only 1571, illustrating the increased complexity made possible by computing developments over the period. A detailed overview of the 1991 SAS and LBS is given by Cole (1993), who also illustrates the increasing size and complexity of local area statistics since 1961, associated with increased computing power.

The census counts in the statistical abstracts, as provided by OPCS, are organized into a structure of cells within tables, and each table is available for every ED (SAS) or ward (LBS), and all higher-level aggregations in the census output area hierarchy. Each ward **and district includes a special 'shipping enumeration district' in the statistical abstracts for the recording of persons present on ships on census night. In many parts of the country, these cells remain empty. For example, the second table in the 100% data contains information about age structure, and contains counts for the total numbers of persons in each OPCS age-band, for males and females and for different population bases. Each table represents the cross-tabulation of two or more sets of results from the questions on the census form, and each cell contains the count of individuals or households having the given characteristics in the current output area. A full listing of the tables available in both the SAS and LBS is given in Appendix (ii). A printed index to the table structure has been published by OPCS (OPCS, 1991; 1992b; 1992c) which allows the identification of any count in terms of cell and table numbers. This referencing system is the way in which the user of the small area data will specify the data which they wish to access. The cell numbering system and layout of the tables is illustrated by Table 3, which shows the layout of SAS table two. Any cell can be uniquely specified by an alphanumeric code which include the identity of the table, and the location of the cell within the table. The table identifier in this case is S02: the S representing the SAS (the alternative would be L for the LBS), and the 02 representing table 2. Each cell is then represented by a four-digit reference number describing**

Table 2: Availability of SAS and LBS in machine-readable form

	Small Area Statistics (SAS)	Local Base Statistics (LBS)
Enumeration districts (EW)	X	
Output Areas (S)	X	
Postcode sectors (EW)	X	
Postcode sectors/subdivisions above confidentiality thresholds (S)	X	X
Civil Parishes/Communities (EW)	X	
Wards and Civil Parishes (S)	X	
Wards/subdivisions above confidentiality thresholds (EW)	X	X
Localities and inhabited islands (S)	X	
Urban and rural areas (EW)	X	
New Towns (S)	X	
Parliamentary and European constituencies	X	X
Regional electoral divisions (S)	X	
District and Regional Health Authorities (EW)	X	X
Health Boards (S)	X	X
Regions, Island Areas and districts (S)	X	X
Standard regions, counties and local authority districts (EW)	X	X
Great Britain, England and Wales, England, Wales and Scotland.	X	X

EW = England and Wales only; S = Scotland only

its position in the table, thus the cell containing the number of married males between the ages of 60 and 64 would be uniquely identified by the code S020109. It should also be noted that some cells are blanked out, such as the cell which would be in position 11. This cell is structurally empty, as there can be no married males in the age range 0-4. The statistical abstracts are distributed by the census offices on magnetic tape, and the conventional method of access is to reformat and store the data using standard retrieval software such as SASPAC91 or C91, as described in section 5 below. These software systems compact the original data file, and allow production of printed tables, or retrieval of specific counts using the table and cell referencing conventions. As part of the Census Initiative, the Economic and Social Research Council (ESRC) is funding the production of ED-based SAS and ward-based LBS for Northern Ireland. These datasets will be available for use by the academic community for research and teaching. Grid-square based SAS will be made available following completion of the topic report programme.

Table 3: Layout of SAS Table 2 (Source: OPCS, 1992c)

1991 Census Small Area Statistics - 100%
Area Identifier - : Area Name -
Table Prefix: S02 CROWN COPYRIGHT RESERVED

Table 2 Age and marital status: Residents

Age	TOTAL PERSONS	Males			Females		
		Total	Single widowed or div'ced	Married	Total	Single widowed or div'ced	Married
ALL AGES	1	2	3	4	5	6	7
0 - 4	8	9	10	XXXX	12	13	XXXX
5 - 9	15	16	17	XXXX	19	20	XXXX
10 - 14	22	23	24	XXXX	26	27	XXXX
15	29	30	31	XXXX	33	34	XXXX
16 - 17	36	37	38	39	40	41	42
18 - 19	43	44	45	46	47	48	49
20 - 24	50	51	52	53	54	55	56
25 - 29	57	58	59	60	61	62	63
30 - 34	64	65	66	67	68	69	70
35 - 39	71	72	73	74	75	76	77
40 - 44	78	79	80	81	82	83	84
45 - 49	85	86	87	88	89	90	91
50 - 54	92	93	94	95	96	97	98
55 - 59	99	100	101	102	103	104	105
60 - 64	106	107	108	109	110	111	112
65 - 69	113	114	115	116	117	118	119
70 - 74	120	121	122	123	124	125	126
75 - 79	127	128	129	130	131	132	133
80 - 84	134	135	136	137	138	139	140
85 - 89	141	142	143	144	145	146	147
90 and over	148	149	150	151	152	153	154

(iii) Special datasets

a) The Sample of Anonymised Records (SAR)

The Sample of Anonymised Records (SAR), also termed census microdata, is a new product for 1991 in the UK. For a detailed explanation of microdata and its advantages, the reader is referred to Marsh and Teague (1993). This is another data product whose production has been specially commissioned by the ESRC. The ESRC-funded Census Microdata Unit is solely responsible for the preparation and dissemination of the SAR data in the UK. SARs have also been commissioned from the Northern Ireland Census, which follow the same structure as those outlined here. The data files actually comprise two separate samples, a 2% sample of all individuals (1.21 million records), and a 1% hierarchical sample of households and the individuals within those households (240,000 household records). The SARs are drawn from the data for which 10% counts have also been coded, and thus contain the full range of census information. The SAR files actually contain abstracts of the individual records, but without

unique identifiers such as names and addresses. The data in the 2% SAR have been geographically referenced by assigning each record to a local authority district or aggregation of contiguous districts such that all the base areas had populations in excess of 120,000 in the 1989 OPCS mid-year population estimates. At this level of resolution, all non-metropolitan counties in England and Wales; all London Boroughs (except the City of London); metropolitan districts and most Scottish Regions are separately identifiable. For the 1% household SAR, the lowest level of geographical detail are the Standard Regions in England, plus Wales and Scotland. The South East region is further subdivided into Inner and Outer London, and the rest of the South East.

A fear which was expressed regarding the SAR was the chance that it may be possible to identify individuals from the anonymised records, but a working party set up to evaluate this issue considered that the risk of an individual being identifiable from their SAR record was in the region of 1 in 4 million (Marsh et al., 1991). In addition to the grouping together of small areas, the responses to a number of census questions have been recoded to provide fewer output categories. These include for example, ages over 90, small occupational classes, etc., where the SAR contains less detail than the raw data. Some additional restrictions are placed on the inclusion of records containing rare characteristics which may be identifiable, such as the characteristics of individuals in very large households; detailed workplace and migration information, or individuals with occupations which are very much in the public eye.

The great advantage of the SAR is that it enables users to perform analyses which are not possible on the pre-tabulated SAS and LBS, either prior to the specification of some customised tables, or in order to undertake analysis of some detailed sub-groups of the population. Despite the small sampling proportion, the SAR still represents an enormously rich database, far exceeding in size other routines collected official survey information. Non-tabular analyses are possible with the SAR such as analysis of variance and regression, which are concerned with the relationships between variables at the level of the individual observation. The SAR offers the potential to explore relationships in the data in ways which were not pre-planned like the rest of the census output, and this is perhaps its greatest strength.

b) Special Migration Statistics (SMS) and Special Workplace Statistics (SWS)

The 1991 Census questionnaire contained questions relating to respondents' place of work, and also to address one year prior to the census. A certain amount of information derived from these questions is contained in the SAS and LBS tables, indicating for example the number of one-year migrants in each ED or OA. However, one of the greatest advantages of these questions lies in their ability to describe flows of people from place to place, and the Special Migration Statistics (SMS) and Special Workplace Statistics (SWS) provide detailed information on these flows. The Census is the most complete source of information on migration and commuting, and is thus of considerable research interest in this field. New tabulations for 1991 further enhance the utility of these datasets. The locations of workplaces and previous addresses are recorded as unit postcodes which are then assigned by OPCS to local government wards using a national directory of postcodes and wards, the Central Postcode Directory (CPD). It should be noted that there are some problems associated with the use of the CPD for these purposes, due to inaccuracies in the directory which may lead to misallocation. The time taken to code these locations, and to search for addresses whose postcodes are not recorded means that the appearance of the SMS and SWS will be rather later than the standard statistical abstracts. Flow information takes the form of

very large trip matrices, giving the magnitude of flows between each pair of geographical units. While journeys to work tend to be relatively short, migration flows may be long-distance, and there are 10,287² potential flows between wards (England and Wales) and postcode sectors (Scotland). Despite the sparse nature of these trip matrices, the SMS and SWS are large and complex datasets (Flowerdew and Green, 1993).

The SMS are 100% data, and comprise 11 tables in three sets, describing (1) interward (or postcode sector) flows; (2) interdistrict flows, and (3) flows between contiguous groups of districts, which may be defined by users (OPCS, 1992d). SMS are subject to confidentiality constraints, such that a reduced set of information is produced for those flows falling below the appropriate thresholds. Set 1 provides only a broad age and sex breakdown of migrants is given, and these tables are not restricted. Sets 2 and 3 contain more individual detail, but all tables are only available where at least 10 migrants (or 10 wholly moving households for household statistics) are present. Most flows between neighbouring districts, and between large cities will be unaffected by these thresholds. Confusingly, 1991 set 1 corresponds to 1981 set 2 and vice versa. The geographical organization of the SMS has been significantly changed from that used in 1981, which imposed a complex structure in order to preserve confidentiality constraints. In 1981 Set 1, no information was available at a given level unless the total number of movements was 25 or more. If this condition was not met, the data were 'thresholded up' to the next geographical level. The modification of these constraints for 1991 greatly enhances the research potential of the dataset, giving much more geographically detailed information.

The SWS are 10% data, and take the form of nine tables, again organized into three sets. These are (A) for residents in each zone of residence; (B) persons with a workplace in each workplace zone, and (C) the trip matrix for residence zones and workplace zones (OPCS, 1992e). Information about mode of transport and distance to work are available, with distance being calculated as the straight line distance between the grid references given for the postcodes of residence and workplace in the CPD.

SMS and SWS tables are only available in machine-readable form. A software package, called MATPAC was produced to handle the flow data from the 1981 Census, and this has been updated to MATPAC91 for the 1991 SMS and SWS data. It is produced by the same organization as the SASPAC91 software, and provides the user with facilities for reformatting, arithmetic manipulation and retabulation of the flow matrices.

c) The Longitudinal Study (LS)

The OPCS Longitudinal Study (LS) comprises a 1% sample of records drawn from the 1971 Census, and followed up in 1981 and 1991 (Dale, 1993). The sample was originally drawn by selecting people with one of four dates each year. At subsequent censuses, new births and immigrants with these birth dates have also been added to the sample. Both 100% and 10% questions are coded, with special coding of those LS records which do not fall in the standard 10% sample. In addition to census data, the sample records have been linked to births, deaths and cancer registrations, also held by OPCS, by means of the National Health Service Central Register (NHSCR). Clearly, such information is strictly confidential at the individual level, but a variety of aggregate tabulations are available to researchers, and the fully disaggregate dataset is maintained by OPCS. These data include ED codes from 1971 and 1981, and postcode from 1991, allowing the aggregation of the data to non-standard areal units. There was no

geographical clustering in the original sample design. The addition of the 1991 records to the LS database will give further enhanced potential for the study of topics such as occupational mortality, migration, household formation and dissolution, and other life (or death!) events over 20 years which are impossible to trace in a single census 'snapshot'. A small proportion of records are lost at each stage because it proves impossible to trace them via the NHSCR (Goldblatt, 1990). The different extent to which it is possible to trace certain sub-groups in the sample will have effects on the usefulness of the data for researchers, higher failure rates applying to residents of communal establishments for example. 8% of individuals recorded in the 1971 Census sample could not be traced in 1981. Access to the LS data is possible directly via OPCS, or via the Social Statistics Research Unit at City University for academic users. Tabulated data will be available as printed output or as system files for the (confusingly named) SAS or SPSS-X statistical packages.

d) Specially commissioned abstracts

In addition to the standard census outputs, customers may specify, and pay the marginal costs of producing, additional statistical information prepared specifically to meet their own requirements (Denham, 1993). This additional information may take a number of forms. Extension tables are standard tabulations from the topic reports produced for smaller areas. The new areas must be aggregations of standard census areas, but are not produced at the ward or ED level, in order to preserve confidentiality. Alternatively, extension tables may be commissioned which include expanded variables, perhaps giving a more detailed breakdown of responses than those shown in the standard products. Users may also specify new tables using either standard or customised variables. Requests for commissioned tables will be carefully checked to ensure that confidentiality is maintained, with particular attention being given to geographical aggregations or statistical definitions which differ only marginally from those in previously published outputs, and which may allow the identification of individuals or households which fall in the small difference margin.

(iv) Census-related data

a) Ed/postcode directory (England and Wales)

A series of directories giving the unit postcode constitutions of 1991 Eds have been developed by using the postcodes of addresses of enumeration captured in the census together with centroid references and 'non-enumerated' postcodes from the May 1991 Central Postcode Directory (CPD). They provide detailed information about the geographical relationships between EDs and unit postcodes (discussed in section 4 below). A sample extract from a directory is shown as Figure 1. Each record in a directory relates to a single Partial Postcode Unit (PPU), which is the unique intersection of an ED and a unit postcode. For each PPU, the identity of the ED and postcode are given, together with a pseudo-ED (PED) code which represents the ED to which the postcode would be assigned in a best approximation of the census geography based on whole postcodes. A single grid reference is also provided for each record, which is taken from the grid reference for that postcode in the Central Postcode Directory, and the number of usually resident households in the PPU is given. These codes may be used in a number of ways in order to link the census data to postcode-referenced registers such as customer or patient registers, and postcoded survey results. Such linkages are very important in the field of 'geodemographics' (Beaumont, 1991). OPCS are considering whether to issue further directories relating to the updated postcode base, which changes constantly, but it will not be possible to redistribute counts

of households to new unit postcodes. A more detailed discussion of the potential uses of the directory will be found in Martin (1992). Finally, an imputed postcode indicator reveals how many questionnaires were returned without a postcode recorded, for which the postcode has been imputed from neighbouring addresses. A technical specification of the directory's contents is given in OPCS (1992f).

Figure 1: An extract from the 1991 ED/postcode directory

ED code	Unit postcode	Pseudo-ED code	OS grid reference	No. of households	Imputation code
JEFS020P08	9ED	JEFS034	698011220004	000	
JEFS020P08	9EA	JEFS024	699011220008	000	
JEFS020P08	9DR	JEFS024	699011220020	000	
JEFS020P08	9DX	JEFS024	700011220006	000	
JEFS020P08	9EZ	JEFS024	702011220009	000	
JEFS020P08	9HD	JEFS024	701011230009	000	
JEFS020P08	9DP	JEFS024	700011210004	000	
JEFS020P08	9HE	JEFS044	701011220004	001	

b) OA Indexes (Scotland)

In Scotland, there is a much higher correspondence between postcode and OA boundaries than with EDs in England and Wales. A number of directory products are available for Scotland (GRO(S), 1991). These comprise a postcode-OA index file, which indicates to which OA each postcode has been assigned; an OA-postcode index file, which contains the same information sorted into OA area, and an OA-Higher Area index file, which contains for each OA the codes of various higher level areas to which it belongs or has been assigned. The higher areas include some into which OAs nest exactly, such as local government districts and health board areas, and others for which there is no exact correspondence, such as new towns and postcode sectors. Provisional indexes were produced before the completion of census processing, and a final set will be available once processing is complete and all OAs have been finalised.

c) Digital boundary data

Two complete national sets of digitized boundaries have been produced at the ED level in association with the 1991 Census (Dugmore, 1992). This contrasts with the situation in 1981, when national boundaries were only created down to ward level, and ED digitization was patchy, being conducted by a variety of interested agencies to differing standards. Neither of the 1991 boundary sets were digitized by OPCS, but are commercial data products, produced with maps provided by OPCS. Ordnance Survey created national ward boundaries, and these are incorporated into the ED-line product, produced by the MVA/London Research Centre consortium which was responsible for the SASPAC91 software. An entirely separate set of boundaries, which do not necessarily correspond with the OS ward data, have been produced by Graphical Data Capture Ltd. and are being supplied under the name ED91. Hard copies of the 1991 Census boundaries are also available from OPCS as paper maps and on microfiche, and will be found in a number of value-added products such as CD-ROMs incorporating census statistics

and mapping software. In Scotland, a postcode boundary file is available, which contains the digitized boundary of each postcode, and also an OA boundary file.

4 CENSUS GEOGRAPHY

(i) Census areas

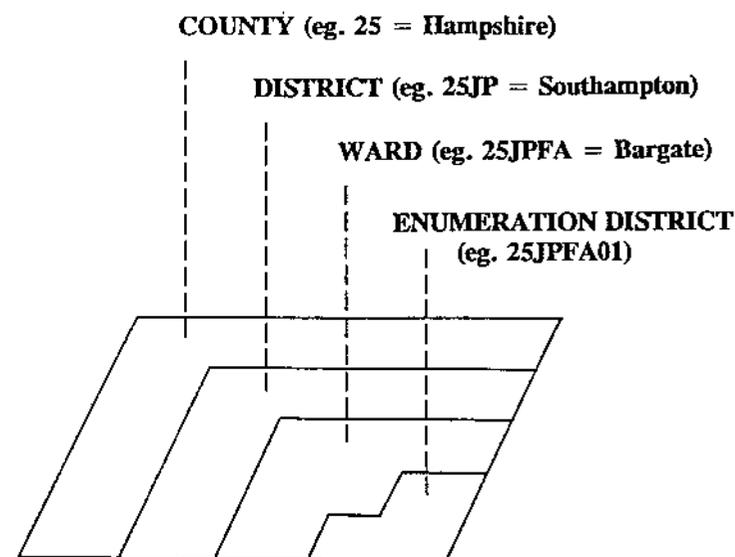
As has been noted above, the smallest geographical unit for which 1991 census data are available is the enumeration district (EDs) in England and Wales (and Northern Ireland) and Output Area in Scotland. The EDs are the areal units which were used to organize the collection of the data, and each represents the area covered by a single enumerator. Consequently, the EDs are used only for the census, and must be made to nest within all higher level boundaries which form part of the census geography. The hierarchy of census areas is shown in Figure 2, and the number of areas at each level, with their average populations, are given in Table 4 (England and Wales). EDs have been used as the basis for the census since 1961, and these censuses shared with 1991 a hierarchical output geography, although the precise composition of the intermediate levels has varied according to the prevailing structure of local government organization. In 1981 Scottish EDs were constructed as aggregations of postcodes, and the postcodes were only split where it was necessary to make ED boundaries coincide with higher level administrative areas. In 1971, census SAS were also made available for grid squares (mostly 100m or 1km), a major innovation. It was considered that the grid squares would offer a powerful facility for examining change over time, as they would remain constant, regardless of changes in administrative geographies. However, the grid cell-based SAS were not repeated in 1981 or 1991, and an important avenue for geographical analysis was missed. The 1971 grid cell data are superbly illustrated in the census atlas 'People in Britain' (CRU/OPCS/GRO(S),1980). 1991 EDs in Scotland were used only for data collection, and separate Output Areas (OAs) constructed for data output. As far as possible, the OAs contain the same postcodes as the 1981 EDs, although some 1981 EDs have been split where more than 80 households were present in 1991.

In addition to boundary lines, a population-weighted centroid location has been determined by eye at OPCS for each ED since 1971. These locations are intended to represent the 'centre of gravity' of the residential part of each ED, and are recorded to 100m resolution in rural areas, and to 10m in urban areas. The centroid locations are included as part of the header information in the 1991 SAS, along with additional codes which indicate whether or not a 1981 ED boundary has been re-used.

Table 4: The hierarchy of 1991 census output areas

Area type	Number of areas	Typical population
England and Wales	1	49,890,000
County	54	923,889
District	402	124,104
Ward	9,135	5,461
Enumeration district	109,670	442
(Special ED)	3,269	

Figure 2: 1991 Census Geography



(ii) Postcode geography

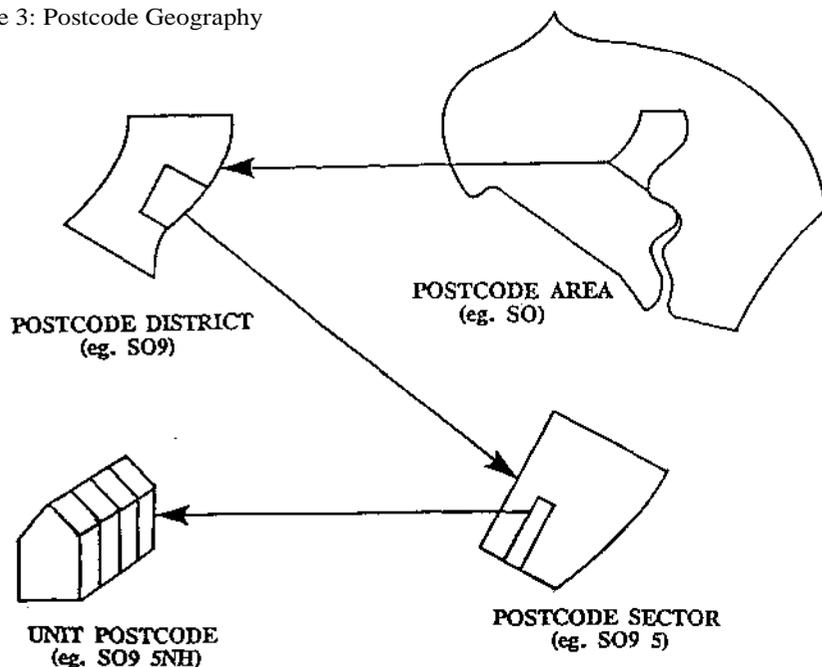
The postcode system was designed by the Post Office primarily to aid the automated sorting and delivery of mail, but during the 1980s it has become widely used as a georeferencing system (Raper et al., 1992). Indeed, the Chorley Report into the handling of geographical information recommended that 'the preferred bases for holding and/or releasing socioeconomic data should be addresses and unit postcodes', and specifically referred to the 1991 Census in this context (DoE, 1987). Examples of its use in this context include general practitioners' patient lists; mortality and cancer registries; insurers' risk calculation tables and many companies' customer lists. The advantages of the postcode as a geographical reference include its small size (on average about 14 addresses), and familiarity. Also, the postcode system is constantly updated as new properties are constructed or old ones demolished. The hierarchical nature of the postal geography is illustrated in figure 3. As described in section 2, it was originally hoped that it would be possible to use the geography of the postcode system as the basis for the creation of the census geography in England and Wales, as in Scotland, or at least to provide postcode-based small area statistics, but the scheme did not secure the necessary government funding. Use of the postcode base continued to be funded in Scotland, where digitized postcode boundaries were actually used in ED planning. Nevertheless, the popularity of the postcode as a referencing system means that many organizations will be faced with a requirement to link postcoded records with information from the 1991 Census, and for this purpose OPCS have created a new directory of enumeration districts and postcodes for use with the 1991 SAS in England and Wales, illustrated in Figure 1. As described in section 3, various indexes are available in Scotland.

(iii) Locational referencing

Locational referencing refers to the ways in which it is possible to relate the published census data to specific locations, usually expressed in terms of Ordnance Survey grid references. Clearly, the basic framework by which this is possible is the hierarchy of census data collection areas which have been described above. However, the association of a number of counts with a particular zone identifier is not in itself sufficient information for the construction of a population map, for example. Three entirely separate sets of locational references are available in association with the 1991 Census, and each offers different levels of detail and precision.

The most obvious locational information with which statistical data may be associated are the boundaries of the census areas (EDs/OAs etc.) themselves. These are available either as paper maps, on microfiche or as sets of digital boundary data. The second level of locational referencing is to use the population-weighted ED centroid locations which form part of the SAS data. These provide a single summary location for each ED in the form of an Ordnance Survey grid reference, and may be suitable for the placement of proportional symbols on maps, or as a crude indication of population density. The third method for locational referencing is to use the postcode locations provided in the ED/postcode directory. This will provide an average of 15 summary points to 100m resolution for the population of each enumeration district. This information may be of particular use in rural areas where the boundaries and centroid locations do not provide useful information about the distribution of isolated populations. These three sets of locational references may also provide the basis for other forms of geographical modelling of the data, and may subsequently be enhanced, as new geographical data products become available during the mid-1990s, such as Ordnance Survey's 'Address Point' product, containing very high resolution postcode and grid reference data for each address in the UK (Rhind, 1992).

Figure 3: Postcode Geography



5 ANALYSIS

(i) Software Tools

A very successful software package was developed following the 1981 Census for the retrieval and manipulation of the SAS files, known as SASPAC (Small Area Statistics PACKAGE), by the Local Authorities Management Services Committee (LAMSAC). SASPAC operated in batch mode, and performed tabulation, area aggregation and basic mathematical functions, but more sophisticated analyses were generally performed by exporting the data to a specialized statistical package. Thematic mapping was undertaken using the census data and digital boundaries in mapping packages such as GIMMS, and in the late 1980s by exporting the data to the rapidly growing range of geographic information systems (GIS) (Martin, 1991). The use of SASPAC for SAS retrieval was almost universal, and its success largely due to its availability on a wide range of computer hardware. Towards the end of the decade, a PC version of the software appeared, for the 80386 processor.

By the time a new generation of software was required, LAMSAC had ceased to exist and the responsibility for developing software for the 1991 Census was taken up by the London Research Centre, and data consultancy MVA. The resulting SASPAC91 product features all the functions which were available in the old software; increased facilities for data import and export, and extended manipulation and mathematical functionality, together with an improved user interface. The 1991 product includes the ability to read the ED/postcode directory and treat it as a gazetteer for the reaggregation of SAS to postcode-based areas. IBM-compatible PCs were seen as a major platform, and PC and workstation versions feature a menu-driven interface. This is a feature of the falling cost and rising power of hardware during the 1980s, such that many users concerned with one or two counties will easily be able to hold the entire SAS locally. This contrasts with the 1981 situation in which SASPAC was primarily a mainframe facility, associated with large central filestore and submitted command file processing. Another census data retrieval package for the PC has been developed for 1991 by Powys County Council, called C91. Both systems store the SAS or LBS data as internal system files, and offer the user a wide range of manipulation options.

A new software product for the analysis and manipulation of the two trip matrix datasets, the special migration and workplace statistics (SMS and SWS) is being produced by the same consortium as SASPAC91, and will be known as MATPAC91. This will fill the same role as the MATPAC package developed for the equivalent datasets from the previous census. MATPAC91 provides facilities to load the census office data, creating a database for subsequent analysis. Analytical functions include the ability to select or merge data for areas, and to create new zones by aggregation or splitting areas. Flow matrices may be manipulated in many ways and new variables can be created. A range of selection criteria may be applied to the data values. The software can reproduce the standard printed tables and a range of reports, or export data to SASPAC and more specialist analysis software. As with SASPAC91, the package runs on a variety of computer platforms and includes a menu-driven interface on PCs and workstations.

For many organizations, particularly in local government, the data aggregation and tabulation possible with SASPAC91 or C91 will meet many of their immediate needs for reporting and analysis of the census outputs. However, it seems likely that the most common route for more complex census data processing will be to export the data into statistical and GIS software. A vast range of statistical packages are in use for census analysis, depending on the users' computing environment and particular interests. Powerful PC-based databases are likely to be

of major importance for the 1991 data, in addition to the traditional general purpose statistical packages such as SPSS-X. Uses of the SAS include the derivation of neighbourhood classification schemes for marketing and resource targeting, often based around cluster analysis of selected socioeconomic indicator variables. The development of classification schemes such as these requires more specialised software, and a number of such classification systems were derived directly from the 1981 SAS as commercial products. Examples include ACORN ('A Classification Of Residential Neighbourhoods'), and Superprofiles. Other products involved the integration of census data with other commercial databases. The whole field of geodemographics and market analysis has been reviewed by Beaumont (1991) in this series. A common feature of 1991 processing may well involve the integration of SAS with organizations' own data holdings, to create customized classification schemes, and industry-specific classifications, although general purpose products will still find a market. The demand for these hybrid systems emphasizes the growing importance of mechanisms for integrating census and postal geographies.

Dissatisfaction with choropleth (shaded area) mapping techniques, and artificial areal units in general (Openshaw, 1984), and problems encountered in transferring the census data into other non-census areal units have also provided a focus for the development of new methodologies. These have concentrated on statistical methods for areal interpolation (eg. Flowerdew and Green, 1991), and boundary-free representations of the SAS (eg. Martin, 1989). Analysis of the more specialised datasets such as the SAR and LS is likely to be based around custom tabulations using statistical packages such as SAS or SPSS-X. For these datasets, geography will usually be encoded at higher levels of the administrative hierarchy (eg. local authority districts or standard regions).

In addition to these software products which users may purchase in order to process their own statistical abstracts, there are a number of commercially available ready-packaged systems which include both census data and retrieval software on the medium of CD-ROM. CD storage offers enormous scope for the dissemination of census data, being ideal for the recording and distribution of archival datasets. Chadwyck-Healey Ltd. had begun to offer 1981 Census data on CD prior to the 1991 Census, and have now produced 1991 data, including digital boundary data and Supermap retrieval and manipulation software. Claymore Services Ltd. have produced a CD product specifically for the education sector which includes complete SAS and LBS datasets, the ED91 digital boundary data, and the MAP91 Windows-based mapping package. Such products will again help to ensure the dissemination of the detailed 1991 Census data to wider audiences than ever before.

(ii) 1991 Census Initiative

As has already been mentioned, the census datasets present an enormously rich resource for research surrounding the structure of contemporary British society, and intercensal analyses offer powerful means of understanding social change. In addition, the census data are widely used in order to direct public and commercial policy. Much of the initial academic research activity concerning the 1991 Census has been focused on the Census Initiative, jointly funded by the Economic and Social Research Council (ESRC) and Information Systems Committee (ISC) of the Universities Funding Council (UFC). This interest in the Census on the part of major academic funding bodies reflects its enormous research importance. The objectives of the initiative were

to provide census datasets as a resource for the academic community, to develop training materials and courses, and to fund a programme of research projects which focused on the development of the census data. An additional contribution to this initiative has been provided by the Department of Education Northern Ireland (DENI) to provide census abstracts from the Northern Ireland Census.

The datasets purchased as part of the initiative include complete sets of SAS, LBS, LS, SMS and SWS. ESRC were the sole purchasers of the SAR datasets, and access is possible via the ESRC-funded Census Microdata Unit. The initiative has also purchased the postal directories, and ED-line digitized boundary data. Projects funded by the initiative are focused primarily on training and development, under the guidance of the initiative coordinator. The first round of projects funded by the initiative have run in the period 1992-93, and a second round of development projects is being funded during 1993-94. The training programme includes the production of a Census User's Handbook (Dale and Marsh, 1993); sample datasets and trainers' resources; interactive tutorials; and various training workshops. The research potential of the 1991 Census data is illustrated by the range of the development programme, which includes re-examination of aggregation issues; population surface modelling; evaluation of occupational definition coding; comparison of US and UK Census handling techniques and a number of migration analyses. Support for these datasets and research teams is provided through a number of units: the ESRC data archive (which holds local area data from 1961 and 1971 censuses also), the LS support project, Census Microdata Unit and Census Dissemination Unit, both at the University of Manchester. A seminar programme is being coordinated by the Census Analysis Group (CAG) at the University of Leeds.

6 1981-1991 CHANGES

Important changes have occurred between the 1981 and 1991 Censuses which affect the interpretation of the published census statistics. These issues are of particular relevance in situations where the researcher is interested in substantive changes in population characteristics between the two censuses, and it is necessary to distinguish between real world changes, and those apparent changes which are due to different practices in 1981 and 1991. There is also a danger that researchers who are familiar with the datasets from 1981 or a previous census will apply the same techniques to 1991 data, and will obtain erroneous results due to the use of different definitions and population base calculations. Changes in census characteristics can most conveniently be divided into those relating to the actual questions asked; those arising from redefinition of the census geography, and those related to alterations in the methods used for processing the completed census questionnaires and preparing the aggregate data.

(i) Questions

The 1991 Census questionnaire included a number of new and altered questions, relative to those used in previous censuses. The choice of questions asked reflects changing user requirements, social conditions, and experience with previous censuses and the test census. A summary of new and changed question topics is given in Table 5. It will be apparent that a number of detailed modifications to the questions are specific to one or more parts of the UK. The significance of changes of this kind is that they necessitate alterations to the calculation of some standard indicators, because the information base is altered, and they also frequently reflect a need to keep

the census questionnaire up to date as the socioeconomic environment alters. Changes of this kind are to be welcomed in that they ensure the collection of policy-relevant information, but they also make the task of intercensal change analysis more difficult.

Table 5: New and altered questions on the 1991 census form

New Questions	Changed Questions
England and Wales Only	England and Wales Only
Postcode of household (not coded in 1981)	Self-contained accommodation
Type of accommodation	Scotland Only
	Floor level accommodation
England, Wales and Scotland	England, Wales and Scotland
Ethnic group	Tenure
Limiting long-term illness	Relationship to head
Term-time address of students	Employment status
Weekly hours worked	Amenities

The inclusion of a question relating to ethnicity (the respondent's membership of an ethnic minority group) has been the subject of much debate in the last two decades. A question relating parents' country(ies) of birth, giving proxy information on ethnic origins, in the 1971 Census proved unpopular, and was resented by many residents of non-UK origin. Following this experience, such a question was dropped from the 1981 questionnaire. A question on ethnic group was extensively tested, but not included, and the 1981 Census only provided information about the country of birth of the head of household. Responses to this question were coded into a limited number of categories, such as 'New Commonwealth'. The presence of substantial ethnic minority populations in areas suffering multiple socioeconomic deprivation led to the inclusion of 'New Commonwealth head of household' in a number of deprivation indicators during the 1980s, but appropriate use of this variable was hindered by the small number of classifications, and its failure to identify large groups of second- and third-generation immigrants, who appeared as 'born in the UK'. In 1991 a new ethnicity question was included, which asked respondents to state the ethnic group to which they belonged. A number of options were given, and additional space was provided in which respondents could enter any group not listed. Thus the level of information available about ethnic minority populations is far higher in 1991 than 1981, and it is in fact easier to make 1971-91 comparisons than 1981-91.

In 1981, the section of the questionnaire relating to economic activity included a 'permanently sick or disabled' category, but this question failed to identify large numbers of people whose daily lives may be affected by chronic medical conditions but would not strictly qualify as having a permanent illness or disability. For 1991, an attempt has been made to identify this group by asking about 'limiting long-term illness', and it is hoped that this will provide more useful

information about the impact of chronic illness on quality of life. This question is likely to prove of particular use to those seeking to construct health-related indicators of need or deprivation from the 1991 data.

The inclusion of term-time address of students or schoolchildren on the 1991 forms allows the computation of the term-time population of an area by reassigning students to their term-time address, regardless of their whereabouts on census night. The 1991 survey was conducted (in contrast to 1981) in a period of transition between vacation and term-time of most universities and colleges at which students might be staying, away from their area of permanent residence. Additional information about working conditions has been obtained by the inclusion of a question relating to weekly hours worked. This information is likely to prove most useful in combination with occupational classifications and other questions relating to economic activity.

In addition to the inclusion of entirely new questions for 1991, a number of 1981 questions have been retained with modifications which affect the interpretation of the results. In most cases these reflect a perceived need to adjust the census questions in line with changes in population characteristics which were poorly captured by the existing question formats. An example of such a change is the decision to drop the part of the household amenities question which related to the presence of an outside W.C., and its replacement with a question about the presence of a central heating system in the residence. It was felt that reliance on outside W.C.s was so rare by 1991 that it no longer provided a useful indication of housing quality, and that this indication could better be provided by the presence of a fixed heating system. Another change which reflects altered social conditions is the extension of 'relationship to head of household' to allow the identification of couples living together but not married - again, an attempt to bring the census form up to date. Other changes to questions included the further subdivision of owner occupation, as a form of housing tenure into 'owned outright' and 'owned with a mortgage'. This reflects a period in which many mortgages taken out in the decade following the Second World War have been paid off completely, while the borrowers are still in later middle age, creating a growing subset of the population who have outright ownership of the properties in which they live. Housing information has also been extended by the inclusion of a question about the type of property inhabited (eg. 'terraced house', 'detached house'). A final set of modifications to questions relate to employment status. The 1991 questionnaire has seen the amalgamation of some separate 1981 questions (relating to employment status) into response categories of a more general employment question.

Following the 1981 Census, a 'Change File' was produced for England and Wales which contained over 400 comparable variables from the 1971 and 1981 censuses, and the counts were made available for districts and for census tracts. Tracts represent aggregations of small numbers of EDs whose external boundary has not changed, and are discussed below. There are plans to produce a similar file for 1981-1991 change, although this will appear relatively late in the sequence of census data products. The analysis of change through time is considered by Norris and Mounsey (1983), and many of the fundamental issues remain the same in 1991.

(ii) Geography

A second significant aspect of change between 1981 and 1991 Censuses has been change relating to geography. Section 2 above has explained the need for the redesign of ED boundaries between censuses. The impact of boundary change varies significantly across Great Britain. The redesign

of statutory boundaries during the 1980s resulted in extensive changes to lower level census areas which must nest within these boundaries. In Wales, a total revision of local authority areas has led to a complete redesign of the ED base, and this has also occurred in some English counties. In Scotland, by contrast, the creation of Output Areas based on postcode geography for both 1981 and 1991 has allowed the user to aggregate census statistics for largely identical geographical areas (ie 1981 EDs or areas built from them). In some areas of the country, statutory **boundary** changes will already have made the areas represented in the census output obsolete by the **time** the data are published, and imminent reorganization of local government is likely to cause further difficulties for the application of census statistics to statutory areas. It is likely that some 1991 statistics will be re-published for the new areas. Perhaps the most important general change relating to census geography is the larger range of methods which are available **for** georeferencing the census data, including the digital boundary products and ED/postcode directory which have been described in section 3 above.

A conventional approach to the comparison of data where boundaries have changed, is to identify census tracts. It frequently happens that new EDs are subdivisions of old ones (for example, where new development takes place at the urban fringe), and major physical features such as railways and main roads tend to be used consistently as ED boundaries. It is therefore often possible to identify groups of contiguous EDs whose external boundaries are unchanged, and **for** which comparable census data can be aggregated. Unfortunately, census tracts are **rarely** internally homogeneous, and frequently group together socially diverse EDs. The widespread availability of GIS in 1991 makes possible a range of options for the comparison of data where boundaries have changed, including the automatic identification of tracts where digital boundaries are available for 1981 EDs. Where this is not possible, areal interpolation techniques, surface modelling and reaggregation of 1991 EDs to 1981 wards may offer alternative methods **for** achieving a degree of comparability.

In Scotland, 1971 enumerators' records were retrospectively postcoded, allowing for comparison with the 1981 census, with its postcode-based geography. Although this procedure did **not** provide a perfect match, it allowed the creation of far better change statistics than in England **and** Wales. The ability to produce close matches between 1991 Output Areas and 1981 EDs again makes intercensal comparisons far easier in Scotland than in England and Wales.

(iii) Data processing

Two alterations to the methods of data processing which affect the 1991 products are changes **to** restriction and imputation. Due to the increased number of cross-tabulations available in the **SAS and LBS** datasets, it was necessary to raise the population thresholds below which counts are 'suppressed' and merged with a neighbouring area in order to ensure confidentiality. In the **1981 SAS, 100%** data for restricted EDs was not merged with that of a neighbouring ED: only **10%** data were exported. The change in imputation relates to the inclusion of estimated values **for** usually resident households and persons in them, which were absent at the time of the census, but whose characteristics may be estimated from neighbouring census questionnaires. **The** 'topping up' of the usual residents base was in response to user demand, but the inclusion **of** these imputed values effectively alters the census usually resident population bases, and makes difficult the direct measurement of population change in the data for small areas. Table 1 in **the LBS and SAS shows the** 1991 populations on the old and new bases. In addition to these general changes, there is a change to the conditions for the release of data for special enumeration

districts (*eg.* communal establishments). These special EDs were planned where more than 100 people were expected to be present on census night. Total persons present, residents and resident households have been released for all such EDs, but only tables or parts of tables which take residents as their base are released where there are 50 or more residents but the usual threshold of 16 resident households is not met.

The large number of cells included in the 1991 statistical abstracts raises the likelihood that an individual or household with a rare combination of census characteristics may be identifiable in the tabulated data. To avoid this possibility, the thresholds have been increased to 50 persons and 16 households for the SAS, and 1000 persons and 320 households for the **LBS. Output areas** containing less than these total populations are termed 'restricted' areas, **and their data are** suppressed. In order to correctly maintain overall totals, the counts for restricted areas are 'exported' to a neighbouring area (ie. ED or ward), termed an 'importing' area. **All counts for** importing areas comprise information both for that area, and any others from which it has imported data. Restricted areas will only export to a single importing area, but importing areas may receive additional counts from more than one exporting area. Descriptive variables in the OPCS statistical abstracts files contain the actual population and household totals for each output area, and the identities of any associated importing or exporting areas. 1991 Census User Guide 43 lists the importing/exporting ED relationships in full, and is available for each county (OPCS, 1992g).

The second significant area of change in the data processing for 1991 has been the imputation of wholly absent usually resident households and absent usually resident individuals from enumerated households. This issue is best explained by reference to Table 6. For each output area, the number of persons recorded may be divided into eight separate groups, as indicated in the table. Information from the census forms allows the identification of persons who are not at their normal address, and it is possible to transfer these visitors (group 4) back to their area of permanent residence (where they would appear on the census forms). The 1981 usually resident (present/absent) base comprised groups 1,2 and 3, although a second (transfer) base was also constructed. The present/absent base did not include any residents from wholly absent households, and so was an incomplete count of the resident population. The transfer base 'transferred' visitors back to their area of residence, thus giving a more accurate estimate of resident population, but the visitors could not be allocated to households, limiting the usefulness of the count. Most tables appearing in the 1981 SAS used the present/absent population base. For 1991, the base population has been extended to include persons in wholly absent households for which a census form was nevertheless returned, and persons in households which were imputed. This is referred to as the topped-up present/absent base. It comprises the 1981 present/absent base, 'topped up' with wholly absent households from which a form was returned voluntarily (group 5), and imputed households (groups 6 and 7). Where no form was returned or no contact made, 100% variables were imputed for these households and their residents, by reference to a similar property in the same area. No imputation of 10% variables took place, due to the absence of any reliable method for imputing the more complex characteristics involved. Overall, around 1.5% of all residents in England and Wales were imputed in this way. The 1991 base populations used for most of the tables in the 1991 SAS and LBS thus include groups 1-4, although 1981/91 comparative information is given in table 71 of the abstracts. In any analysis of 1981-91 change, it is particularly important to be aware of the change in the definitions, as this may have significant effects on the results. Fuller details of the methodology adopted for these imputation procedures may be found in OPCS (1992a.)

Table 6: Definition of population bases, 1981 and 1991

Group number	Group and base population definition
1	Present residents
2	Absent residents: in GB (part of household present)
3	Absent residents: not in GB (part of household present)
4	Visitors: usual address in GB
5	Wholly absent household members: form returned voluntarily
6	Wholly absent household: no form - imputed
7	Evidence of residence: no contact - imputed
8	Visitors: usual address outside GB
1+2+3	Usually resident population (present/absent) 1981 base
1+3+4	Usually resident population (transfer) 1981 alternative base
1+2+3+5+6+7	Usually resident population (topped-up present/absent) 1991 base

7 ACCURACY OF THE CENSUS DATA

(i) Coverage

A very important consideration relating to the use of the census, is the extent to which it covered the whole population of Great Britain. Censuses taken in the early 1990s in other countries such as Canada and the USA have shown increased levels of underenumeration compared with those of the previous decade, with individuals less prepared to provide detailed and personal information (Wormald, 1991)— In addition to this apparent international trend, the 1991 Census in Britain was conducted at a politically sensitive time, at which there was considerable public resentment towards the community charge being used as a mechanism for raising local government revenue. Despite the extensive confidentiality protection built into the census, it is likely that some individuals deliberately avoided completing a census form for fear that the census results would be linked to the community charge register, which suffered from extensive under-registration. Publication of preliminary results from the 1991 Census were greeted in the press by reports of a 'missing million', raising more general questions about the coverage and accuracy of the census data. Evaluation of the 1991 Census may be conducted either by use of surveys designed to double-check the census information, or by comparison with other estimates of the national population at the time.

After the census had taken place, OPCS conducted an important evaluation study, which is known as the Census Validation Survey (CVS). The CVS was based on a nationally stratified sample of 20,000 households in over 1200 EDs, with the aim of assessing the coverage and accuracy of the census. Enumerators' record books were used to draw separate samples of households who had returned census forms, households who had not returned forms, and dwellings believed to be vacant. In addition, a record was compiled of any dwellings which had been missed by the enumerators. The CVS was conducted in June and July of 1991. An analysis of the provisional CVS results suggests that the census underenumerated the total population of Great Britain by 394,000 (0.73%). This inaccuracy can be accounted for by a number of different error types, including errors on completed forms, errors due to missed addresses and errors due to absent households. Residents wrongly imputed to absent households actually represent an over-estimate

of population which is masked by errors of underenumeration. The greatest percentage errors were found in English metropolitan counties outside London (0.98%), but the differences in error levels between different types of area are not statistically significant due to the relatively small size of the CVS sample. The age/sex group for which the largest errors occur is males between the ages of 20-29. The CVS also provides valuable information regarding the accuracy with which census questions were answered. An exercise such as this inevitably suffers from many of the same obstacles to data collection as the census itself, in that individuals who were not detected by the census may not be detected in the CVS either. Important population groups which are generally considered to have been underenumerated include the homeless, and the very elderly.

Another method by which to assess the coverage of the census is by comparing the census population totals with those obtained from the annual mid-year population estimates compiled from routinely collected information. The mid-year population estimate is produced by a year-on-year updating of the 1981-based population estimate, and is felt to be the best available figure. The difference between the adjusted census count and the rolled forward estimates is 572,000 (Population Statistics Division, 1993). Analysis of the differences again reveals the strongest undercount for young men, with a maximum 6% difference in the counts at age 27. This represents a lower coverage rate than in 1981, when the under-enumeration on census night was estimated to be only 0.5%. In situations where the user requires absolute numbers by age and sex for a particular population, and where analyses are heavily dependent on age/sex ratios, suitable adjustment factors have been made available by OPCS, and additional information will be provided by subsequent mid-year population estimates. For the majority of more general studies, the estimated census coverage of 98% is unlikely to have serious effects.

(ii) Accuracy of 10% data

A potential source of error in the output data relates to the processing of the 10% counts. The data which have been processed at this level are only a sample, and will therefore fail to perfectly represent the characteristics of the underlying population. The precise extent of this misrepresentation is impossible to ascertain. The degree of error involved in the 10% sampling process is likely to increase as the absolute size of the sample decreases. Thus a 10% figure based on the population of an entire county will be statistically much more reliable than the corresponding figure for the same variable based on a single enumeration district. Studies of the 1981 10% sample data confirmed that for larger areas such as local authority districts, it was acceptable to gross up these data by a factor of 10 to produce reliable estimates for the whole population. Although there was no evidence of systematic bias, the data for small areas are subject to large sampling errors. The 1991 data cannot be simply grossed in the same way, as the 10% sample does not include any imputed households.

The nature of the relationship between sample sizes and likely errors is known, allowing the likelihood of an error of a specified size to be calculated. An explanation of the method for calculating sample percentage errors in this way is given in OPCS (1992h). This allows the chance that an error falls within any given percentage limits to be measured, and may form the basis for an assessment of sample accuracy for any given purpose. The sample design used in 1991 is the same as that used in 1981, the effects of which have been carefully investigated. Similar analyses are planned for the 1991 data. One of the main conclusions of this work was that users may assume the standard error of a 10% count to be equal to the square root of the

number of observations. Table 7 shows the standard errors associated with selected sample values in the 10% SAS. For example, 95% of the time a cell in the 10% tables with a value of 25 will be within +10 (2 SEs) of its true value. As a general principle, the 10% data are subject to large sampling errors at the ED level, and should be aggregated to reduce variability: they have been released for use as building blocks, and not for ED-level analysis.

Table 7: Standard errors for sample values in 10% SAS (Source: OPCS, 1992h)

Sample Value (a)	Standard Error = $\sqrt{\text{sample value}}$ (b)	Percentage Error (b) * 100 / (a)
10,000	100.0	1
2,500	50.0	2
1,111	33.3	3
625	25.0	4
400	20.0	5
204	14.3	7
100	10.0	10
25	5.0	20
4	2.0	50

(iii) Errors in processing

The complex nature of the census data collection and processing provides a large number of opportunities for the introduction of error into the published data. 1991 Census forms are manually coded and then keyed into the computer database. The edit system includes a number of checks for inconsistencies in the keyed data and, where these are found, provides for the imputation or input of valid values. These procedures allow for the elimination of impossible answers such as married persons aged 5. Comparison with other information such as economic position would be used to flag one of these fields for the imputation of a valid value (Mills and Teague, 1991). Imputation is performed from tables of valid answers to each census item. For most items, these imputation levels were less than 1 %.

One of the earliest errors encountered was the incorrect classification of many persons as students, an error which was estimated to apply to 0.5 million individuals. This problem was uncovered by routine data quality checking at OPCS, and the need for recoding resulted in considerable delay to the release of the 100% SAS and LBS. Some other errors arise during the data processing stage, such as wrong cell values and incorrect grid references, but these are generally picked up by OPCS error checking or immediately on release to users.

9 THE FUTURE

Following the 1991 Census, the census offices (OPCS, GRO(S) and the Census Office (Northern Ireland)) began a programme of evaluation and review in order to determine the future direction of census policy in the UK. In the short term, consultation with users was directed at ascertaining the demand for a census to be held in 1996 (Mahon, 1992). In the longer term, it

was intended to explore the possibilities for an alternative to a 2001 Census. In the light of users' responses, and the need to limit public expenditure, the review of alternatives was terminated at the end of its first stage, and the government decided to abandon any plans for a census in 1996. Planning is therefore proceeding on the basis that the next UK census will be of the conventional kind, and will be held in 2001. A summary of the issues raised in the brief review period is given in OPCS (1993b).

Alternatives which were considered included a rolling census, population or housing registers and administrative data record linkage. It was concluded that none of these options could really provide a cost-effective alternative to a conventional census by 2001. Users from all sectors were agreed about the continued need for census-type information, and strengths of the conventional census included its broad acceptability, confidentiality, legal power and value for money. The continuation of a conventional census data collection exercise should not however create the impression of a static situation. We began by commenting on the enormous changes in computing power and statistical data holding which had characterized the 1980s, and these trends seem set to continue in the 1990s. Issues of particular significance to the geographer include the imminent creation of definitive national high resolution grid referencing in the form of Ordnance Survey's 'Address Point' product, scheduled for completion by late 1995, and continued growth in the availability and implementation of geographical information systems. It seems inevitable that the design of the 2001 census geography will be conducted within some form of GIS, utilising national digital mapping as a framework, and with enhanced small area referencing, perhaps based on the existing postcode system. With these developments come further possibilities for the integration of geographical data relating to population, and a raised awareness of geographical issues for census data users. In closing, it is worth noting that the sceptic should take a careful look at the conduct of the 1991 Census in Scotland, where many of these features are already in place.

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APPENDICES

Appendix (i) Census form

The Census form illustrated here is form H, used for private households in England. Variants of this standard form were used in Scotland and Wales, which included specific questions about the respondents' ability to speak Gaelic or Welsh (included immediately before question 13). Other detailed country-specific alterations to questions are noted in Table 5. A separate form was used for the enumeration of residents of communal establishments in each country. These forms again followed the same format, but a separate questionnaire was completed for or by each resident in the establishment. Full details of the variations in the actual forms will be found in OPCS (1992a) *1991 Census Definitions* CEN 91 DEF

**1991 Census
England**
H form for Private Households

To the Head or Joint Heads or members of the Household aged 16 or over

Please complete this form for all members of the household, including children, and have it ready for collection on Monday 22nd April. Your census enumerator will call to collect it then or soon afterwards and will help you with the form if you have any difficulties. The enclosed leaflet explains why the Census is necessary and how the information is used.

Completion of the form is compulsory under the Census Act 1920. If you refuse to complete it, or give false information, you may have to pay a fine of up to £400.

Your answers will be treated in strict confidence and used only to produce statistics. Names and addresses will not be put into the computer; only the postcode will be entered. The forms will be kept securely within the Office and treated as confidential for 100 years.

Anyone using or disclosing Census information improperly will be liable to prosecution. For example, it would be improper for you to pass on to someone else information which you had been given in confidence by a visitor to enable you to complete the Census form.

If any member of the household aged 16 or over does not wish you, or another member of the household, to see their information, please ask the enumerator for an individual form with an envelope.

After completing the form, please sign the declaration on the last page. Thank you for your co-operation.

P J Wormald
 P J Wormald
 Registrar General
 Office of Population Censuses and Surveys
 PO Box 100 Fareham PO16 6AL
 Telephone: 0329 844444

To be completed by the Enumerator

Census District	Enumeration District	Form Number
<input type="text"/>	<input type="text"/>	<input type="text"/>
Name <input type="text"/>		
Address <input type="text"/>		
Postcode <input type="text"/>		

Panel A
 To be completed by the Enumerator and amended, if necessary, by the person(s) signing this form.

Tick one box to show the type of accommodation which this household occupies.

A caravan or other mobile or temporary structure 1

A whole house or bungalow that is

- detached 2
- semi-detached 3
- terraced (include end of terrace) 4

The whole of a purpose built flat or maisonette

- in a commercial building for example in an office building or hotel or over a shop 5
- in a block of flats or tenement 6

Part of a converted or shared house, bungalow or flat

- separate entrance into the building 7
- shared entrance into the building 8

Please read these instructions before filling in this form

A Household:
 A household comprises either one person living alone or a group of people (not necessarily related) living at the same address under common housekeeping — that is, sharing at least one meal a day or sharing a living room or sitting room.
 People staying temporarily with the household are included.

- ▶ If there is more than one household in this building, answer for your household only.
- ▶ First answer questions H1 and H2 on this page and H3 to H5 on the back page about your household and the rooms which it occupies.
- ▶ When you have answered the household questions, answer the questions on the inside pages about each member of your household.
- ▶ If a member of the household is completing an Individual form please still enter their name and answer questions 5 and 6 on this form.
- ▶ Then complete Panel A and Panel C on the back page.
- ▶ Answer each question by ticking the appropriate box or boxes where they are provided.
- ▶ Please use ink or ballpoint pen.

H1 Rooms

Please count the number of rooms your household has for its own use.

Do not count: small kitchens, under 2 metres (6 feet 6 inches) wide
 bathrooms
 toilets

Do count: living rooms
 bedrooms
 kitchens at least 2 metres (6 feet 6 inches) wide
 all other rooms in your accommodation

The total number of rooms is

H2 Accommodation
 If box 7 or box 8 in Panel A is ticked, tick one box below to show the type of accommodation which your household occupies.

- A one roomed flatlet with private bath or shower, WC and kitchen facilities. 1
- One room or bedsit, not self-contained (to move from your room to bathroom, WC or kitchen facilities you have to use a hall, landing or stairway open to other household's). 2
- A self-contained flat or accommodation with 2 or more rooms, having bath or shower, WC and kitchen facilities all behind its own private door. 3
- 2 or more rooms, not self-contained (to move between rooms or to bathroom, WC or kitchen facilities you have to use a hall, landing or stairway open to other household's). 4

Please turn to the back page and answer questions H3 to H5 ▶

1-3 Name, sex and date of birth of people to be included

Important: please read the notes before answering the questions. In answering the rest of the questions please include:

- ▶ every person who spends census night (21-22 April) in this household, including anyone staying temporarily.
- ▶ any other people who are usually members of the household but on census night are absent on holiday, at school or college, or for any other reason, even if they are being included on another census form elsewhere.
- ▶ anyone who arrives here on Monday 22nd April who was in Great Britain on the Sunday and who has not been included as present on another census form.
- ▶ any newly born baby born before the 22nd April, even if still in hospital. If not yet given a name, write **BABY** and the surname.

Write the names in **BLOCK CAPITALS** starting with the head or a joint head of household.

Person No. 1

Name and surname

Sex Male 1
Female 2

Date of birth Day Month Year

Person No. 2

Name and surname

Sex Male 1
Female 2

Date of birth Day Month Year

4 Marital status

On the 21st April what is the person's marital status? If separated but not divorced, please tick 'Married (first marriage)' or 'Re-married' as appropriate. Please tick one box.

Single (never married) 1
Married (first marriage) 2
Re-married 3
Divorced (decree absolute) 4
Widowed 5

Single (never married) 1
Married (first marriage) 2
Re-married 3
Divorced (decree absolute) 4
Widowed 5

5 Relationship in household

Please tick the box which indicates the relationship of each person to the person in the first column.

A step child or adopted child should be included as the son or daughter of the step or adoptive parent.

Write in relationship of 'Other relative' — for example, father, daughter-in-law, niece, uncle, cousin.

Relationship to Person No. 1

Husband or wife 1
Living together as a couple 2
Son or daughter 3
Other relative
please specify

Unrelated
please specify

Relationship to Person No. 1

Husband or wife 1
Living together as a couple 2
Son or daughter 3
Other relative
please specify

Unrelated
please specify

Write in position in household of an 'Unrelated' person for example, boarder, housekeeper, friend, flatmate, foster child.

6 Whereabouts on night of 21-22 April 1991

Please tick the appropriate box to indicate where the person was on the night of 21-22 April 1991.

At this address, out on night work or travelling to this address 0
Elsewhere in England, Scotland or Wales 1
Outside Great Britain 2

At this address, out on night work or travelling to this address 0
Elsewhere in England, Scotland or Wales 1
Outside Great Britain 2

7 Usual address

If the person usually lives here, please tick 'This address'. If not tick 'Elsewhere' and write in the person's usual address.

For students and children away from home during term time, home address should be taken as the usual address.

For any person who lives away from home for part of the year, the home address should be taken as the usual address.

Any person who is not a permanent member of the household should be asked what he or she considers to be his or her usual address.

This address 1
Elsewhere 2

If elsewhere, please write the person's usual address and postcode below in **BLOCK CAPITALS**

Post-code

This address 1
Elsewhere 2

If elsewhere, please write the person's usual address and postcode below in **BLOCK CAPITALS**

Post-code

8 Term time address of students and schoolchildren

If not a student or schoolchild, please tick first box.

For a student or schoolchild who lives here during term time, tick 'This address'.

If he or she does not live here during term time, tick 'Elsewhere' and write in the current or most recent term time address.

Not a student or schoolchild 1
This address 1
Elsewhere 2

If elsewhere, please write the term time address and postcode below in **BLOCK CAPITALS**

Post-code

Not a student or schoolchild 1
This address 1
Elsewhere 2

If elsewhere, please write the term time address and postcode below in **BLOCK CAPITALS**

Post-code

Person No. 3

Name and surname

Sex Male 1
Female 2

Date of birth Day Month Year

Person No. 4

Name and surname

Sex Male 1
Female 2

Date of birth Day Month Year

Person No. 5

Name and surname

Sex Male 1
Female 2

Date of birth Day Month Year

Person No. 6

Name and surname

Sex Male 1
Female 2

Date of birth Day Month Year

Single (never married) 1
Married (first marriage) 2
Re-married 3
Divorced (decree absolute) 4
Widowed 5

Single (never married) 1
Married (first marriage) 2
Re-married 3
Divorced (decree absolute) 4
Widowed 5

Single (never married) 1
Married (first marriage) 2
Re-married 3
Divorced (decree absolute) 4
Widowed 5

Single (never married) 1
Married (first marriage) 2
Re-married 3
Divorced (decree absolute) 4
Widowed 5

Relationship to Person No. 1

Husband or wife 1
Living together as a couple 2
Son or daughter 3
Other relative
please specify

Unrelated
please specify

Relationship to Person No. 1

Husband or wife 1
Living together as a couple 2
Son or daughter 3
Other relative
please specify

Unrelated
please specify

Relationship to Person No. 1

Husband or wife 1
Living together as a couple 2
Son or daughter 3
Other relative
please specify

Unrelated
please specify

Relationship to Person No. 1

Husband or wife 1
Living together as a couple 2
Son or daughter 3
Other relative
please specify

Unrelated
please specify

At this address, out on night work or travelling to this address 0
Elsewhere in England, Scotland or Wales 1
Outside Great Britain 2

At this address, out on night work or travelling to this address 0
Elsewhere in England, Scotland or Wales 1
Outside Great Britain 2

At this address, out on night work or travelling to this address 0
Elsewhere in England, Scotland or Wales 1
Outside Great Britain 2

At this address, out on night work or travelling to this address 0
Elsewhere in England, Scotland or Wales 1
Outside Great Britain 2

This address 1
Elsewhere 2

If elsewhere, please write the person's usual address and postcode below in **BLOCK CAPITALS**

Post-code

This address 1
Elsewhere 2

If elsewhere, please write the person's usual address and postcode below in **BLOCK CAPITALS**

Post-code

This address 1
Elsewhere 2

If elsewhere, please write the person's usual address and postcode below in **BLOCK CAPITALS**

Post-code

This address 1
Elsewhere 2

If elsewhere, please write the person's usual address and postcode below in **BLOCK CAPITALS**

Post-code

Not a student or schoolchild 1
This address 1
Elsewhere 2

If elsewhere, please write the term time address and postcode below in **BLOCK CAPITALS**

Post-code

Not a student or schoolchild 1
This address 1
Elsewhere 2

If elsewhere, please write the term time address and postcode below in **BLOCK CAPITALS**

Post-code

Not a student or schoolchild 1
This address 1
Elsewhere 2

If elsewhere, please write the term time address and postcode below in **BLOCK CAPITALS**

Post-code

Not a student or schoolchild 1
This address 1
Elsewhere 2

If elsewhere, please write the term time address and postcode below in **BLOCK CAPITALS**

Post-code

1-3 Name, sex and date of birth of people to be included

Important: please read the notes before answering the questions.
In answering the rest of the questions please include:

- ▶ every person who spends census night (21-22 April) in this household, including anyone staying temporarily.
- ▶ any other people who are usually members of the household but on census night are absent on holiday, at school or college, or for any other reason, even if they are being included on another census form elsewhere.
- ▶ anyone who arrives here on Monday 22nd April who was in Great Britain on the Sunday and who has not been included as present on another census form.
- ▶ any newly born baby born before the 22nd April, even if still in hospital.

Person No. 1	Person No. 2
Name and surname	Name and surname
Sex Male <input type="checkbox"/> 1 Female <input type="checkbox"/> 2	Sex Male <input type="checkbox"/> 1 Female <input type="checkbox"/> 2
Date of birth Day Month Year	Date of birth Day Month Year

Person No. 3	Person No. 4	Person No. 5	Person No. 6
Name and surname	Name and surname	Name and surname	Name and surname
Sex Male <input type="checkbox"/> 1 Female <input type="checkbox"/> 2	Sex Male <input type="checkbox"/> 1 Female <input type="checkbox"/> 2	Sex Male <input type="checkbox"/> 1 Female <input type="checkbox"/> 2	Sex Male <input type="checkbox"/> 1 Female <input type="checkbox"/> 2
Date of birth Day Month Year			

9 Usual address one year ago

If the person's usual address one year ago (on the 21st April 1990) was the same as his or her current usual address (given in answer to question 7), please tick 'Same'. If not, tick 'Different' and write in the usual address one year ago.

If everyone on the form has moved from the same address, please write the address in full for the first person and indicate with an arrow that this applies to the other people on the form.

For a child born since the 21st April 1990, tick the 'Child under one' box.

Person No. 1	Person No. 2
Same as question 7 <input type="checkbox"/> 1 Different <input type="checkbox"/> Child under one <input type="checkbox"/> 3	Same as question 7 <input type="checkbox"/> 1 Different <input type="checkbox"/> Child under one <input type="checkbox"/> 3
If different, please write the person's address and postcode on the 21st April 1990 below in BLOCK CAPITALS	If different, please write the person's address and postcode on the 21st April 1990 below in BLOCK CAPITALS
Post-code	Post-code

10 Country of birth

Please tick the appropriate box.

If the 'Elsewhere' box is ticked, please write in the present name of the country in which the birthplace is now situated.

Person No. 1	Person No. 2
England <input type="checkbox"/> 1 Scotland <input type="checkbox"/> 2 Wales <input type="checkbox"/> 3 Northern Ireland <input type="checkbox"/> 4 Irish Republic <input type="checkbox"/> 5 Elsewhere <input type="checkbox"/>	England <input type="checkbox"/> 1 Scotland <input type="checkbox"/> 2 Wales <input type="checkbox"/> 3 Northern Ireland <input type="checkbox"/> 4 Irish Republic <input type="checkbox"/> 5 Elsewhere <input type="checkbox"/>
If elsewhere, please write in the present name of the country	If elsewhere, please write in the present name of the country

11 Ethnic group

Please tick the appropriate box.

If the person is descended from more than one ethnic or racial group, please tick the group to which the person considers he/she belongs, or tick the 'Any other ethnic group' box and describe the person's ancestry in the space provided.

Person No. 1	Person No. 2
White <input type="checkbox"/> 0 Black-Caribbean <input type="checkbox"/> 1 Black-African <input type="checkbox"/> 2 Black-Other <input type="checkbox"/> please describe	White <input type="checkbox"/> 0 Black-Caribbean <input type="checkbox"/> 1 Black-African <input type="checkbox"/> 2 Black-Other <input type="checkbox"/> please describe
Indian <input type="checkbox"/> 3 Pakistani <input type="checkbox"/> 4 Bangladeshi <input type="checkbox"/> 5 Chinese <input type="checkbox"/> 6 Any other ethnic group <input type="checkbox"/> please describe	Indian <input type="checkbox"/> 3 Pakistani <input type="checkbox"/> 4 Bangladeshi <input type="checkbox"/> 5 Chinese <input type="checkbox"/> 6 Any other ethnic group <input type="checkbox"/> please describe

12 Long-term illness

Does the person have any long-term illness, health problem or handicap which limits his/her daily activities or the work he/she can do?

Include problems which are due to old age.

Person No. 1	Person No. 2
Yes, has a health problem which limits activities <input type="checkbox"/> 1 Has no such health problem <input type="checkbox"/> 2	Yes, has a health problem which limits activities <input type="checkbox"/> 1 Has no such health problem <input type="checkbox"/> 2

Person No. 3	Person No. 4	Person No. 5	Person No. 6
Same as question 7 <input type="checkbox"/> 1 Different <input type="checkbox"/> Child under one <input type="checkbox"/> 3	Same as question 7 <input type="checkbox"/> 1 Different <input type="checkbox"/> Child under one <input type="checkbox"/> 3	Same as question 7 <input type="checkbox"/> 1 Different <input type="checkbox"/> Child under one <input type="checkbox"/> 3	Same as question 7 <input type="checkbox"/> 1 Different <input type="checkbox"/> Child under one <input type="checkbox"/> 3
If different, please write the person's address and postcode on the 21st April 1990 below in BLOCK CAPITALS	If different, please write the person's address and postcode on the 21st April 1990 below in BLOCK CAPITALS	If different, please write the person's address and postcode on the 21st April 1990 below in BLOCK CAPITALS	If different, please write the person's address and postcode on the 21st April 1990 below in BLOCK CAPITALS
Post-code	Post-code	Post-code	Post-code
England <input type="checkbox"/> 1 Scotland <input type="checkbox"/> 2 Wales <input type="checkbox"/> 3 Northern Ireland <input type="checkbox"/> 4 Irish Republic <input type="checkbox"/> 5 Elsewhere <input type="checkbox"/>	England <input type="checkbox"/> 1 Scotland <input type="checkbox"/> 2 Wales <input type="checkbox"/> 3 Northern Ireland <input type="checkbox"/> 4 Irish Republic <input type="checkbox"/> 5 Elsewhere <input type="checkbox"/>	England <input type="checkbox"/> 1 Scotland <input type="checkbox"/> 2 Wales <input type="checkbox"/> 3 Northern Ireland <input type="checkbox"/> 4 Irish Republic <input type="checkbox"/> 5 Elsewhere <input type="checkbox"/>	England <input type="checkbox"/> 1 Scotland <input type="checkbox"/> 2 Wales <input type="checkbox"/> 3 Northern Ireland <input type="checkbox"/> 4 Irish Republic <input type="checkbox"/> 5 Elsewhere <input type="checkbox"/>
If elsewhere, please write in the present name of the country	If elsewhere, please write in the present name of the country	If elsewhere, please write in the present name of the country	If elsewhere, please write in the present name of the country
White <input type="checkbox"/> 0 Black-Caribbean <input type="checkbox"/> 1 Black-African <input type="checkbox"/> 2 Black-Other <input type="checkbox"/> please describe	White <input type="checkbox"/> 0 Black-Caribbean <input type="checkbox"/> 1 Black-African <input type="checkbox"/> 2 Black-Other <input type="checkbox"/> please describe	White <input type="checkbox"/> 0 Black-Caribbean <input type="checkbox"/> 1 Black-African <input type="checkbox"/> 2 Black-Other <input type="checkbox"/> please describe	White <input type="checkbox"/> 0 Black-Caribbean <input type="checkbox"/> 1 Black-African <input type="checkbox"/> 2 Black-Other <input type="checkbox"/> please describe
Indian <input type="checkbox"/> 3 Pakistani <input type="checkbox"/> 4 Bangladeshi <input type="checkbox"/> 5 Chinese <input type="checkbox"/> 6 Any other ethnic group <input type="checkbox"/> please describe	Indian <input type="checkbox"/> 3 Pakistani <input type="checkbox"/> 4 Bangladeshi <input type="checkbox"/> 5 Chinese <input type="checkbox"/> 6 Any other ethnic group <input type="checkbox"/> please describe	Indian <input type="checkbox"/> 3 Pakistani <input type="checkbox"/> 4 Bangladeshi <input type="checkbox"/> 5 Chinese <input type="checkbox"/> 6 Any other ethnic group <input type="checkbox"/> please describe	Indian <input type="checkbox"/> 3 Pakistani <input type="checkbox"/> 4 Bangladeshi <input type="checkbox"/> 5 Chinese <input type="checkbox"/> 6 Any other ethnic group <input type="checkbox"/> please describe
Yes, has a health problem which limits activities <input type="checkbox"/> 1 Has no such health problem <input type="checkbox"/> 2	Yes, has a health problem which limits activities <input type="checkbox"/> 1 Has no such health problem <input type="checkbox"/> 2	Yes, has a health problem which limits activities <input type="checkbox"/> 1 Has no such health problem <input type="checkbox"/> 2	Yes, has a health problem which limits activities <input type="checkbox"/> 1 Has no such health problem <input type="checkbox"/> 2

1-3 Name, sex and date of birth of people to be included

Important: please read the notes before answering the questions. In answering the rest of the questions please include:

- ▶ every person who spends census night (21-22 April) in this household, including anyone staying temporarily.
- ▶ any other people who are usually members of the household but on census night are absent on holiday, at school or college, or for any other reason, even if they are being included on another census form elsewhere.
- ▶ anyone who arrives here on Monday 22nd April who was in Great Britain on the Sunday and who has not been included as present on another census form.
- ▶ any newly born baby born before the 22nd April, even if still in hospital.

Person No. 1		Person No. 2	
Name and surname		Name and surname	
Sex Male <input type="checkbox"/> 1 Female <input type="checkbox"/> 2		Sex Male <input type="checkbox"/> 1 Female <input type="checkbox"/> 2	
Date of birth Day Month Year		Date of birth Day Month Year	

Answers to the remaining questions are not required for any person under 16 years of age (born after 21st April 1975)

13 Whether working, retired, looking after the home etc last week

Which of these things was the person doing last week?

Please read carefully right through the list and tick all the descriptions that apply.

Casual or temporary work should be counted at boxes 1, 2, 3 or 4. Also tick boxes 1, 2, 3 or 4 if the person had a job last week but was off sick, on holiday, temporarily laid off or on strike.

Boxes 1, 2, 3 and 4 refer to work for pay or profit but not to unpaid work except in a family business.

Working for an employer is part time (box 2) if the hours worked, excluding any overtime and mealbreaks, are usually 30 hours or less per week.

Include any person wanting a job but prevented from looking by holiday or temporary sickness.

Do not count training given or paid for by an employer.

Was working for an employer full time (more than 30 hours a week) <input type="checkbox"/> 1	Was working for an employer full time (more than 30 hours a week) <input type="checkbox"/> 1
Was working for an employer part time (one hour or more a week) <input type="checkbox"/> 2	Was working for an employer part time (one hour or more a week) <input type="checkbox"/> 2
Was self-employed, employing other people <input type="checkbox"/> 3	Was self-employed, employing other people <input type="checkbox"/> 3
Was self-employed, not employing other people <input type="checkbox"/> 4	Was self-employed, not employing other people <input type="checkbox"/> 4
Was on a government employment or training scheme <input type="checkbox"/> 5	Was on a government employment or training scheme <input type="checkbox"/> 5
Was waiting to start a job he/she had already accepted <input type="checkbox"/> 6	Was waiting to start a job he/she had already accepted <input type="checkbox"/> 6
Was unemployed and looking for a job <input type="checkbox"/> 7	Was unemployed and looking for a job <input type="checkbox"/> 7
Was at school or in other full time education <input type="checkbox"/> 8	Was at school or in other full time education <input type="checkbox"/> 8
Was unable to work because of long term sickness or disability <input type="checkbox"/> 9	Was unable to work because of long term sickness or disability <input type="checkbox"/> 9
Was retired from paid work <input type="checkbox"/> 10	Was retired from paid work <input type="checkbox"/> 10
Was looking after the home or family <input type="checkbox"/> 11	Was looking after the home or family <input type="checkbox"/> 11
Other <input type="checkbox"/> please specify	Other <input type="checkbox"/> please specify

Person No. 3	Person No. 4	Person No. 5	Person No. 6
Name and surname	Name and surname	Name and surname	Name and surname
Sex Male <input type="checkbox"/> 1 Female <input type="checkbox"/> 2	Sex Male <input type="checkbox"/> 1 Female <input type="checkbox"/> 2	Sex Male <input type="checkbox"/> 1 Female <input type="checkbox"/> 2	Sex Male <input type="checkbox"/> 1 Female <input type="checkbox"/> 2
Date of birth Day Month Year			

Answers to the remaining questions are not required for any person under 16 years of age (born after 21st April 1975)

Was working for an employer full time (more than 30 hours a week) <input type="checkbox"/> 1	Was working for an employer full time (more than 30 hours a week) <input type="checkbox"/> 1	Was working for an employer full time (more than 30 hours a week) <input type="checkbox"/> 1	Was working for an employer full time (more than 30 hours a week) <input type="checkbox"/> 1
Was working for an employer part time (one hour or more a week) <input type="checkbox"/> 2	Was working for an employer part time (one hour or more a week) <input type="checkbox"/> 2	Was working for an employer part time (one hour or more a week) <input type="checkbox"/> 2	Was working for an employer part time (one hour or more a week) <input type="checkbox"/> 2
Was self-employed, employing other people <input type="checkbox"/> 3	Was self-employed, employing other people <input type="checkbox"/> 3	Was self-employed, employing other people <input type="checkbox"/> 3	Was self-employed, employing other people <input type="checkbox"/> 3
Was self-employed, not employing other people <input type="checkbox"/> 4	Was self-employed, not employing other people <input type="checkbox"/> 4	Was self-employed, not employing other people <input type="checkbox"/> 4	Was self-employed, not employing other people <input type="checkbox"/> 4
Was on a government employment or training scheme <input type="checkbox"/> 5	Was on a government employment or training scheme <input type="checkbox"/> 5	Was on a government employment or training scheme <input type="checkbox"/> 5	Was on a government employment or training scheme <input type="checkbox"/> 5
Was waiting to start a job he/she had already accepted <input type="checkbox"/> 6	Was waiting to start a job he/she had already accepted <input type="checkbox"/> 6	Was waiting to start a job he/she had already accepted <input type="checkbox"/> 6	Was waiting to start a job he/she had already accepted <input type="checkbox"/> 6
Was unemployed and looking for a job <input type="checkbox"/> 7	Was unemployed and looking for a job <input type="checkbox"/> 7	Was unemployed and looking for a job <input type="checkbox"/> 7	Was unemployed and looking for a job <input type="checkbox"/> 7
Was at school or in other full time education <input type="checkbox"/> 8	Was at school or in other full time education <input type="checkbox"/> 8	Was at school or in other full time education <input type="checkbox"/> 8	Was at school or in other full time education <input type="checkbox"/> 8
Was unable to work because of long term sickness or disability <input type="checkbox"/> 9	Was unable to work because of long term sickness or disability <input type="checkbox"/> 9	Was unable to work because of long term sickness or disability <input type="checkbox"/> 9	Was unable to work because of long term sickness or disability <input type="checkbox"/> 9
Was retired from paid work <input type="checkbox"/> 10	Was retired from paid work <input type="checkbox"/> 10	Was retired from paid work <input type="checkbox"/> 10	Was retired from paid work <input type="checkbox"/> 10
Was looking after the home or family <input type="checkbox"/> 11	Was looking after the home or family <input type="checkbox"/> 11	Was looking after the home or family <input type="checkbox"/> 11	Was looking after the home or family <input type="checkbox"/> 11
Other <input type="checkbox"/> please specify			

1-3 Name, sex and date of birth of people to be included

Important: please read the notes before answering the questions.
 In answering the rest of the questions please include:

- ▶ every person who spends census night (21-22 April) in this household, including anyone staying temporarily.
- ▶ any other people who are usually members of the household but on census night are absent on holiday, at school or college, or for any other reason, even if they are being included on another census form elsewhere.
- ▶ anyone who arrives here on Monday 22nd April who was in Great Britain on the Sunday and who has not been included as present on another census form.
- ▶ any newly born baby born before the 22nd April, even if still in hospital.

Person No. 1		Person No. 2	
Name and surname		Name and surname	
Sex Male <input type="checkbox"/> 1 Female <input type="checkbox"/> 2		Sex Male <input type="checkbox"/> 1 Female <input type="checkbox"/> 2	
Date of birth Day Month Year		Date of birth Day Month Year	

Person No. 3	Person No. 4	Person No. 5	Person No. 6
Name and surname	Name and surname	Name and surname	Name and surname
Sex Male <input type="checkbox"/> 1 Female <input type="checkbox"/> 2	Sex Male <input type="checkbox"/> 1 Female <input type="checkbox"/> 2	Sex Male <input type="checkbox"/> 1 Female <input type="checkbox"/> 2	Sex Male <input type="checkbox"/> 1 Female <input type="checkbox"/> 2
Date of birth Day Month Year			

Please read A below, tick the box that applies and follow the instruction by the box ticked.

<p>A Did the person have a paid job last week (any of the boxes 1, 2, 3 or 4 ticked at question 13)?</p>	<p>YES <input type="checkbox"/> Answer questions 14, 15, 16, 17 and 18 about the main job last week, then go on to question 19</p>	<p>YES <input type="checkbox"/> Answer questions 14, 15, 16, 17 and 18 about the main job last week, then go on to question 19</p>
	<p>NO <input type="checkbox"/> Answer B</p>	<p>NO <input type="checkbox"/> Answer B</p>
<p>B Has the person had a paid job within the last 10 years?</p>	<p>YES <input type="checkbox"/> Answer questions 14, 15 and 16 about the most recent job, then go on to question 19</p>	<p>YES <input type="checkbox"/> Answer questions 14, 15 and 16 about the most recent job, then go on to question 19</p>
	<p>NO <input type="checkbox"/> Go on to question 19</p>	<p>NO <input type="checkbox"/> Go on to question 19</p>
<p>14 Hours worked per week</p> <p>How many hours per week does or did the person usually work in his or her main job? Do not count overtime or meal breaks.</p>	<p>Number of hours worked per week <input type="text"/></p>	<p>Number of hours worked per week <input type="text"/></p>
<p>15 Occupation</p> <p>Please give the full title of the person's present or last job and describe the main things he/she does or did in the job. At a, give the full title by which the job is known, for example: 'packing machinist', 'poultry processor', 'jig and tool fitter', 'supervisor of typists', 'accounts clerk', rather than general titles like 'machinist', 'process worker', 'supervisor' or 'clerk'. Give rank or grade if the person has one. At b, write down the main things the person actually does or did in the job. If possible ask him/her to say what these things are and write them down. Armed Forces — enter 'commissioned officer' or 'other rank' as appropriate at a, and leave b blank. Civil Servants — give grade at a and discipline or specification, for example: 'electrical engineer', 'accountant', 'chemist', 'administrator' at b.</p>	<p>a Full job title</p> <p>b Main things done in job</p>	<p>a Full job title</p> <p>b Main things done in job</p>
	<p>a Name of employer</p> <p>b Description of employer's business</p>	<p>a Name of employer</p> <p>b Description of employer's business</p>
<p>16 Name and business of employer (if self-employed give the name and nature of the person's business)</p> <p>At a, please give the name of the employer. Give the trading name if one is used. Do not use abbreviations. At b, describe clearly what the employer (or the person if self-employed) makes or does (or did). Armed Forces — write 'Armed Forces' at a and leave b blank. For a member of the Armed Forces of a country other than the UK — add the name of the country. Civil Servants — give name of Department at a and write 'Government Department' at b. Local Government Officers — give name of employing authority at a and department in which employed at b.</p>	<p>a Name of employer</p> <p>b Description of employer's business</p>	<p>a Name of employer</p> <p>b Description of employer's business</p>

This will tell you which questions to answer for each person.

<p>YES <input type="checkbox"/> Answer questions 14, 15, 16, 17 and 18 about the main job last week, then go on to question 19</p>	<p>YES <input type="checkbox"/> Answer questions 14, 15, 16, 17 and 18 about the main job last week, then go on to question 19</p>	<p>YES <input type="checkbox"/> Answer questions 14, 15, 16, 17 and 18 about the main job last week, then go on to question 19</p>	<p>YES <input type="checkbox"/> Answer questions 14, 15, 16, 17 and 18 about the main job last week, then go on to question 19</p>
<p>NO <input type="checkbox"/> Answer B</p>			
<p>YES <input type="checkbox"/> Answer questions 14, 15 and 16 about the most recent job, then go on to question 19</p>	<p>YES <input type="checkbox"/> Answer questions 14, 15 and 16 about the most recent job, then go on to question 19</p>	<p>YES <input type="checkbox"/> Answer questions 14, 15 and 16 about the most recent job, then go on to question 19</p>	<p>YES <input type="checkbox"/> Answer questions 14, 15 and 16 about the most recent job, then go on to question 19</p>
<p>NO <input type="checkbox"/> Go on to question 19</p>	<p>NO <input type="checkbox"/> Go on to question 19</p>	<p>NO <input type="checkbox"/> Go on to question 19</p>	<p>NO <input type="checkbox"/> Go on to question 19</p>
<p>Number of hours worked per week <input type="text"/></p>	<p>Number of hours worked per week <input type="text"/></p>	<p>Number of hours worked per week <input type="text"/></p>	<p>Number of hours worked per week <input type="text"/></p>
<p>a Full job title</p> <p>b Main things done in job</p>	<p>a Full job title</p> <p>b Main things done in job</p>	<p>a Full job title</p> <p>b Main things done in job</p>	<p>a Full job title</p> <p>b Main things done in job</p>
<p>a Name of employer</p> <p>b Description of employer's business</p>	<p>a Name of employer</p> <p>b Description of employer's business</p>	<p>a Name of employer</p> <p>b Description of employer's business</p>	<p>a Name of employer</p> <p>b Description of employer's business</p>

Please turn over ▶

1-3 Name, sex and date of birth of people to be included

Important: please read the notes before answering the questions. In answering the rest of the questions please include:

- every person who spends census night (21-22 April) in this household, including anyone staying temporarily.
- any other people who are usually members of the household but on census night are absent on holiday, at school or college, or for any other reason, even if they are being included on another census form elsewhere.
- anyone who arrives here on Monday 22nd April who was in Great Britain on the Sunday and who has not been included as present on another census form.
- any newly born baby born before the 22nd April, even if still in hospital.

17 Address of place of work

Please give the full address of the person's place of work. For a person employed on a site for a long period, give the address of the site. For a person not working regularly at one place who reports daily to a depot or other fixed address, give that address. For a person not reporting daily to a fixed address, tick box 1. For a person working mainly at home, tick box 2. **Armed Forces — leave blank.**

18 Daily journey to work

Please tick the appropriate box to show how the longest part, by distance, of the person's daily journey to work is normally made. For a person using different means of transport on different days, show the means most often used. Car or van includes three-wheeled cars and motor caravans.

19 Degrees, professional and vocational qualifications

Has the person obtained any qualifications after reaching the age of 18 such as: -degrees, diplomas, HNC, HND, -nursing qualifications, -teaching qualifications (see * below), -graduate or corporate membership of professional institutions, -other professional, educational or vocational qualifications? Do not count qualifications normally obtained at school such as GCE, CSE, GCSE, SCE and school certificates. If box 2 is ticked, write in all qualifications even if they are not relevant to the person's present job or if the person is not working. Please list the qualifications in the order in which they were obtained. If more than three, please enter in a spare column and link with an arrow. *For a person with school teaching qualifications, give the full title of the qualification, such as 'Certificate of Education' and the subject(s) which the person is qualified to teach. The subject 'education' should then only be shown if the course had no other subject specialisation.

Person No. 1	Person No. 2
Name and surname	Name and surname
Sex Male <input type="checkbox"/> 1 Female <input type="checkbox"/> 2	Sex Male <input type="checkbox"/> 1 Female <input type="checkbox"/> 2
Date of birth Day Month Year	Date of birth Day Month Year
Please write full address and postcode of workplace below in BLOCK CAPITALS	Please write full address and postcode of workplace below in BLOCK CAPITALS
Post-code	Post-code
No fixed place <input type="checkbox"/> 1 Mainly at home <input type="checkbox"/> 2	No fixed place <input type="checkbox"/> 1 Mainly at home <input type="checkbox"/> 2
British Rail train <input type="checkbox"/> 1 Underground, tube, metro <input type="checkbox"/> 2 Bus, minibus or coach (public or private) <input type="checkbox"/> 3 Motor cycle, scooter, moped <input type="checkbox"/> 4 Driving a car or van <input type="checkbox"/> 5 Passenger in car or van <input type="checkbox"/> 6 Pedal cycle <input type="checkbox"/> 7 On foot <input type="checkbox"/> 8 Other <input type="checkbox"/> 9 Please specify	British Rail train <input type="checkbox"/> 1 Underground, tube, metro <input type="checkbox"/> 2 Bus, minibus or coach (public or private) <input type="checkbox"/> 3 Motor cycle, scooter, moped <input type="checkbox"/> 4 Driving a car or van <input type="checkbox"/> 5 Passenger in car or van <input type="checkbox"/> 6 Pedal cycle <input type="checkbox"/> 7 On foot <input type="checkbox"/> 8 Other <input type="checkbox"/> 9 Please specify
Works mainly at home <input type="checkbox"/> 0	Works mainly at home <input type="checkbox"/> 0
NO — no such qualifications <input type="checkbox"/> 1 YES — give details <input type="checkbox"/> 2	NO — no such qualifications <input type="checkbox"/> 1 YES — give details <input type="checkbox"/> 2
1 Title Subject(s) Year Institution	1 Title Subject(s) Year Institution
2 Title Subject(s) Year Institution	2 Title Subject(s) Year Institution
3 Title Subject(s) Year Institution	3 Title Subject(s) Year Institution

Person No. 3	Person No. 4	Person No. 5	Person No. 6
Name and surname	Name and surname	Name and surname	Name and surname
Sex Male <input type="checkbox"/> 1 Female <input type="checkbox"/> 2	Sex Male <input type="checkbox"/> 1 Female <input type="checkbox"/> 2	Sex Male <input type="checkbox"/> 1 Female <input type="checkbox"/> 2	Sex Male <input type="checkbox"/> 1 Female <input type="checkbox"/> 2
Date of birth Day Month Year			
Please write full address and postcode of workplace below in BLOCK CAPITALS	Please write full address and postcode of workplace below in BLOCK CAPITALS	Please write full address and postcode of workplace below in BLOCK CAPITALS	Please write full address and postcode of workplace below in BLOCK CAPITALS
Post-code	Post-code	Post-code	Post-code
No fixed place <input type="checkbox"/> 1 Mainly at home <input type="checkbox"/> 2	No fixed place <input type="checkbox"/> 1 Mainly at home <input type="checkbox"/> 2	No fixed place <input type="checkbox"/> 1 Mainly at home <input type="checkbox"/> 2	No fixed place <input type="checkbox"/> 1 Mainly at home <input type="checkbox"/> 2
British Rail train <input type="checkbox"/> 1 Underground, tube, metro <input type="checkbox"/> 2 Bus, minibus or coach (public or private) <input type="checkbox"/> 3 Motor cycle, scooter, moped <input type="checkbox"/> 4 Driving a car or van <input type="checkbox"/> 5 Passenger in car or van <input type="checkbox"/> 6 Pedal cycle <input type="checkbox"/> 7 On foot <input type="checkbox"/> 8 Other <input type="checkbox"/> 9 Please specify	British Rail train <input type="checkbox"/> 1 Underground, tube, metro <input type="checkbox"/> 2 Bus, minibus or coach (public or private) <input type="checkbox"/> 3 Motor cycle, scooter, moped <input type="checkbox"/> 4 Driving a car or van <input type="checkbox"/> 5 Passenger in car or van <input type="checkbox"/> 6 Pedal cycle <input type="checkbox"/> 7 On foot <input type="checkbox"/> 8 Other <input type="checkbox"/> 9 Please specify	British Rail train <input type="checkbox"/> 1 Underground, tube, metro <input type="checkbox"/> 2 Bus, minibus or coach (public or private) <input type="checkbox"/> 3 Motor cycle, scooter, moped <input type="checkbox"/> 4 Driving a car or van <input type="checkbox"/> 5 Passenger in car or van <input type="checkbox"/> 6 Pedal cycle <input type="checkbox"/> 7 On foot <input type="checkbox"/> 8 Other <input type="checkbox"/> 9 Please specify	British Rail train <input type="checkbox"/> 1 Underground, tube, metro <input type="checkbox"/> 2 Bus, minibus or coach (public or private) <input type="checkbox"/> 3 Motor cycle, scooter, moped <input type="checkbox"/> 4 Driving a car or van <input type="checkbox"/> 5 Passenger in car or van <input type="checkbox"/> 6 Pedal cycle <input type="checkbox"/> 7 On foot <input type="checkbox"/> 8 Other <input type="checkbox"/> 9 Please specify
Works mainly at home <input type="checkbox"/> 0			
NO — no such qualifications <input type="checkbox"/> 1 YES — give details <input type="checkbox"/> 2	NO — no such qualifications <input type="checkbox"/> 1 YES — give details <input type="checkbox"/> 2	NO — no such qualifications <input type="checkbox"/> 1 YES — give details <input type="checkbox"/> 2	NO — no such qualifications <input type="checkbox"/> 1 YES — give details <input type="checkbox"/> 2
1 Title Subject(s) Year Institution	1 Title Subject(s) Year Institution	1 Title Subject(s) Year Institution	1 Title Subject(s) Year Institution
2 Title Subject(s) Year Institution	2 Title Subject(s) Year Institution	2 Title Subject(s) Year Institution	2 Title Subject(s) Year Institution
3 Title Subject(s) Year Institution	3 Title Subject(s) Year Institution	3 Title Subject(s) Year Institution	3 Title Subject(s) Year Institution

H3 Tenure

Please tick the box which best describes how you and your household occupy your accommodation.

If buying by stages from a Council, Housing Association or New Town under shared ownership, co-ownership or equity sharing scheme, answer as an owner-occupier at box 1.

If your accommodation is occupied by lease originally granted for, or extended to, more than 21 years, answer as an owner-occupier. For shorter leases, answer 'By renting'.

A private landlord may be a person or a company or another organisation not mentioned at 3, 4, 5 or 6 above.

As an owner-occupier:
 - buying the property through mortgage or loan 1
 - owning the property outright (no loan) 2

By renting, rent free or by lease:
 - with a job, firm, shop or other business 3
 - from a local authority, Council 4
 - from a New Town Development Corporation or Commission, or from a Housing Action Trust 5
 - from a housing association or charitable trust 6
 - from a private landlord, furnished 7
 - from a private landlord, unfurnished 8

In some other way:
 - please give details below:

H4 Amenities

Does your household — that is, you and any people who usually live here with you — have the use of:

a. A bath or shower? **Yes** — for use only by this household 1
Yes — for use also by another household 2
No — no bath or shower available 3

b. A flush toilet/WC with entrance inside the building? **Yes** — for use only by this household 0
Yes — for use also by another household 1
No — flush toilet with outside entrance only 2
No — no flush toilet indoors or outdoors 3

c. Central heating in living rooms and bedrooms or (if no tight storage heaters, warm air or under-floor heating), whether actually used or not? **Yes** — all living rooms and bedrooms centrally heated 1
Yes — some (not all) living rooms and bedrooms centrally heated 2
No — no living rooms or bedrooms centrally heated 3

H5 Cars and vans

Please tick the appropriate box to indicate the number of cars and vans normally available for use by you or members of your household other than visitors. Include any car or van provided by employers if normally available for use by you or members of your household, but exclude vans used only for carrying goods.

None 0
 One 1
 Two 2
 Three or more 3

Panel B

Was there anyone else, such as a visitor, here on the night of 21-22 April whom you have not included because there was no room on the form? No Yes

If yes ticked, please ask the Enumerator for another form.

Have you left anyone out because you were not sure whether they should be included in the form? No Yes

If yes ticked, please give their names and the reasons why you were not sure about including them:

Name: _____
 Reason: _____

Name: _____
 Reason: _____

Name: _____
 Reason: _____

Panel C

Before you sign the form, will you please check:

▶ that all questions which should have been answered have been answered for every member of your household

▶ that you have included everyone who spent the night of 21-22 April in your household

▶ that you have included everyone who usually lives here but was away from home on the night of 21-22 April

▶ that if visitors, boarders or newly born children, seen if still in hospital, have been missed

It would help the Enumerator to be able to telephone you if there is a query on, or an omission from, your form.

If you have no objection, please write your telephone number here.

Telephone number _____

Declaration
 This form is correctly completed to the best of my knowledge and belief.

Signature(s) _____

Date: _____ April 1991

Appendix (ii) LBS/SAS Tables

This appendix indicates the coverage of the 1991 Local Base Statistics (LBS) and Small Area Statistics (SAS) tables. All tables appear in the LBS, and are numbered as in the 'LBS' column below. An equal sign (=) in the 'SAS' column indicates that an identical table appears in the SAS. An asterisk (*) indicates that a table covering this topic appears in the SAS, but does not contain the same level of detail as the corresponding LBS table. An 'N' indicates that this table does not appear in the SAS.

LBS SAS

I Demographic and economic characteristics

1		Population bases
2		Age and marital status
3		Communal establishments
4		Medical and care establishments
5		Hotels and other establishments
6		Ethnic group
7		Country of birth
8		Economic position
9		Economic position and ethnic group
10	*	Term-time address
11		Persons present
12	*	Long-term illness in households
13	*	Long-term illness in communal establishments
14	*	Long-term illness and economic position
15	*	Migrants
16	*	Wholly moving households
17	*	Ethnic group of migrants
18	N	Imputed residents
19	*	Imputed households
20	*	Tenure and amenities
21		Car availability

II Housing

22	*	Rooms and household size
23	*	Persons per room
24		Residents 18 and over
25		Visitor households
26	=	Students in households
27	=	Households 1971/81/91 bases

III Households and household composition

28	*	Dependants in households
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29		Dependants and long-term illness
30	=	'Carers'
31		Dependant children in households
32	=	Children 0-15 in households
33		Women in 'couples': economic position
34	=	Economic position of household residents
35	*	Age and marital status of household residents
36	=	'Earners' and dependent children
37	=	Young adults
38	*	Single years of age
39	*	Headship
40	=	Lone 'Parents'
41	*	Shared accommodation
42	*	Household composition and housing
43	*	Household composition and ethnic group
44	*	Household composition and long-term illness
45	N	Migrant household heads
46	*	Households with dependent children; housing
47	*	Households with pensioners; housing
48	*	Households with dependants; housing
49	*	Ethnic group; housing
50	*	Country of birth; household heads and residents
51	*	Country of birth and ethnic group
52	N	Language indicators
53		'Lifestages'
54	=	Occupancy

IV Household spaces and dwellings

55	*	Household spaces and occupancy
56	=	Household space type and occupancy
57	*	Household space type; rooms and household size
58	*	Household space type; tenure and amenities
59	*	Household space type; household composition
60	*	Dwellings and household spaces
61	*	Dwelling type and occupancy
62	*	Occupancy and tenure of dwellings
63	*	Dwelling type and tenure
64	N	Tenure of dwellings and household spaces
65	N	Occupancy of dwellings and households spaces
66	=	Shared dwellings

V Scotland and Wales only tables

67	=	Welsh language / Gaelic language
68		Floor level of accommodation
69	=	Occupancy norm: households
70	=	Occupancy norm: residents

VI 10 per cent topics

71		Comparison of 100% and 10% counts
72	N	Economic and employment status (10% sample)
73		Industry (10% sample)
74	*	Occupation (10% sample)
75	*	Hours worked (10% sample)
76	*	Occupation and industry (10% sample)
77	*	Industry and hours worked (10% sample)
78	*	Occupation and hours worked (10% sample)
79		Industry and employment status (10% sample)
80	*	Working parents; hours worked (10% sample)
81		Occupation and employment status (10% sample)
82	=	Travel to work and SEG (10% sample)
83		Travel to work and car availability (10% sample)
84	*	Qualified manpower (10% sample)
85	N	Ethnic group of qualified manpower (10% sample)
86	*	SEG of households and families (10% sample)
87	*	Family type and tenure (10% sample)
88	N	'Concealed families' (10% sample)
89	=	Family composition (10% sample)
90	=	Social class of households (10% sample)
91		Social class and economic position (10% sample)
92	=	SEG and economic position (10% sample)
93	N	SEG, social class and ethnic group (10% sample)
94	=	Former industry of unemployed (10% sample)
95		Former occupation of unemployed (10% sample)
96	N	Armed forces(10% sample)
97	N	Armed forces; households (10% sample)
98	N	Occupation orders; 1980 classification (10% sample)
99	N	Occupation; standard occupational classification (10% sample)

Appendix (iii) OPCS/GRO(S): 1991 Census User Guides

1		Preliminary Reports for England and Wales and for Scotland: Prospectus
2		Topic Statistics: Sex, Age and Marital Status Prospectus
3		Local Statistics / Small Area Statistics Prospectus
4		Topic Statistics: Historical Tables Prospectus
5		Topic Statistics: Limiting Long-term Illness Prospectus
6		Topic Statistics: Persons Aged 60 and Over Prospectus
7		Topic Statistics: Usual Residence Prospectus
8		Topic Statistics: Qualified Manpower Prospectus
9		Topic Statistics: Ethnic Group and Country of Birth Prospectus
10		Topic Statistics: Welsh Language in Wales Prospectus
11		Topic Statistics: Household Composition (100%) Prospectus
12		Topic Statistics: Housing and Availability of Cars Prospectus
13		Topic Statistics: Children and Young Adults Prospectus

14 Topic Statistics: Guide to Commissioned Tables Prospectus
 15 Topic Statistics: Communal Establishments Prospectus
 16 Topic Statistics: Economic Activity Prospectus
 17 Topic Statistics: National Migration Prospectus
 18 Topic Statistics: Gaelic Language in Scotland Prospectus
 19 Topic Statistics: County / Region Monitor Prospectus
 20 Topic Statistics: Workplace and Transport to Work Prospectus
 21 File Specification: Local Statistics and Small Area Statistics Prospectus
 22 Topic Statistics: Regional Migration Prospectus
 23 Topic Statistics: Household and Family Composition (10%) Prospectus
 24 Cell Numbering Layouts: Local Base Statistics
 25 Cell Numbering Layouts: Small Area Statistics
 26 ED / Postcode Directory: Prospectus
 27 Guide to Sources of Census Statistics
 28 Guide to Statistical Comparability between 1981 SAS and 1991 Local and Small Area Statistics
 29 Key Statistics: Local Authority Area Prospectus
 30 Key Statistics: Urban and Rural Areas Prospectus
 31 Key Statistics: Health Authority Areas Prospectus
 32 Local Statistics: Ward and Civil Parish / Community Monitor Prospectus
 33 Local Statistics: Postcode Sector (England and Wales) Monitor Prospectus
 34 Local Statistics: Parliamentary Constituency Prospectus
 35 Local Statistics: Special Migration Statistics Prospectus
 36 Local Statistics: Special Workplace Statistics Prospectus
 37 Licences and Agencies
 38 Local Statistics: LBS _SAS Explanatory Notes
 39 Topic Statistics: Report for Health Areas Prospectus
 40 Area Constitution: District within Counties in England and Wales
 41 Area Constitution: Electoral Wards within District in England and Wales (1 per county)
 42 Area Constitution: Enumeration Districts within Electoral Wards within Districts of England and Wales and Special Enumeration Districts (1 per county)
 43 Local and Small Area Statistics: Restricted EDs and their level of restriction, Suppressed Wards, EDs with zero Population, Errors and Anomalies (1 per county)
 44 Social Class based on occupation: Definitions in terms of Standard Occupational Classification (SOC) Unit Groups and employment status
 45 Socio-economic Group: Definition in terms of Standard Occupational Classification (SOC) Unit Groups and employment status
 46 Standard Industrial Classification: Comparisons between SIC(92) and SIC(80)
 47 Key Statistics: definitions and cell numbers
 48 Local Base Statistics/Small Area Statistics: Modification of Counts for Confidentiality

Appendix (iv) Addresses/sources of further information

Census output, England and Wales:
 Census Customer Services, OPCS, Segensworth Road, Titchfield, Fareham, Hampshire, P015 5RR
 (0329) 842511 ext 3800

Census output, Scotland:
 Census Customer Services, GRO(S), Ladywell House, Ladywell Road, Edinburgh, EH12 7TF
 031 314 4254

1961, 1971, 1981 Census data:
 ESRC Data Archive, University of Essex, Wivenhoe Park, Colchester, Essex, C04 3SQ
 (0206) 872001

Online access to 1991 datasets:
 Census Dissemination Unit, Manchester Computing Centre, University of Manchester, Oxford Road, Manchester, M13 9PL
 061 275 6066

Sample of Anonymised Records:
 Census Microdata Unit, Faculty of Economic and Social Studies, University of Manchester, Manchester, M13 9PL

Longitudinal Study:
 The LS Support Programme, Social Statistics Research Unit, City University, Northampton Square, London, EC1V 0HB
 071 477 8586

SASPAC91 software and ED-line boundary products:
 London Research Centre, Parliament House, 81 Black Prince Road, London, SE1 7SZ
 071 627 9652

C91, MAP91, Scamp-CD:
 Claymore Services Ltd., Station House, Whimble, Exeter, Devon, EX5 2QJ
 (0404) 823097

ED91:
 Graphical Data Capture Ltd., 262 Regents Park Road, London, N3 3HN
 081 346 4959

Supermap and 1991 Census on CD:
 Chadwyck-Healey Ltd., Cambridge Place, Cambridge, CB2 1NR
 (0223) 311479

Appendix (v) Glossary of terms and acronyms

Barnardization See 'modification'

Census validation survey (CVS) A post-census survey of 20,000 households conducted in June and July 1991 in order to assess census accuracy and coverage

Central Postcode Directory (CPD) A national directory of postcodes, which includes a 100m Ordnance Survey grid reference for each postcode.

C91 Software package for the PC designed to allow manipulation and tabulation of the 1991 SAS and LBS data files

ED-Line National set of digitized 1991 ED boundaries produced by London Research Centre, MVA and Taywood Data Graphics, incorporating Ordnance Survey ward boundary data

ED91 National set of digitized 1991 ED boundaries produced by GDC Ltd.

Enumeration district (ED) The ED is the smallest geographical area in the census geography, and represents the workload of a single enumerator. It is also the smallest area for which statistical data are output in England and Wales. An average 1991 ED contained around 200 households and 400 individuals.

Enumerator The member of the census field staff who actually delivers and collects census questionnaires, and is responsible for a single enumeration district.

Exporting enumeration district A restricted enumeration district whose census counts have been recombined with another neighbouring ED in order to bring the combined count above the relevant restriction thresholds

General Register Office (Scotland) (GRO(S)) The government organization responsible for the organization of the census in Scotland

Geographical Information System (GIS) An information system designed to store, manipulate and display databases which are geographically referenced

Importing enumeration district An enumeration district to which have been added the census counts from a neighbouring exporting ED, in order to produce totals which are above the relevant restriction thresholds

Imputation The assignment of missing values in the census database. This may refer to answers to specific questions, characteristics of missing households, or unknown postcodes of addresses.

Local base statistics (LBS) A set of tables comprising around 20,000 separate counts which are available in computer-readable form down to the ward level

Longitudinal Study (LS) An ongoing study, begun in 1971, to link the census and certain NHS-

held records of all persons with one of four birthdays in the year, to provide detailed statistical information on major life events, and mortality

MAP91 Census mapping system designed to complement C91 data retrieval package

MATPAC91 Software package designed for the manipulation of 1991 special migration statistics and special workplace statistics trip matrices

Midyear population estimates National estimates of population produced each year by OPCS by rolling on routinely collected birth and death registrations from the base provided by the previous census

Modification The process by which values of -1, 0 or +1 are added to counts in the small area data in a quasi-random fashion in order to provide additional confidentiality protection.

Office of Population Censuses and Surveys (OPCS) The government organization responsible for the organization of the census in England and Wales

Output Area (OA) The smallest geographical area for which census data are published in Scotland. These are generally aggregations of the enumeration districts used for data collection, and provide a high level of comparability with 1981 output

Partial postcode unit (PPU) A small area formed by the intersection of a single enumeration district and a unit postcode. The basic building block of the ED/postcode directory.

Preliminary reports The preliminary reports for England and Wales, and for Scotland were published separately, and provided information about the population present on census night in each local authority area. These figures were compiled from enumerators reports, and were not based on a full analysis of the data collected

Pseudo enumeration district (PED) The 'best fit' to an actual enumeration district which can be created by combining whole unit postcodes

Restriction The suppression of output of counts for any geographical area which falls below certain restriction thresholds. For example, no small area statistics counts are released for any area containing less than 50 persons or 16 households

Restricted enumeration district An enumeration district whose population falls below the restriction thresholds for a particular set of statistical outputs, and for which the census counts are therefore suppressed. Data for these areas will be 'exported' to another ED

SASPAC91 Software package for the manipulation and reporting of small area statistics, local base statistics and ED/postcode directory files

Sample of anonymised records (SAR) Provided for the first time in 1991, a statistical abstract containing two samples of anonymised data, for individuals (2%) and households (1%)

Small area statistics (SAS) A set of tables comprising around 9000 separate counts which are

available in computer-readable form down to the enumeration district level.

Special enumeration district An enumeration district which is not defined by a geographical boundary, but typically contains a single communal establishment such as a prison or hall of residence.

Special migration statistics (SMS) A computer-readable statistical abstract providing detailed information about people with a different address one year prior to the census, including a national matrix of migration flows

Special workplace statistics (SWS) A computer-readable statistical abstract providing detailed information about workplaces and journeys to work, mode of transport, travel time etc. Includes a trip matrix of travel-to-work flows

Unit postcode The smallest geographical level of the postcode hierarchy, typically referring to around 15 delivery points. In England and Wales, these do not have formally defined boundaries, but merely consist of a list of addresses.

Ward The second smallest unit in the hierarchy of census areas. A statutory area, comprising a number of enumeration districts

LISTING OF CATMOGS IN PRINT

CATMOGS (Concepts and Techniques in Modern Geography) are edited by the Quantitative Methods Study Group of the Institute of British Geographers. These guides are both for the teacher, yet cheap enough for students as the basis of classwork. Each CATMOG is written by an author currently working with the technique or concept he describes.

For details of membership of the Study Group, write to the Institute of British Geographers

1:	Collins, Introduction to Markov chain analysis	3.00
2:	Taylor, Distance decay in spatial interactions	3.00
3:	Clark, Understanding canonical correlation analysis	3.00
4:	Openshaw, Some theoretical and applied aspects of spatial interaction shopping models (fiche only)	3.00
5:	Unwin, An introduction to trend surface analysis	3.00
6:	Johnston, Classification in geography	3.00
7:	Goddard & Kirby, An introduction to factor analysis	3.00
8:	Daultrey, Principal components analysis	3.50
9:	Davidson, Causal inferences from dichotomous variables	3.00
10:	Wrigley, Introduction to the use of logit models in geography	3.00
11:	Hay, Linear programming: elementary geographical applications of the transportation problem	3.00
12:	Thomas, An introduction to quadrat analysis (2nd ed.)	3.00
13:	Thrift, An introduction to time geography	3.00
14:	Tinkler, An introduction to graph theoretical methods in geography	3.50
15:	Ferguson, Linear regression in geography	3.00
16:	Wrigley, Probability surface mapping. An introduction with examples and FORTRAN programs (fiche only)	3.00
17:	Dixon & Leach, Sampling methods for geographical research	3.00
18:	Dixon & Leach, Questionnaires and interviews in geographical research	3.50
19:	Gardiner & Gardiner, Analysis of frequency distribution (fiche only)	3.00
20:	Silk, Analysis of covariance and comparison of regression lines	3.00
21:	Todd, An introduction to the use of simultaneous-equation regression analysis in geography	3.00
22:	Pong-wai Lai, Transfer function modelling: relationship between time series variables	3.00
23:	Richards, Stochastic processes in one dimensional series: an introduction	3.50
24:	Killen, Linear programming: the Simplex method with geographical applications	3.00
25:	Gaile & Burt, Directional statistics	3.00
26:	Rich, Potential models in human geography	3.00
27:	Pringle, Causal modelling: the Simon-Blalock approach	3.00
28:	Bennett, Statistical forecasting	3.00
29:	Dewdney, The British census	3.50

(continued inside back cover)