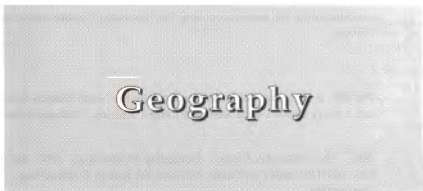


RESOURCE BOOKLET



GEOGRAPHY

The BBC Domesday Discs Resource Booklet for



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PREFACE

The BBC launched the Domesday Discs and the Advanced Interactive Video System in November 1986 to celebrate the 900th anniversary of the original Domesday Book, commissioned by William the Conqueror.

These two videodiscs, the result of a project co-ordinated by the BBC in 1985 and 1986, present a portrait of Britain in the 1980s. Well over a million people in the UK were involved in creating this massive database, an interactive resource for education, industry, government and the information services. Information suppliers have included university and government statistical data banks, photo and print agencies, and nationally recognised experts in specialist subjects. However, the largest number of contributors has been the school children of the United Kingdom who surveyed their local areas in the Summer Term of 1985, supervised and assisted by their teachers and members of the local community.

This booklet, along with the others in the series, carries the Domesday Project one step further by illustrating how the Domesday Discs provide an invaluable educational resource. The BBC once again gratefully acknowledges this project work generously supported by the listed LEAs and institutions, produced by practising teachers, and trialled by young people in schools during the Spring and Summer Terms of 1987. These first steps in exploring the Domesday Discs are offered as a source of ideas to encourage others.

Booklets in this series

Curricular area	LEA/Institution
Projects and Topics	N. Ireland Education and Library Boards, Bulmershe College, Reading, Berkshire and Hampshire LEAs
Mathematics	School of Education, University of Exeter
Social Sciences	Gwent LEA and Gwent Institute of Higher Education
Art; Craft, Design and Technology	Gateshead LEA, North Eastern ELB, N. Ireland
Environmental Education	Moray House College of Education, Edinburgh and Scottish LEAs
Geography	University of Loughborough
In-Service	Christ Church College, Canterbury
	Phyllis Gove Series Editor

INTRODUCTION

This booklet provides a basic introduction to the use of the BBC Advanced Interactive Video System and the Domesday Discs (known collectively as the Domesday AIV System) for geography teachers.

The technology of AIV allows vast amounts of information to be stored in compact form. Much of this information can be used for teaching and for project work by pupils, but teachers first need to develop a familiarity with the Domesday System by using the In-Service Resource Booklet in this series.

This Geography booklet provides a simple guide that focuses on finding information and in particular on using the mappable data software. This geographical information system can then aid learners to explore, test hypotheses and support project work.

Although you will gain a general understanding of the Domesday System by reading right through this booklet, you will only gain experience and familiarity by working through the examples on the machine.

Geography and the Domesday Discs

Geography seeks to develop a better understanding of the landscape and of the organisation of human societies within that landscape. It provides the opportunity for students to appreciate the complex inter-relationships between man and the environment, and the social and economic mechanisms which control the use and distribution of resources.

Much labour can be involved in the collection of information from field observations and archive sources, followed by the painstaking examination of associations and relationships in order to explore, develop and test new ideas that will provide

both a better insight and a means of analysing the processes by which the landscape and societies within it are changing. Most traditional geography lessons still therefore consist of teachers presenting the information that they have managed to collect from sources that are very limited and often seriously out of date.

The Domesday Discs bring together so much information that for the first time it becomes possible to investigate many topics in geography by analysis of the data available on the disc. This investigation can be used by the teacher to prepare lessons and by pupils using 'discovery learning' methods.

Geography and mapping

Geographers consider the map to be one of the major means both of studying and of representing data. As maps are expensive to buy, cumbersome to store and difficult to draw, their use in education is quite limited.

The Domesday data and mapping software allow data sets to be mapped on to different base maps, to use different colour schemes to represent the values, to alter the class boundaries and to change the resolution of the map by altering either the areal units or the raster size. Once you have decided on the change desired, the new map can be produced in seconds rather than in the hours or days that it would take using manual methods.

The limitations of traditional teaching methods have meant that most pupils think of a map simply as a means of presenting information. Now they will be able to appreciate that mapping is a tool with which to explore data, and that a single data set can be used to produce many different maps.

Each new map will give new insights into the distribution of the variable being studied, and at the same time will excite curiosity as to the reasons for the distribution.

The ability to draw maps of other data sets means that it is possible to investigate hypotheses about cause and effect by visually comparing the maps, and that your ideas can be confirmed by calculating correlations between the two sets of data.

This booklet can only attempt to get you over the initial approaches to the use of the system. As you explore its power and resources you will undoubtedly discover geographies that you had never even thought of. The combination of so much data and so many ways of mapping ensures that what you and your pupils discover is almost certainly unique.

Scope of the Domesday System

The two Domesday Discs, the Community and the National, are about Britain in the 1980s. Therefore, it is pointless to search for material on the development of industry in the 19th century or information about crops in Africa.

Remember that the Domesday Discs and the BBC Advanced Interactive Video System were developed and produced in 1985 and 1986 by a large and dedicated team of workers. The two Domesday Discs, while not being totally comprehensive, do represent the largest available single source of statistical data as well as pictures and text on Britain in the 1980s. It is estimated that it would take seven years for someone working a forty hour week to look through the entire database contained in the two Domesday Discs.

In addition, it is important not to forget the value of projects and research activities based on field work and the examination

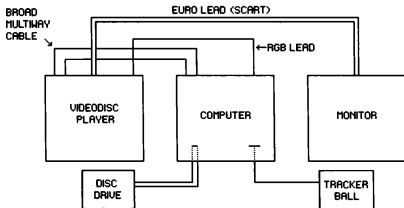
of original material. Although Domesday is a major new resource it is not totally comprehensive, and there are useful skills and a sense of real adventure to be gained from field work and direct observation. Interactive video does not seek to replace these activities, but to support and supplement them.

As a result of the Domesday System's complexity and power, some aspects of the system are not simple to use. However, experience has shown that some instruction plus a little practice and some trial and error will enable most teachers and the majority of pupils to master those parts of it that are likely to be of use for their particular purposes.

GENERAL OPERATING HINTS

Full details of how to set up the equipment is given in the User Guide supplied with it. The following is intended only as a summary to setting up the Acorn system. Refer to other computer manufacturer booklets for reference.

The various components of the system should be connected as shown below:



It is best to turn on the equipment in the following order: monitor first, then the computer, and finally the videodisc player.

To use the interactive videodisc program load the disc into the player with label upwards.

To start the program you should use the following procedure:

Side A National Disc or either side of the Community disc.

FIRST:

Press the two keys CTRL and Q together. Whilst still holding down these two keys also press the BREAK key. Then release the BREAK key and finally release the CTRL and Q keys. You will see a prompt: BASIC

> -

SECOND:

Press the SHIFT key and whilst holding it down press the BREAK key. Then release the BREAK key and finally release the SHIFT key.

The software will begin to load. It will take about 45 seconds. The title sequence will then play automatically. If you do not wish to see all the sequence you can press the ESCAPE key and the program will move on to display the first menu. If you do watch to the end of the title sequence then a menu will be displayed automatically and you can control the arrow on the screen with the trackerball.

TO EJECT THE DISC:

Repeat the first step above and press the EJECT button on the left hand front of the videodisc player.

OR:

Put the arrow onto HELP on the menu bar and press ACTION (left hand button) on the trackerball or the RETURN key on the keyboard. Select SYSTEM on the next menu bar and then type EJECT in the message area at the top of the screen. Press RETURN and the disc will eject.

TO SWITCH OFF THE SYSTEM:

Remove the disc, close the videodisc player drawer and turn off at the mains.

TURNING DISCS OVER:

Discs may need to be turned as only one side is accessed at a time. Follow the instructions which appear on the screen.

NATIONAL DISC

Introduction

The discs contain pictures and digitally encoded information in the form of text, statistics, and computer programs. Once a disc is inserted the system will give you access to the programs needed to run that disc and to all the information that is on it.

The basic decision is therefore which disc to put into the machine. The two discs are normally referred to as the Community Disc and the National Disc. The Community Disc has total map coverage of the whole country and a very large number of photographs and essays, but no statistical data. The north of the country is on one side and the south on the other. The National Disc has information about the country as a whole on one side and a series of video sequences taken from BBC news items on the other.

Since extensive coverage of the Community Disc has been included in the other booklets in this series this booklet concentrates on the National Disc.

Information on the National Disc consists of:

Side A

Photographic images, some organised as picture sets and some as linked sequences forming Surrogate Walks.

Filmed 'Help' demonstrations that explain the functions in the disc. Select HELP, then Demo.

Data sets which can be analysed in the form of a series of graphs and charts.

Data sets which can be mapped.

Text in the form of 45 specially commissioned essays and over 2,000 previously published articles from a wide variety of sources.

Side B

This whole side is reserved for moving film — 60 minutes of film clips of news and current affairs from the BBC archives, covering the years 1980 to 1986.

The Gallery

To become familiar with the Gallery, refer to the following pages in the booklets in this series listed below:

In-Service	31-35
Projects and Topics	30-33
Environmental Education	30-32
Art; Craft, Design and Technology	54-55, 60

Picture sets

In the Environment room of the Gallery, select the picture showing straw bales; this yields a list of twelve topics covering 'Country Life in the Eighties'. Selecting the picture set on 'Crops for Food and Fodder' (set 4) allows you to browse through 94 photographs. There are seven picture sets linked to the picture in the Gallery to the right of the straw bales; these sets relate to many aspects of physical geography and deal with geological structures, landforms and soil erosion.

Return to the Gallery and look for a photograph of clouds. Entering the picture set you will find a vast collection of meteorological photographs, all with captions and descriptions.

When you have finished looking at the picture sets, return to the Gallery by selecting MAIN, ACTION.

Finding the information that you want by looking through the picture sets in the Gallery is rather like leafing through books in the library: you may find some good material that you would not have found in any other way, but you may spend a long time trying to find what you want.

Quick access to pictures

If you want to gain quick access to one or more of the photographs for illustration purposes during a lesson, move the arrow to the HELP section of the menu bar while the picture is on the screen. The HELP screen provides information about the disc currently in use, including the PNR or frame number of the picture currently being shown on the screen. When you want to gain quick access to the picture, turn on just the player and the monitor and use the hand held controller to access the picture by frame number. First press PNR then type in the number and press GOTO. You will find this very quick, but of course you will not have the captions or the descriptions available. Refer to pages 56-59 in the Art; Craft, Design and Technology booklet for instructions on how to program the videodisc player hand set; pages 64-67 in the Projects and Topics booklet for programs for the micro computer for saving a sequence of pictures.

Domesday Display

'Domesday Display', a suite of two programs on floppy discs, has been developed for use with the BBC AIV system. The first program, 'Presenter', allows users to save a sequence of Bookmarks, a function of the system to be explained later in this booklet. The second program, 'Captions', enables users to superimpose one to four lines of text on pictures on either the National or the Community Disc, creating their own story or

explanation. Up to 200 pictures can be displayed and the sequence of presentation and captions for each picture stored on floppy disc. ('Domesday Display' can be obtained from BBC Enterprises or from your local dealer if it has not been purchased together with this series of resource booklets.)

Text essays

After looking at the rock and soil sets turn to the right and you will see a display board with titles for The Seas, Landscape, Pollution, and Climate. Placing the arrow in the lower left corner and pressing ACTION will show the contents list of a lengthy contemporary essay, written by a national expert, on the chosen topic.

Using WRITE with a floppy disc

Selecting WRITE, ACTION allows text to be saved to a floppy disc for printing as from a word processor. It is worth having a disc system connected to the micro and several floppy discs ready to receive information. Note that discs will have to be formatted for the Advanced Disc Filing System (ADFS). You can do this from within the Domesday System:

- insert the Welcome disc
- select HELP, ACTION
- select SYSTEM, ACTION
- type ADFS, RETURN
- type RUN AFORM, RETURN
- insert disc to be formatted
- select drive number for the disc
- choose option L to format an 80 track disc

It is advisable to format at least two discs to hold text and data files and bookmark information. When you have formatted the

discs, press Q RETURN, VFS RETURN, then press ESCAPE and choose R to go back to the beginning of the Gallery. (For more detail refer to the section in this booklet on bookmarking.) Note that material may be copied for individual research purposes only, and that permission must be secured from the copyright holders for making multiple copies. The names of copyright holders are in the Domesday Discs in the DESCRIPTION option for pictures, TEXT for data sets and the last page of a text item.

Surrogate walks

It is possible to explore the Surrogate Walks from the Gallery. Each Surrogate Walk consists of over a thousand photographs designed to give a comprehensive view of an environment which can be explored with almost the same freedom as if you were there, an experience unique to the videodisc medium. For a detailed description of the Surrogate Walks see chapter 15 of the Video Disc Users Guide. For suggestions on how to use the Surrogate Walks, refer to the following pages in the resource booklets in this series:

In-Service	31-35
Art; Craft, Design and Technology	43-55
Environmental Education	53-61
Social Sciences	21-23, 28-29

There are two surrogate walks in the Environment section of the Gallery. To the left of your position, when you have finished looking at soils and geology, you see a door showing some landscape. Turn once to the left, move forward and then turn right twice to line up the doorway in the centre of the screen. Move forward and you will go into Grange Farm, a large mixed farm in East Anglia. If you have used the In-Service or Projects and Topics Resource Booklets you will be

aware that the above can be written as:

L, F, R, R, F.

You will be able to move around two sets of farm buildings and into and around the farmhouse. From time to time you will see a representation of a magnifying glass. Putting the arrow into this and pressing ACTION will give you more detailed information on the object in view. For instance, if you go to the second set of farm buildings you will see the magnifying glass over the first large building to the left, which is the farm shop. The sequence of photographs will show you details of the interior and of the items that you might find there. Once you have started on a series of detailed photographs you can move through them in the usual way by moving the arrow to the left of the screen and pressing CHANGE. When you have come to the end of the sequence the micro will beep and you should select MAIN, ACTION to get back to the main sequence.

At any stage in the surrogate walk you will be able to see a plan of the area just as you can in the gallery.

The East Anglian farm could be used as the basis for a simulated farm study. The other random walk in this part of the gallery is across several miles of Scottish moorlands and woodlands. The computer software 'Captions', mentioned previously, contains a demonstration sequence of a walk around the farm and the Scottish wilderness walk.

It can be time consuming to retrace your steps when you are well into a random walk. Here is a useful tip:

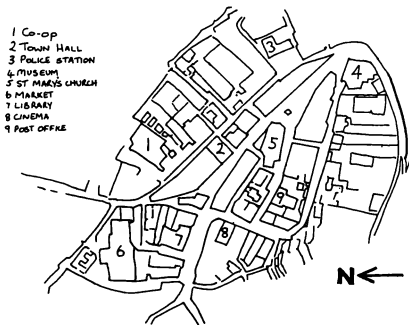
select FIND, ACTION

select GALLERY, ACTION

and you will be back at the entrance. (Or press ESCAPE and select R.) By now you should be good at moving quickly to the area that is likely to be of most interest.

In the Society section there is a Surrogate Walk around the town of Brecon and another around an inner city, multi-ethnic area in the north of England.

BRECON



There are five further Surrogate Walks that are to be found in the Daily Life section of the disc. The first of these is of a high rise council housing estate in the Islington Hackney area. It allows you to simulate what can be done in urban field work, as it is possible to go into one of the flats in the high rise block. Other walks include visits to a house in the type of 'stockbroker belt' found around most of the major conurbations, to a modern two bedroom house, to an older terraced house, and to a stone built cottage. Pages 49 -53 of the Art; Craft, Design and Technology Booklet contain plans of the houses.

CONTENTS, FIND AND BOOKMARK

When you come into the Gallery for the first time you will discover CONTENTS and FIND at the right of the menu bar. Each gives access to the same information and allows access to a wider range of text items than the Gallery, and to over 9,700 data sets that can be mapped or displayed graphically. CONTENTS uses a hierarchical tree structure and FIND allows searches on key words.

Using CONTENTS

This can be thought of as the root system of a tree. Select CONTENTS, ACTION and the four main roots of the contents structure will be displayed: Society, Economy, Culture, and Environment.

Selecting any one of these will allow access to the roots that spread out from it. Select Environment, ACTION. You will now see a list of all the main sub-divisions of Environment at level 2. Now select Urban Environments, ACTION and you will be at the third level with a list of the sub-divisions of urban environments. At this level you will find an essay on the main issues of this topic by an expert in the field, a useful source of up to date information and ideas. In this case there is an essay on 'Urban Environments in the 1980s' by Professor John Goddard. Had you chosen water resources at level two, the essay at level three would have been by Dr Judith Rees on 'Water Resources in the 1980s', including a topical section on the issue of privatisation.

Go further down the urban environments root by choosing 'Land Use Change: Urban'. You will be presented by three choices at level 4; choosing one of these will take you to level 5,

at which point you are at the end of this particular root system. If you consider how many other root endings there are you will have some idea of the amount of information available on the disc. In the case of some of the root systems you will actually have to go down to level six to cater for the number of headings and topics available.

Menu choices at levels 4, 5 or 6

When you have reached the final level of the root you will see that each of the choices is described as either Data, Maps, Text, Pictures or a Walk. At this level you may find anything from one to twenty items. Often they will be all text or all data, occasionally all maps, but usually there will be a mixture. You will not be able to go any further down the hierarchy of titles; when you select any of the items the system will respond appropriately. For instance, if you select an entry that is labelled 'map' the map drawing software will start the process of turning that data into a map.

You will also find at level five that there is a new item on the menu bar — CROSS REFERENCE. Very often an item of data is relevant to more than one part of the data structure, and cross referencing will help you to find everything that is relevant.

The CONTENTS system is a good way of exploring what is available within a structured topic area. It has the advantage that once you have found your area of interest all the relevant data items will be found grouped together. You could usefully spend some time going through each of the four main areas down to level three to get an indication of the topics that are covered in the whole disc. You may find things that are of relevance to the geography on your syllabus in the most unlikely areas!

However, in such a rich and complex hierarchical data base there is always the danger that you will fail to find the section

that is relevant to the topic you are interested in because you have gone down the wrong root or have failed to explore some potentially promising routes.

Using FIND

Another way of accessing data is to use the FIND facility. This is on the right of the menu bar unless you are actually analysing data. To use the FIND facility, select FIND, ACTION. You will see one area coloured cyan and one coloured blue. If you type a word the result will appear in the cyan coloured area.

As soon as you press RETURN, the system will start to search for your key word; finding the occurrence of the word in the titles of the individual items, and finding items that have been listed as being of relevance to your key word. The box at the bottom will report the number of exact matches, up to 100, that have been found. If you have found a very large number and especially if you have found 100 and are still only a small percentage of the way through the search you probably should acknowledge the futility of trying to find what you want in such a large list and should attempt to think of a more precise definition. Select MAIN, ACTION and FIND, ACTION to enter new key words. Using the FIND facility is more an art than a science and it is important to learn how best to use it. In general, a single key word will produce too many 'hits', many of which will be irrelevant to your enquiry. Using too many words will not only slow down the search but may produce too few 'hits'. There is no need to include verbs or prepositions in the key words. Negatives should be avoided. It is important to understand how the program links the key words when searching. A good example is to select FIND, ACTION and type Surrogate Walks. The nine walks on the disc will appear at the top of the list, but you will also be presented with items

relating to childless couples, surrogate mothers, Dame Mary Warnock and numbers of people who travel to work on foot!

To give an idea of the differences in the way that the two systems work, you may wish to try the following:

Route One: using CONTENTS

level 1 — select 'Environment'

level 2 — select 'Urban environments'

level 3 — select 'Land use: urban'

level 4 — select 'Slum clearance'

level 5 — 7 items and one item under CROSS
REFERENCE

Route Two: using FIND

Use the key words Slum Clearance. The program will find 11 items — all those uncovered at level 5 in the Contents search plus three which do not fit into the category of 'urban' change.

If you have been to a particular topic before and you know the exact name of the item that you are looking for, it is possible to enclose its precise name within quotation marks and the system will go directly to it, but the name must be exact — including all spelling and punctuation.

Route Three: using a file name in FIND

Highlight the box and type in exactly:

"1981 RESIDENTIAL POPULATION".

Using the Bookmark facility

Within such a vast data set it is often useful to be able to remember the route that you took to find a particular item. Within the menu that appears when you press HELP is an option called BOOKMARK. If you select this you will be shown the option of SET MARK. This stores all the information needed to get back to the exact place where you were when you selected HELP. It is particularly useful if you are in the process of constructing a complex map presentation and need to break off. It can also be used to keep a record of any map or data display that you wish to return to quickly. Once the message on the top line tells you that the mark has been set, it is available until you set another Bookmark or until you switch off the system. To return to this position go back to the Bookmark menu and select GOMARK, ACTION.

If you have a floppy disc system you can save the Bookmark information so that you can return to it at any time. After you have entered SET MARK select SAVE, ACTION. The top bar will ask you to insert the disc and press R. The information needed to return to the place marked is saved in a file called DOMARK. If you save a second bookmark on the same disc it will overwrite the first. Although it is possible to get into the ADFS system from within Domesday, it is much quicker to have a number of floppy discs already formatted in ADFS and to store one bookmark on each. You should label the discs for easy retrieval. The program 'Presenter' offers a facility to save a number of Bookmarks and re-display them in an order decided by the user.

DRAWING MAPS

Introduction

For geographers it is likely that mappable data sets are going to be used most often. However, it is possible to spend many hours attempting to find your way around the software that will produce a map. It is important to realise that the data for the maps can be organised at different scales and on different base areas. From time to time you will almost certainly get messages such as “not mappable at this resolution”. If this happens do not worry: you will be able to find a way to map the data with some exploration.

Choosing a topic

Consider first the mapping of census data, which poses the least problems and opens up the widest opportunities. A good example to try first would be one of the population data sets to examine the geographical concentration of the elderly. You might wish to test the assertion that there is an above average concentration of the elderly in the coastal areas of southern England.

This is how you would find a suitable data set by using CONTENTS:

- level 1 — select ‘Society’
- level 2 — select ‘Population’
- level 3 — select ‘Population Structure’
- level 4 — select ‘UK: population structure’
- level 5 — select ‘Population Age Structure’

This will give you 13 maps; items 7 and 8 are maps of the distribution of ‘Old People’, here defined as that percentage of the population of each area aged from 65-74.

Data sets available within a topic

Each topic, such as the one that we have chosen, is actually represented by a whole series of data sets on the disc. Choosing a different set will affect the sort of maps that you can draw.

One of the major distinctions is between data that relate to geographical areas, such as counties, and data that relate to grid squares. The former is called **areal mappable** and the latter **grid mappable**.

Note. At level 5 in our previous search item 8 has a full stop after it while item 7 does not. This is the only distinction between the labels, but there is a considerable difference in the nature of the data and in the way in which the data are presented. The distinguishing full stop is used whenever data are available in both areal mappable and grid mappable forms. The item with the full stop refers to data that are grid mappable.

7 Maps Old People

8 Maps Old People.

In other cases you will only be able to discover which form data are in after you have selected the item. Detailed information on numerical data on the National Disc is provided in Chapter 17 of the Domesday Video Disc User Guide. However, since the difference between the two types of mappable data is so fundamental it is worth a digression to explain it before you get into map drawing.

Areal mappable data

Areal mappable data are mappable data recorded for irregular areas of the map. There are twenty-two standard types of area used in the Domesday System. These are referred to as 'areal units'. In item 7 the data consist of one complete set for each type of areal unit for which data are available. Each of these sub-sets contains the name of each areal unit, the positions of its

boundaries and the value of the variable for that unit. The system will select the most appropriate sub-set to map onto the base map that you have selected. If you have chosen 'country' it will usually map it by county. If you have chosen 'county' it will usually map it by district.

If you are trying to map at county level and the data are only available for standard regions or for countries you will get a 'beep' and the message "no resolution available for this area". Trial and error will usually achieve success in such cases, but remember that asking for HELP at this stage will tell you one of the area types (or the only area type) available.

Changing the raster size from the DETAIL and then RESOLUTION options only affects the size of blocks from which the map is produced and hence the realism of the result. The mapped outline of Leicestershire with a 10 km raster looks very crude, while at 2 km it looks very realistic, but the amount of information shown has not changed and the higher resolution map takes longer to draw.

Writing data to disc

If you want to use the option to write information to a disc areal mappable data is the type of data to use. You can obtain a list of values for each of the named areal units, which can be very useful for project work. Select WRITE, insert a formatted floppy disc and press R. The first file that you write in each session will be labelled DOM0001, and can be retrieved and printed in text form using VIEW, the word processor available with the Acorn microcomputer. Consult the manufacturer's manual for instructions on using VIEW.

Grid mappable data

The other type of data will consist of one or more sub-sets each of which contains the values for grid squares. In some cases there are subsets with grid square data available for 2km to 10

km inclusive, but in many cases it is only available at 5 km or at 10 km. Most data will map at all scales, but you will find some limitations. For instance, data on climatic zones is only available for a 5 km block size and will not map at country level, giving the error message "no resolution available for this area".

It is more difficult to interpret data written to disc from this type of map since they are only referenced by grid numbers. Do not try to write to disc for a country map: there is so much data that it will take about 20 minutes to load, and the resultant file will probably be too large for the micro to handle.

Selecting the area for base map

Refer to the CONTENTS list on page 26 and select item 7. If this is the first time that you have asked for a map since the system was switched on, you will go straight to a display that asks you to select the area required to plot the map. Since we are interested in the distribution of 'Old People' across the whole of England, move the arrow to the shaded area underneath

Type of area (e.g. County):

and type in COUNTRY

COUNTRY

Press ACTION

Move the arrow to the shaded area below

Name of area (e.g. Kent):

and type in ENGLAND

ENGLAND

Press ACTION

First the area selected will be outlined in yellow on the map of the UK, then the underlay map of the UK will be shown and you will be asked to select MAIN to display the data map. Note that the area shown on the map is bigger than England alone. This will occur at all scales but later you will be able to reduce the map to the area that you have selected by using the WINDOW option. Select MAIN, ACTION and after a good deal of disc activity the colour shaded choropleth map will be drawn. The shading always follows the same pattern, with dark blue for the areas with the lowest values, then cyan, green, yellow and finally red for the highest values. Even a superficial examination of the map may confirm your hypothesis about the distribution of old people. However, it is possible to get much more detailed information from this data set.

Choosing the appropriate base map

Finding the appropriate base map is not always easy as there are twenty-two types of areal unit available and for some of these a very large number of actual areal units. To make the selection both the type of area and the name of the area must be typed in exactly. In our experience a quick and efficient method is to use :

- 'Country' and 'England' for the national pattern
- 'Standard Region' and 'East Midlands' to focus in closer
- 'County' and 'Leicester', to go closer still
- 'District' and 'Charnwood' for the most detailed level.

You could follow the same sequence to enable you to focus in on your area. The full list of areal types, and the names of the areas, is available by selecting AREAL from the HELP menu. To find the area names select the desired areal unit; e.g. for areal unit 'Country' the area names are Channel Islands, England,

Northern Ireland, Scotland and Wales. Care is need when using area names since they must be entered exactly as shown. For example the area name for the county of Kent is "Kent", but the area name for the county of Antrim is "Co. Antrim". A list of the areal units is given in Appendix 1.

It is also possible to select the area by the use of grid references, but if you do so the underlying map will not be shown and we found that this was a serious handicap to interpreting the map.

Sometimes the underlay map makes the pattern difficult to see. When the menu bar shows ANALYSE you can switch the underlay map on or off by pressing CHANGE while the arrow is anywhere except in the top title bar.

Finding out about the map

It is always important to find as much information as possible about the data set that is being mapped. Select HELP and you will see that:

the item is Old People

the area type is Country

the area name is England

These are all the decisions you made. You will also see that:

the area unit of the data is county

the resolution is 10 km

The fact that the area unit is 'county' is quite significant. It means that the value for the whole county has been calculated and that it is mapped by shading all the 10 km blocks in a colour that represents the average value for that county.

The other source of information about the map is obtained by selecting TEXT from the menu bar. If you do this when you are on item 7 you will find that the values shown are 'Residents Aged 65-74 Years per Hundred Residents', and you will learn

that this variable is calculated from the 100% data in the 1981 Census of Population Small Area statistics. You will also find several pages of explanation about the census (which will be the same for all the data sets of the same type) and a discussion of the variations in pattern that are produced by examining the same data set for different areal units. The text for item 8, grid square data without areal units, describes the process by which data from the census (which was not collected by grid squares in 1981) have been manipulated to give grid square data and that consequently there is an inevitable degree of inaccuracy.

Examining the map

Now that you have the map colour shaded by county you can extract a good deal of information from it. At the top of the screen there is a title, the same as you saw when you chose this data item. Convert this to a key by selecting KEY from the menu bar.

N/A	4.48	5.22	5.89	6.93	>
-----	------	------	------	------	---

The colours will always follow the same convention, with blue used for the lowest values and red for the highest, unless you change the colours by the use of the MANUAL option. For the initial map the system will find the class interval that will identify the top fifth of the areas and this will be the number to the right of the key board. All the areas with a value that is higher than this will be shaded red. It will then find the value that will separate out the next fifth of the areas and this will be the second class boundary shown in the key bar reading from the right in the menu bar. All the areas with values between these two class values will be shaded yellow. The process is repeated until all the areas have been assigned and then the

map is drawn. This is known as quantile mapping (actually the initial quantile boundaries are stored with the data for speed, and it may not always be possible to recreate them for very large data sets once they have been altered because there is a limit to the number of data items that can be ranked). In our case quantiles will shade in red the 12 out of the 64 with the highest values.

RETRIEVE

Select ANALYSE, ACTION and you will see that the menu bar changes. Select RETRIEVE, ACTION and it will change again. Select UNIT, ACTION on the menu bar. Point the arrow to an area on the screen, ACTION and the name of the county will appear in the title bar at the top of the screen. Now select VALUES, ACTION and point again; this time it will give you the actual value of the data for each county. So you will be able to discover that, for example, East Sussex has 13.99% of the population in the 65-74 age group while West Sussex has 11.69%. Searching through the areas that are shaded blue you will find that the county with the lowest value is Buckinghamshire with 7.02%. This will give you a good idea of the range of values by county.

A copy of this data can be made by selecting WRITE, ACTION. Follow the instructions on the screen. A file called DOM0001 will be created. In each session the first file you create will be called DOM0001, the second DOM0002 and so on. If you use a disc which already has a file called DOM0001, from an earlier session, the new file will overwrite the old and your earlier data will be lost. You can, however, rename any file created on the Domesday System using the RENAME facility in the ADFS filing system. Files created in this way can be accessed from the VIEW wordprocessor and printed. It is only sensible to do this when you have a relatively small number of units such as the 64

counties in the country which will be current display. Before the data are saved you will be given an indication of the amount of data to be written and the option to cancel .

HINT: how to retrieve values and units simultaneously

A useful tip while retrieving information from the map is to use the keys on the micro instead of the tracker ball and buttons. Hold down the cursor key for coarse movements and tap it gently to move from one 10 KM square to the next. Then use the function key whose position corresponds with that of the option, from the menu bar, which you wish to use. For example, function key F5 will give you the unit and F3 will produce the value. Having selected the appropriate function key press RETURN. Using the function keys in this way you will be able to switch from reading the value to reading the name of the area with that value without disturbing your position on the map.

Using CLASS intervals and the colour key

Select MAIN, ACTION to return to the previous menu then select CLASS, ACTION. This enables you to alter the class intervals that have been used for mapping the data. The menu for CLASS allows you to make manual alterations to the boundaries or to allow them to be recalculated automatically. The three types of automatic calculations, equal, nested and quantile, will produce very different maps if the data are skewed, as they so often are. Data is described as skewed when the range of values is not evenly distributed across the areas. For instance, it may be found that most of the areas have values that are very similar but that a few areas have very high values.

Using the MANUAL option

Select MANUAL, ACTION then move the arrow into any area of the key bar and use ACTION to change the values. Once you have selected this you can move into any area on the key bar and use ACTION to change the values. Type in the new value and press RETURN or ACTION. Press ACTION while the arrow is in the box with the highest value label. The value will disappear and you can type in a new value. Try entering the value 12, RETURN and REPLOT, ACTION. Only the three highest value counties are now shown. Try again, altering the value to 11.5; Somerset and Devon are added to those shown.

Incidence maps

Selecting MANUAL also allows the colours to be changed. Move the arrow into the area in the key shaded cyan and press CHANGE until the cyan changes to blue, then move to the area to the right and repeat until the whole map, except for the highest values, turns blue. This clarifies the distribution of the highest values which will still be in red. This is very useful if you want the pattern of the highest value areas to stand out clearly and do not want to be distracted by the overall pattern. Since it does not involve re-drawing the map it is also one of the fastest modifications to the map that can be made.

In effect you have now turned the map into an incidence map with the two colours now showing the presence or absence of a percentage of the elderly over the upper boundary level. It is now possible to use LINK (available from the COMPARE option on the main menu) to link this map to other maps that only have incidence data. If you link the map showing high density areas for the elderly with the map showing areas thought to be suitable for the location of nuclear power stations it is possible to produce a map of the location of areas thought

unsuitable for nuclear power stations that also contain a high proportion of the elderly. You can get the power stations' data from FIND by typing "CEGB". (You will be warned that this data is suspect!)

Window

So far we have been looking at this data set for the whole of the UK. Actually you will remember that we had asked for ENGLAND. If you do not wish to be distracted by the pattern for Scotland and Wales you can select ANALYSE, ACTION then WINDOW, ACTION to get a map showing only England.

Resolution and unit

You can now make an adjustment to the map to reveal more detail. Select MAIN, ACTION to get out of CLASS and then select DETAIL, ACTION. You will have two new options: RESOLUTION and AREAS. Resolution is not relevant when mapping at the Country level since you are already on the only one allowed, 10 km. Selecting AREAS, ACTION will first change the title bar to show counties. Point at the title bar and press CHANGE. It will now cycle through all the other areal units that are available. When it shows 'Districts' select REPLOT, ACTION. A new subset of data will be selected and mapped, in much greater detail than before. You will now see that within the counties of Devon, Cornwall, East Sussex and Kent, which have generally high values, the highest values are for those districts near the coast.

If you use the MANUAL option to set the highest boundary to 14, then select REPLOT, ACTION, only the highest value districts will stand out in red. Colwyn with 14.46%, Rother with 17.23% and Christchurch with 17.29% are the highest values.

Looking at grid mappable data

Where data are available in both grid mappable and areal mappable format it is useful to be able to compare the maps.

One way of moving to the other data set is to select MAIN, ACTION. A screen message asks, "are you sure that you wish to Exit (Y/N)?" Press Y and go back to the list of items at level 5. Now select item 8 and the map will be redrawn. You will not be asked to select the area of the map again; the system stays with the area that you have chosen unless you reselect AREA from the menu bar.

A much quicker way is to use MAIN to go back to the main menu and then to select COMPARE, ACTION, then NAME, ACTION and type OLD PEOPLE., remembering to add the full stop, since, when data are available in both forms, the grid mappable data are distinguished by the full stop.

The new map shows individual 10 km squares. The same overall pattern is there with the high values in red generally in the coastal resort areas, but it is much more detailed and there are many detailed differences. For example, while the county data set showed that the whole of Devon and Cornwall was in the highest category, it can now be seen that there are large areas in these counties that are in lower categories. The same is true for Sussex and for Norfolk. On the other hand, only the Borders Region of Scotland is in the highest category using county data, but now quite a spread of highest category 10 km squares occur in Highland, Central and Grampian Regions.

It is also worth selecting KEY, ACTION. When looking at item 8 you will notice that the key values range from 8 to 12. With item 7 the key ranges from 8.42 to 10.26 because no county will have values as high or as low as individual 10 km squares.

Changing the base map

Before examining the map in greater detail it is a good idea to change the area of study. By selecting a smaller part of the country we will be able to see the effects more clearly and we will speed up our investigations since the map will be redrawn, after each experiment, much more quickly.

However, you may wish to go back to look at the national map to see how your more detailed area fits in with the whole. To be able to do this quickly it is worth using the Bookmark facility to create a file called DOMARK on the floppy disc. Make a note that this disc is the national map showing the regional distribution of old people.

Exit from the existing map by repeatedly selecting MAIN, ACTION until it disappears from the menu bar, at which point you will be invited to type Y to exit. You will then see the list of items again above the menu bar from which you can now select AREA.

You should now select HELP, ACTION followed by AREAL, ACTION. This will give you twenty-two types of area with which you can work. See Appendix 1 for a list of areal types. For this exercise select Standard Region and you will get a list of the Standard Regions. The South East is a good area to take for more detailed study of the geographical concentration of old people. Make a note that this is what you want and select EXIT. It is important to make notes at this stage since the type of area and the name of the area must be typed in 'letter perfect', including all spaces and punctuation.

Now type Standard Region in the 'Type of area' box and South East in the 'Name of area' box. When the base map comes up you can go back to your data set by using FIND and typing "OLD PEOPLE" in quotation marks. You will now have an enlarged segment of the map showing the distribution of old people by county.

Selecting HELP, ACTION will tell you that the data are still mapped at 10 km resolution by county units. You can now use HELP, BOOKMARK and SET MARK, then save the data to disc. Now swap discs and use LOAD and GOMARK, to look at the national pattern. You will see that you have effectively captured and enlarged a small part of it. It is now possible to produce a much more realistic looking map, at the cost of some time in plotting, by selecting ANALYSE, DETAIL and RESOLUTION and then selecting the smallest raster available. Using WINDOW to get the south east region precisely will produce a very accurate looking map. However, although it looks better, you have not changed the amount of information that is displayed. For this reason, when investigating the different displays, it is often worth working with the largest raster available to obtain the advantage of speed of map

Local and national data

Selecting ANALYSE, ACTION and then CLASS, ACTION allows the use of the LOCAL option. Using LOCAL means that any automatic recalculations of the class boundaries will now be based on the range of values for the areas that lie within the base map area. At any time you can change it back to NATIONAL, choose one of the automatic class interval calculations and see the extent of the change. This will give a good indication if the area that you are looking at has a different range of data values from those for the country as a whole. If the difference is extreme you may find that your initial map has very little detail, with much of it falling within only one of the class boundaries that have been calculated for the country as a whole, and you may need to select LOCAL, ACTION before you can see the range of values within the region that you are examining. If you do have to do this you will have found out something interesting about the area that you have selected.

AUTOMATIC: manipulating class intervals

Now examine the map in more detail by modifying the class boundaries, but first set the RESOLUTION to 10 km and the UNIT to county so that the map draws quickly. The operation of the Domesday System can be speeded up if you are careful to avoid asking it to carry out unnecessary calculations and re-drawing of maps.

It is now possible to modify the map of old people by county to show the information in different ways. Select ANALYSE, CLASS and AUTOMATIC in sequence pressing ACTION after each option. You now have three options.

QUANTILES is the form in which the data are now plotted to make most use of the available colours thus providing maximum differentiation on the map.

NESTED is based on the mean of all the data. In this case it is 9.43. The other boundaries are the mean of all those points below the mean and the mean of all those points above the mean. This is a quick way of allowing for the effect of skewness in the data.

EQUAL takes the range of data values and divides it into five equal groups. When the data are skewed, the effect of selecting EQUAL, ACTION and REPLOT, ACTION will often be to reduce the number of areas with one colour and increase the number of areas of other colours. To give an extreme hypothetical example, imagine a data set where one area had a value of 10 and all the other areas had values ranging from 0 to 3. EQUAL would set the class boundaries to five equal divisions starting with 0-2. The result would be a map where one area was shaded red and the rest were assigned to blue and cyan.

In our case QUANTILES will give the highest value of shading to the top fifth of the total number of counties. (You can use RETRIEVE to find out which they are.) The key will show that the boundary value at the bottom of the top group has to be set

to 10.26 to include the top fifth of the total number of counties shown. Changing to EQUAL will only include East Sussex, Isle of Wight and Dorset, which are in the top fifth of the range of data, i.e. between 12.61 and the 13.99 for East Sussex. This difference in distribution is caused by the skewness of the data and the different methods of plotting show it up well. There is a full discussion of skewness on page 198 of the Domesday Video Disc User Guide. Also refer to pages 71-74 of the Mathematics Resource Booklet in this series for a discussion of skewness of data and exercises.

There are clearly a vast series of maps which could be produced. With a little practice you will be able to demonstrate the data that you wish to show in the most effective manner.

Grid mappable v areal mappable data

Although we have seen evidence to support the hypothesis that there is a concentration of old people in the counties near the coast it is possible to get more precise detail by looking at the digital area data. Select COMPARE, ACTION then NAME, ACTION and type in OLD PEOPLE. (note the full stop). The thin red line along the coast indicates that our hypothesis is clearly demonstrated. This image can be made even clearer by changing to a 6 KM grid by selecting ANALYSE, DETAIL and then, RESOLUTION. Selecting EQUAL will produce a clearer pattern, though it is influenced by the very high value of 33 at one point on the Essex coast. Selecting other raster scales will call up the relevant data set for that scale and produce a new map. Experiment to discover the scale that is most appropriate.

Changing areal units

Another way of investigating our map of the distribution of old people by county is by changing the AREAL units. Go back to the areal based map by selecting COMPARE, ACTION then NAME, ACTION. Type in OLD PEOPLE (without the full stop) and press RETURN. Now use ANALYSE, DETAIL and AREAS. Move the arrow into the title bar and press CHANGE to see the range of areal units available.

GPO Postcode Areas are smaller than counties and will give a much more detailed pattern than counties. The concentration along the south coast with a significant area to the north of the Thames close to the coast will be clearly seen. Parliamentary Constituencies and CURDS Functional City regions are equally good for this exercise. This is another good demonstration of the fact that there is usually more than one type of map that can be used when representing and attempting to analyse the distribution of a variable.

You can also use this map to investigate the effect of changing from a national to a local set of data. When it is first plotted the class boundaries will be those which would give an equal number of postcode areas in each class for the country as a whole. In the South-East there is a great concentration of postcode areas in and around London with below average numbers of old people. Make a note of the class boundary figures shown in the key bar and then use ANALYSE, CLASS, LOCAL, AUTOMATIC, QUANTILES and REPLOT. The class boundaries will have changed to ensure that there are the same number of postcode areas in each of the categories and the resultant map will reflect this. There will now be a smaller number of postcode areas in the lower categories and, to compensate, a greater number of areas in the higher categories.

Correlation

One of the most powerful features of the Domesday System is that it is possible to compare and to correlate two different data sets. In this way you can begin to develop one of the most important skills of geographical enquiry.

Use ANALYSE, COMPARE, and CORRELATE. The key bar will now ask you for the name of the data set with which you want to correlate the data that is on the screen. In this case you may remember that there are youths and children on the list of items in the age structure list. Type in CHILDREN and press RETURN. Children correlates -0.701 with old people. This suggests that where there is a high proportion of old people there will be a smaller proportion of children. If you try with youths you will get a correlation of -0.572.

It is not very sensible to examine correlations within an overall data set such as age distribution by percentages since a high percentage of one age group will necessarily mean that there is a lower value for the percentage of another group.

Instead investigate another data set which you consider would correlate sensibly with the distribution of old people. When you are asked to type in NAME you will have to do so 'letter perfect'. To find a second data set you will have to go back to FIND or to CONTENTS. It is advisable to set Bookmark first.

Exit from the current map by selecting MAIN repeatedly until it disappears from the menu bar and answer 'Y' to the question in the title bar.

Select CONTENTS, ACTION then follow this route:

- level 1 — select 'Society'
- level 2 — select 'Transport and communications'
- level 3 — select 'Vehicles and transport'
- level 4 — select 'Car ownership'
- level 5 — select 'People with cars'

This will allow us to look at the relationship between car ownership and old people. We would suspect that old people are less likely to have cars, although we would not expect the relationship to be strong since many old people do have cars, and in the South East the concentrations of old people are generally in areas of high income groups.

When we select people with cars the system will retain the map of the South East mapped by postcode areas, and will draw a map of the percentage of persons having cars for that region and by those areal units. Within the data that are derived from the census this will usually work. But many of the data sets are not available for all regions and for all area types. You may well have to undertake some experiments to find two compatible data sets within the variables that you are attempting to compare.

The system will calculate the rank correlation coefficient, which is likely to give a truer representation of the association between the two variables if one of them is highly skewed than would be the case with the product-moment correlation coefficient. There is a limit to the number of areas that the system can rank (which also prevents you going back to quantile mapping of some variables, which also involves ranking). Do not attempt to undertake correlations if there are a large number of individual areas or grid squares on the screen. At the other extreme, the results that you might get from a very small number of points would be a very unreliable indication of the general relationship and the system will tell you if the number of data points is too small for correlation analysis.

We should also be careful of the ecological fallacy in drawing any conclusions about the results. If we do find a correlation coefficient which looks strong it does not mean that one variable causes the other. It may merely mean that high values on both coincide. You may get an association of high car ownership and old people because both are found in areas of above average income!

Here we find our initial map on a national scale has a very large area in the highest category, reflecting wealth of the south east. Converting to local raises the highest boundary from 78 to 80.43% and on replotting you will see a more even distribution of colour. (Since the ranking is done on the underlying data this change will not affect the correlation.)

Immediately you will notice that the pattern is very different from that of old people. (Notice how clearly London stands out as an area with very few cars per household as does most of the south coast.) However, the correlation is reported as being not significant. This is caused by a combination of a weak relationship and relatively few data points, so that it could have occurred by chance through the sampling of a relatively small set of data.

Changing the areal units to Parliamentary Constituencies gives twice as many items of data (147 instead of 72) and the correlation of -0.202 is now reported as being significant.

How you interpret this result will be based on your judgement. The Domesday System will give you the facts and do all the hard work of data processing, but it will not do the thinking for you. You have to have the ideas about data sets that are worth exploring, about relationships that might provide an understanding of the processes and patterns, and you will have to interpret the results.

This example has been but one chosen to enable you to understand the mechanism of one of the most powerful aspects of the system. Now it is up to you to use it to do some real geography!

For further information and exercises on correlation refer to page 208 in the Domesday Video Disc User Guide and to pages 68-70 in the Mathematics Resource Booklet.

RANGE OF MAPS AVAILABLE

Mapping variables from The Economy

It is of course now possible to explore other ideas that are to be found within the vast database, many of them of relevance to contemporary geography teaching. Let us first take some examples from 'The Economy'.

Select CONTENTS, ACTION and select choices at each level:

level 1 — 'The Economy'

level 2 — 'Industry'

level 3 — 'Manpower'

level 4 — 'Employees by Industry'

There are no maps at the end of this root, so go back

level 4 — 'Male and Female Employment'

level 5 — 'Females: change in employment' and
'Males: change in employment'

These map at a national scale and can provide a good picture of the changing fortunes of the differing regions of Britain, showing the big conurbations losing employment with areas in Scotland, East Anglia, Outer London and the South West gaining strongly. Consett, Corby, Manchester, Liverpool, Ebbw Vale, Bridgend and Llanelli stand out as the main losers of employment with Milton Keynes and Redditch as the major gainers. More detailed information on this can be gleaned from the figures for changes in employment which show areas where unemployment has been rising and areas where it has been falling. As with all data of this sort it is important to think very carefully about the nature of the data. Any raw number data set will be influenced by the size of the underlying population.

The map for the 'average no. males unemp. 1984' mapped by Standard Regions shows the South East to have the highest figures, but that is because it is a heavily populated area. Demonstrate this by comparing it with the 'average male unemp. rate 1984' which shows a very different picture.

Mapping variables from Environment

This part of the Contents root system contains much of interest to geographers. As you look down the list you will find topics that are relevant to many parts of the syllabus. Map data forms only a small part of the total, and you will want to look at the essays, the picture sets and the data sets. A worked example of the use of one of the data sets is described below. As you explore this data set from CONTENTS you will find it useful to have a paper and pencil to note interesting areas that you will want to return to. When you find a particularly interesting data item note its name with exact spelling so that you can go back to it by using FIND with quotation marks.

Follow the main root from Environment to 'conservation', 'landscape areas', 'landscape conservation' and there are maps of areas of outstanding beauty on the national scale.

Contrast this with the patterns of environmental pollution that are to be found in the next sub-heading after conservation in the environment section. Select 'environmental pollution', 'air pollution', 'sulphate concentration:gb'. Then examine the picture in relation to the maps of employment of heavy industry and of wind speed. Notice the effect of the heavy plumes of sulphur dioxide to the lee of the large power stations of the Trent valley.

This is a good point at which to look at an associated data set. Select 'smoke and SO₂:urban concentrations.' The first bar chart that is drawn shows the steady decline from 1972 to 1983.

Agriculture

Follow the root system from Environment through 'agriculture', 'crops', 'crop totals', 'agricultural land 1972:gb' and an excellent map showing the main agricultural land of the UK will be drawn. It shows the totals of the returns of agricultural land, other than improved grass and rough grazing, as a percentage. It is also possible in this area of CONTENTS to find maps of farm types which will, for instance, show the concentration of cereal farms very clearly.

'Land use and change: agriculture', is one of the more useful maps. It provides an example of a category map where the numbers that are mapped represent categories rather than values. For this sort of map it is essential to know the key which is on the text pages; otherwise the map will not be interpretable. Since the key is extensive you will need to have a paper record of it. When you are in text you will be able to WRITE to disc (one page at a time) and later you can load the files into VIEW, or you could attach a printer and PRINT each page. Detailed examination of this type of map is discussed in the geology section which follows.

Climate

Now see if you can find your way through the Environment root to Climate and explore what you can find there.

The first set of items, climatic zones, includes a series of photographed maps to show January and July temperatures for south west England, though not labelled as such. With photographed maps no analysis or manipulation is possible. It also includes a photographed map of chalk and limestone outcrops.

There is a fascinating map of climatic zones for Scotland that is

based on calculations derived from temperature and rainfall throughout the year. This map set is only available at 5 km resolution so it will not map at country level. You will have to select a county level map first. Unfortunately there is no equivalent for England and Wales as the Scottish data collection system is unique in this instance.

Under rainfall there are data sets at 10 km resolution to show rainfall by season which will map at country level. There are also a series of maps for rainfall bands, which give the percentage of each square with that band. The map of rainfall below 600 mm shows up the dry areas to the east very clearly, while that for 2200 to 3199 mm shows the incidence of this high level of rainfall in the west of Scotland and a few areas in Wales. For an overall rainfall map the "annual rainfall 1940-71: gb" provides a good overall map, although the data in this case is so skewed that manual adjustment of the boundaries is necessary.

Similarly the maps of mean annual temperature and of sunshine show clearly the higher temperatures in the south and the lowest temperatures on the high ground in Scotland. It is not so easy to use RETRIEVE to identify the precise areas of interest since all the climatic data are grid-mappable and UNIT will only give you the grid reference. You will then have to go to another map, on the Community Disc, to locate the position. Use the 'FIND by grid reference' facility on the Community Disc.

Relief maps

Following the Contents roots through Environment, landscape, land altitude and relief will lead to a series of maps showing slope classes. Maps of steep slopes will pick out the major rugged mountains but not the gently sloping ones and they therefore look quite different from the maps of gentle slopes.

Geology maps

Environment has a sub-heading called geology at level 2 which is also worth exploring. Within this you will find lists of the major rock types which are shown as the percentage of each 10 km square that contains rocks of each broad geological age.

Other geological maps show the presence or absence of particular deposits or minerals. They are typical of a class of incidence maps of which there are a considerable number in the Domesday set. When they map they show red for presence of the deposit and blue for absence which means it is not possible to modify the class boundaries. However, from COMPARE you can select LINK and then NAME. If you now give the name of another category map you will see the display being modified to show only those areas where both variables are present.

LINK can also be used if you start with a numerical data map (percentages, index numbers or raw numbers), and modify the colours in the key bar until the map is blue with the class you are interested in picked out in red. Then LINK to an incidence map and you will be able to see how much of the incidence of the class that you have identified is covered by the presence of the variable on the incidence map.

You can find a very large and useful mappable data set which will generate geological maps by following Contents through environment, geology, rocks, rock types to 'Geology of Great Britain'. These data are of the category type and it is necessary to print or copy the text pages that contain the key. The key indicates the range of numbers that relate to the rock types through the geological time scale.

Try mapping this variable using 'County' and 'Kent' as Type and Name of your area. When it first plots it appears virtually all red because south-east England is composed of rocks that are well up the geological time scale. Using RETRIEVE it is

possible to discover that most of the values lie between 40 and 50 (the Cretaceous). Using MANUAL it is possible to adjust the scale bar to values within this range so that most of the different outcrops can be distinguished. You will find it well worth doing this for the areas around your school or the areas where you regularly undertake field work.

When you have spent considerable time on the creation of such a detailed map you will find that being able to save a Bookmark to disc is a great asset. The following section details how to use the geological maps to great benefit, using areal types for Northern Ireland as an example.

* Examples of some of the maps produced by pupils using the procedures outlined in this chapter are shown in Appendices 2 and 3.

WORKSHEET 1: Geology maps for Northern Ireland

INSERT NATIONAL DISC — side A

Follow this route to access the maps you will study:

Select AREA, ACTION

Enter COUNTRY in the 'Type of area' box

Enter Northern Ireland in the 'Name of area' box

Select CONTENTS, ACTION

level 1 — select item 4

level 2 — select item 6

level 3 — select item 4

level 4 — select item 1

level 5 — select item 11

If you have followed all the steps correctly a map showing the percentage of all igneous and metamorphic rock types in Great Britain and Northern Ireland will be displayed. If not repeat the process.

When the map is displayed make a note of the title.

Select TEXT, ACTION.

Study the information given about the map.

Return to the map by selecting MAIN, ACTION.

Select KEY, ACTION and make your own record of the percentage range of each colour used on the map.

WORKSHEET 2: Rock type percentages

The precise percentage of the rock type in question for a particular 10km x 10km Ordnance Survey grid square may be obtained as follows:

Select ANALYSE, ACTION.

Select RETRIEVE, ACTION.

Select VALUES, ACTION.

Move the arrow to any 10 KM x 10 KM grid square, ACTION.

Displayed at the top of the screen is the precise percentage for the Ordnance Survey grid square chosen.

Record the precise percentages of igneous and metamorphic rock types for the Ordnance Survey grid squares containing:

- 1 Newry
- 2 Dungannon
- 3 Enniskillen
- 4 Londonderry
- 5 Your own local area

A copy of the map displayed may be traced from the screen using the appropriate transparency and then transferred to the corresponding map on paper.

Several maps will be copied in this manner but it may first be necessary to alter their keys and then to replot them so that direct comparisons may be made between maps. The standard key to be used for all maps is:

Dark Blue	Cyan	Green	Yellow	Red
< 5%	5% - 20%	20% - 35%	35% - 50%	>50%

WORKSHEET 3: Geology map key changes

Change the key of the map displayed to the standard key by the following procedure:

Select MAIN, ACTION.

Select CLASS , ACTION.

Select MANUAL, ACTION.

Move arrow into dark blue box in the key at the top of the screen, ACTION.

Enter the figure 5, RETURN.

Move arrow into light blue box, ACTION.

Enter the figure 20, RETURN.

Move arrow into green box, ACTION.

Enter the figure 35, RETURN.

Move arrow into yellow box, ACTION.

Enter the figure 50, RETURN.

Select REPLOT, ACTION.

Make a copy of the replotted map on the appropriate transparency.

CAUTION: Use water soluble markers.

Exit from the map and return to the level 5 index using MAIN and ACTION. Note that this index also displays particular types of igneous and metamorphic rocks; maps for each of these rock types may also be made using the same methods as described above.

WORKSHEET 4: Rock types

Make maps of the following rock types:

REMEMBER: change the key for each new map to the agreed standard.

INDEX	ROCK TYPE
No.	
2	Basalts and Basic Schists: NI
4	Dolerites and Basic Gneisses: NI
8	Granites and Acid Gneisses: NI
13	Metamorphosed Limestone: NI
15	Quartzites: NI
17	Rhyolites and Acid Schists: NI

Sedimentary rock types in Northern Ireland will now be studied.

An overall picture of these rock types may be obtained by dividing this group into 2 major sub-divisions — calcereous sedimentary rocks and non-calcereous sedimentary rocks.

Each sub-division represents many different rock types.

Select item 2 in the index, ACTION.

Complete the blank maps provided, as outlined previously, for each sedimentary rock type listed below.

INDEX	ROCK TYPE
No.	
2	Calc. Sedimentary Rocks: NI
4	Clays: NI
6	Hard Limestones: NI
8	Hard Sandstones: NI
10	Non-Calc. Sedimentary Rocks: NI
12	Slates and Shales: NI
14	Soft Limestones: NI

WORKSHEET 5: The geology of Northern Ireland

INSERT COMMUNITY DISC — northern side

Move arrow on to the map of Northern Ireland until it changes from green to white, ACTION.

Select TEXT, ACTION.

Select item 2 in the index, ACTION.

Study carefully the text entitled 'GEOLOGY and LAND DIVERSITY'. Compare the facts listed in the text with those recorded on the maps.

To page through the text, move the arrow to the right of the screen, CHANGE.

To go back through the text move the arrow to the left of the screen, CHANGE.

Answer the questions below using information obtained both from the maps drawn and the text studied.

1 Rock types are classified according to their age. Geologists refer to four periods:

- (a) Primary (earliest)
 - (b) Secondary
 - (c) Tertiary
 - (d) Quaternary (most recent)
- (a) The basement rocks referred to in the text belong to the pre-tertiary period. Erosion has resulted in some of these rock types being exposed.
- (i) List the basement rock types and their locations in the northern part of the Province.
 - (ii) Repeat part (i) for the southern part of the Province
 - (iii) By selecting the appropriate maps check your answers to parts (i) and (ii).

2 Basalt is associated with 'Extrusive Vulcanicity'. It is formed as a result of hot molten magma cooling quickly at the earth's surface.

- (a) According to the map 'BASALTS + BASIC SCHISTS: NI', where are the greatest deposits of basalt to be found in the Province?
- (b) Is your answer to part (a) in agreement with the relevant facts in the text?

3 Granite is associated with 'INTRUSIVE VULCANICITY'. It is formed as a result of hot molten magma cooling slowly beneath the earth's surface. The slow cooling of the magma to produce granite means that it is a crystalline rock. Erosion of the surface rocks in many areas results in the granite being exposed.

- (a) According to the map 'GRANITES + ACID GNEISSES: NI', where are the greatest deposits of basalt to be found in the Province?
- (b) Which mountains were therefore formed as a result of intrusive vulcanicity ?

4 How was the Giant's Causeway formed?

5 According to the map 'CLAYS: NI', where in the Province are the greatest deposits of clays to be found?

6 Explain the origin of the clay deposits referred to in question 5.

7 During which of the four periods were the drumlins in the southern part of the Province formed?

8 How were the drumlins referred to in question 7 formed?

9 Why are the coastal areas of the Province so diverse?

WORKSHEET 6: Rock erosion

INSERT NATIONAL DISC — side A

Select FIND, ACTION.

Move arrow into top box and type, 'ROCK EROSION', RETURN.

When the 'hit' list appears select item1, ACTION.

To page through the photographs move the arrow to the right of the screen, CHANGE.

To page backwards move the arrow to the left of the screen, CHANGE.

After viewing photographs select MAIN, ACTION to return to the 'hit' list.

Page through the items until you can select item 94.

Page through these photographs as before.

ORDER OF MAPS

- A) Igneous and Metamorphic Rocks
 - 1 Basalts + Basic Schists
 - 2 Rhyolites + Acid Schists
 - 3 Dolerites + Basic Gneisses
 - 4 Granites + Acid Gneisses
 - 5 Metamorphosed Limestone
 - 6 Quartzites
- B) Calcerous Sedimentary Rocks
- C) Non-Calcerous Sedimentary Rocks
 - 7 Hard Limestones
 - 8 Hard Limestones
 - 9 Slates + Shales
 - 10 Soft Limestone
 - 11 Clays

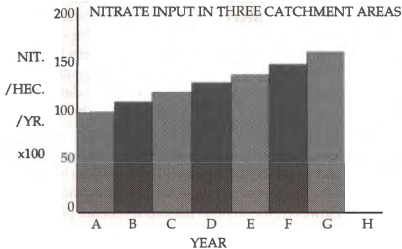
USING DATA

Any item that is labelled data will draw a graph or chart. Approximately one third of the statistical data on the National Disc is represented as chart data and the remaining two-thirds as map data. Many of the data items are in effect multiple cross tables and the graphs can be redrawn to show the data by each of these secondary variables in turn.

In teaching about pollution it is encouraging to be able to show that air pollution has been decreasing, but you can find evidence from Domesday to show that some types of water pollution are increasing rapidly.

Select environmental pollution, water pollution, pollution of water, nitrates in the water supply, and a bar chart will be drawn.

The first chart that appears will be a bar chart and will show the concentration of nitrates caused by sewage on the vertical axis and the year on the horizontal axis for the Thames at Walton-on-Thames.



You will be able to see the upward trend very clearly. If you want to know the years point to the label telling you the value of the first bar (a=1940-44) and press CHANGE to determine what the other labels stand for. In the box at the right you will see under RIVER that the words 'Thames at' appears. To find out where exactly this is point to it and press ACTION. The full title will appear in the title bar.

To find out about the other rivers point to the name of the river and press CHANGE, then select REPLOT. Similarly you can find out about the other sources of nitrate by pointing at the word Sewage and pressing CHANGE and again selecting REPLOT. This time all the bars will go off the top of the scale. To restore the graph move the arrow to the vertical scale bar and press CHANGE.

If you point to the word Nitrate and press CHANGE you will see that year is now set at 1940-44 and on selecting REPLOT you will see that the bars now represent the different sources of nitrate for one river for one year.

There are easier ways to make comparisons.

Point to Bar chart and press CHANGE to find back-back, which will show the inter-relationships of the data more effectively. You will have to select two variables to be plotted. In this case point and press CHANGE on River and on Nitrate so that they both show pink, with Year in green. Now press REPLOT and you will see the three bars for the three rivers showing the amount of nitrates from different sources. Underneath Year you will see one set of dates. If you point at this and press CHANGE the graph will be redrawn for another time period.

If you now point at year and press change until nitrate shows green and select REPLOT you will see a back to back chart for each of the sources of nitrate in turn showing the change with time. However, for obvious reasons it will not plot if all the

variables shown in pink have more than three possible values since it will not be possible to show all the bars. Check the Domesday Disc User Guide section in REGROUP, pages 225-228, to reduce the number of values to three.

Point and CHANGE at year and then at river until only nitrate is in green (under it you will see one of the sources of nitrate; you can point and CHANGE this). Then select REPLOT, and you will see that for fertiliser the rise has been very steep and the figures are high, for sewage it is increasing for the Stour and slowly for the Thames, but is less than the rainfall figures (which are relatively high for the Frome). To go from one source of nitrate to the next, point and CHANGE at the source of nitrate and then point and ACTION on REPLOT.

If you go from rainfall to fertiliser all the bars will try to reach off the top of the scale. Point and CHANGE in the vertical scale area and the map chart will redraw.

The loop bar option allows you to see the data in a different way. Point and choose the chart type until it shows loop bar. Then select the variable, which will be represented along the bottom of the graph, by pointing and changing until only it is in pink and the other two will then change every few seconds. Each of the variables can be pointed at and changed in turn.

The final type of chart is the pie chart. But this is generally considered much harder to interpret than the Bar chart, loop chart or back-back.

COMMUNITY DISC

This booklet will give little attention to the Community Disc, not because it is of little value, but because it is relatively easy to use, and the purpose of this book is to help teachers to handle the more complex National Disc software.

On inserting the Community Disc you will be presented with a map of the whole of the UK. Pointing and pressing ACTION on the half of the disc corresponding to the side that you put in uppermost will give you a more detailed map of half of the UK. You can move the arrow to select any part of the map, and it will zoom in to a 30 x 40 km extract from the Ordnance Survey map. At this stage you can again zoom in to a 3 x 4 km extract. If you see yellow squares marked on this map you will be able to zoom in even further. You can go back up the sequence by selecting UP. At any of the lower levels you can move the arrow to the edge of the map and press CHANGE to move to an adjacent map at the same scale (if it exists).

At each level you will find text and photographs appropriate to the scale of the map. You can explore them to discover the type of information that is covered.

Refer to the other booklets in this series for exercises relating to the Community Disc.

Distances and Areas

Select **OPTION** and choose the units (metric or imperial). Then point to the beginning of a route and press **ACTION**. Continue to move and to press **ACTION** and you will see the cumulative total distance in the title bar. You can either measure straight lines or follow along a road. If you complete a circuit you can then choose area and the computed area will be shown in the title bar.

Find

Using **FIND** is dependent on the map that is showing at the time that you select it. If you choose to type in the **MAP BY PLACE NAME** area it will look for all the place names that match or approximate to the word that you have typed in. If you select one of them the map of that area will be shown and will be the base map for further exploration.

If, on the other hand, you type a word into the **TEXT AND PHOTOS BY TOPIC** section it will search for any key word in the text pages or photographs at the level of the map and at the level of any maps which may be contained within that map area.

PROJECTS

The booklet has been concerned with the mechanics of using the system, to help you to overcome the frustration that most of the early users felt as they attempted to get to grips with it.

Your biggest challenge now is to move beyond exploration of the system and how it works and to identify projects that can be undertaken.

From the Community Disc you will be able to identify a mass of information on any topic. It is best to move to the 30 x 40 km square close to your school and then to type in a text and photo request. A topic could be an aspect of local industry or agriculture, such as dairying. You will be able to discover many references which can be followed up. From any text reference you can locate the actual sub-area by selecting map and then OUT.

Typing the same word in FIND on the National Disc will give you 43 references to text, photographs, data and maps.

With a little time exploring you will find that the Domesday system will provide information much more quickly and much more thoroughly than any existing resource in school and can be most effectively used in project work.

The text available at the 40 x 30 km block has been written by a member of the Geographical Association or provided by the Automobile Association and allows an excellent overview of the area in geographical terms.

Conclusion

Those of us at Loughborough and in Northern Ireland who have been using the Domesday System have found it exciting and stimulating. It has encouraged both staff and students to investigate ideas in geography that are quite new.

In school, teachers and students from many curricular areas will be using the system. You will find that geographers may tend to become expert on the mappable data sets. So do share your skills, and at the same time explore what the mathematicians have discovered about the graphs, charts and mappable data. By sharing expertise and findings, teachers and students alike will gain.

Appendix 1

List of areal units: areal unit types

- 1 National Aggregate
- 2 Country
- 3 Standard Region
- 4 ITV Region best fit
- 5 ITV Region n/o 1
- 6 ITV Region n/o 2
- 7 ITV Region n/o 3
- 8 EEC Level 2 Region
- 9 Regional Health Authority
- 10 Police Authority Area
- 11 County
- 12 European Assembly Area
- 13 GPO Postcode Area
- 14 Local Education Authority
- 15 CURDS Functional City
- 16 CIPFA Library Area
- 17 District Health Authority Area
- 18 CURDS Local Labour Market Area
- 19 Travel-to-work Area
- 20 District
- 21 Parliamentary Constituency
- 22 Amalg. Employment Office Areas

Appendix 2

**Old People
England**



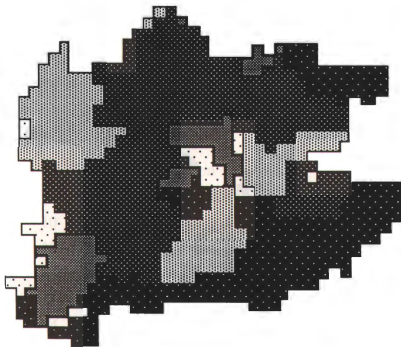
**Old People
by District**



lowest values

highest values

Appendix 3



**South East Map
by Postcodes
for Old People**



lowest values

highest values



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