Introduction

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People and places 2011 is an atlas designed to show how the social geography of the UK is changing as revealed by the UK 2011 Census of Population and Housing. By comparing the latest Census to the previous Census in 2001, and combining that information with more recent data on trends revealed since 2011, up to and including 2015, it is possible to gain a sense of how the UK is slowly transforming in terms of the people who live in each place as well as the places themselves, the families, households, flats and houses they live in, the cars they drive or buses, cycles and trains they use to get to work (or to study), whether they work or study (or both, or neither), for whom they work, who they care for, if they are ill, and so on (and on in bewildering detail), to build up a picture of how millions of people in thousands of neighbourhoods in hundreds of towns and cities interact, survive, prosper, suffer, and – above all else – are changing.

Ever since the *second* UK Census was taken, just over two centuries ago in 1811, this 10-yearly survey of the entire population became interesting because one Census could be compared to the previous Census to see how the population had altered in number, and later, as Censuses became more sophisticated, in its characteristics. Without the ability to compare and contrast, very big or very small numbers have limited significance. And to see any significance of a large volume of numbers relating to many areas it helps to map them. Very little mapping of Census data was done, however, until it became possible to use computers to both tabulate and aggregate Census data, and also to draw the numerous possible maps that could be produced. Automation also turned out to be vital, along with the development of new computer algorithms. These were needed to reorder space itself, creating new map projections that are required if most Census data is to be seen at all clearly and if the rest is to be seen undistorted. Until the 1960s almost all mapping of Census data that was conducted was undertaken by hand, and Census maps were drawn using map projections in which the information about most of the population was hidden in just a few small densely populated places on the map. This was true of all such mapping worldwide.

In 1959 Waldo Tobler, a geography PhD student at the University of Washington, US, published a paper in Volume 49 of the *Geographical Review* titled 'Automation and cartography'. Tobler would go on to pioneer new map projections for showing Census populations and electoral mapping in the US that were later copied across the world and which came to include revelatory new projections of the world and all of humankind. Census mapping spans the

whole gamut, from revelation as to our common humanity and distribution, through to who has a kitchen sink that drains, and who goes cold in their home or not.

In the 1960s computing had advanced sufficiently, along with human imagination, so that the UK 1971 Census came to be organised by being punched into a computer, tabulated by another computer, and the results plotted by yet another computer. At the same time, social advancements in the 1960s meant that many more interesting questions were asked in the UK's 1971 Census, including whether people had a sink that drained in their kitchen, and any hot running water anywhere in their home. This was the first Census to be mapped by computer in the UK. Back then we could put people on the moon and map a Census by passing electricity through computer chips, but we were still struggling to ensure adequate plumbing in many homes, and to keep many people warm, well and securely sheltered, living without fear of homelessness. On 16 November 1966 the BBC play *Cathy Come Home* was broadcast concerning homelessness. Its impact was wide enough to alter what questions were asked in a Census. The 50th anniversary of *Cathy Come Home* is later this year, and homelessness is again an acute issue in the UK.

Census mapping of the UK by computer has a history that now spans more than 50 years, with the UK experiments beginning in the 1960s. The first national digitally produced atlas of the 1971 Census was published as *People in Britain: A Census atlas*, with the authorship jointly credited to the Census Research Unit of Durham University (UK) and the Office for Population Censuses and Surveys (OPCS), the predecessor of the Office for National Statistics (ONS). Published by the government, through Her Majesty's Stationery Office (HMSO), it appeared in print just before the 1981 Census was being collected. A copy was purchased by the city of Oxford's public library. That copy sat on a shelf and was untouched for several years, sealed in its brown cardboard packaging. Then, on a rainy Saturday afternoon, a bored schoolboy opened it up, saw what it was possible to map, and applied to Newcastle University to study Geography, Maths and Statistics. That boy is one of the two authors of this atlas.

Progress in Census mapping was rapid in the 1970s. By the end of that decade printing maps on hard-copy paper was considered old fashioned by some. The 1981 Census was made available to schoolchildren as part of the 1986 BBC Domesday project. This was an attempt to replicate the first Domesday Book that was published 900 years earlier, in 1086. Census data from 1981 was embedded in a newly invented 12-inch laser disc that the BBC Domesday computer read. Unfortunately only very well resourced schools could afford to purchase the new laser readers for these discs. The 1981 Census data was held at Newcastle University, where the data had been assembled to be placed on the disc. In effect, the BBC Domesday laser disc contained a Census atlas, one that also mapped data by grid square, as had been done with the 1971 Census, but now 1981 data, and now directly onto the screen, rather than to a pen-plotter driven by a computer program reading data from a magnetic tape.

By the early 1990s the centre of Census mapping in the UK had moved from Durham University and then Newcastle University down to the University of Bristol. Using software developed at the University of Edinburgh called GIMMS (Geographic Information Mapping and Management System), David Gordon and Ray Forrest at Bristol published two Census atlases in quick succession. These were both of the 1991 Census data and published as Forrest, R. and Gordon, D. (1993) *People and places: A 1991 Census atlas of England*, by SAUS Publications, the predecessor to Policy Press (established as an academic publisher in 1996); and as Gordon, D. and Forrest, R. (1995) *Class and economic distinctions in England 1991*, Bristol; SAUS Publications.

The second author of this atlas, Bethan Thomas, moved to Bristol to start work on her doctoral thesis shortly after the publications by Gordon and Forrest were produced. It is partly this series of coincidences that meant that Bethan and Danny authored the 2001 *People and places* atlas for Policy Press, and then this publication for 2011. At the time we began writing this atlas, the only other Census atlas of 2011 data was created to exist online with maps generated automatically according to code written by Alex Singleton of the University of Liverpool. That atlas has far more maps than are shown here, and almost no commentary on each because there are so many maps that could be commented on. Now a second online Census resource exists, http://datashine.org.uk, created by James Cheshire and Oliver O'Brien. This contains almost endless maps, and because of that, almost no commentary – but the maps are fascinating and were the result of a huge amount of hard work allowing the users to alter the map seen. Perhaps one day commentaries will also be semi-automated!

Census mapping keeps on changing. In this atlas all the maps used are of the population cartogram variety, and a particular kind that was first created using a computer by Waldo Tobler in the early 1970s, called *population cartograms*. Every district is drawn in proportion to its population. The same base map is used throughout this atlas, using the population as it was enumerated in 2011. A few years ago it would have taken several paragraphs of text to explain these types of map, and in a publication like this we would also have had to include traditional maps. Today, these population cartogram maps are now known well enough that all you need know is that they are topologically correct, that is, everywhere districts touch where they should and nowhere that they shouldn't, and the districts shown are the 406 Local Authority districts of the UK that existed in 2011. The locator maps, which appear in the pages immediately following this introductory text, show and name each of those districts. We map at the level of district as this simplifies the patterns shown, and allows broad generalisation to be made more easily. However, there is no reason why in future, data for smaller neighbourhoods could not be depicted within each district. Each neighbourhood would have an area equal to its population, and would look very much like it looks on a traditional map, except that the parkland and countryside would shrink away.

Finally, the only other information you need to know to be able to understand this atlas is that unless otherwise specified, all the proportions are reported as

a share of the entire Local Authority district population, and wherever possible, everything is counted in units of (or shares of) people. Thus unemployment rates are described as the number of people who are out of work and looking for work for every 100 people living in each place. The denominator 'all people' includes children who would not be allowed to work and people too old or infirm to work, as well as many others whose existence in any district would not normally be used in calculating an unemployment rate. The advantage of calculating all rates in this way is that they can all be compared to each other. It is also easier to understand change over time statistics when proportions are calculated this way. Thus, an increase in unemployment of 0.1% is one extra person becoming unemployed for every 1,000 people living in a place. If two had been unemployed in every 1,000 and now there are three, or if 102 had been and now 103 were, in both cases the increase is measured as 0.1%.

So, sit back and enjoy the view. So much has changed in just over 200 years after the first change between two Censuses was calculated in the UK, 150 years after a Census was first mapped, 100 years after social classes and housing issues were first recorded in the 1911 Census, and half a century since Census data began to be routinely placed on computer tape, rather than punched card, and what could only be imagined before became not just possible, but normal. Today we depict the results of the Census with maps that were once seen as discoveries and great innovations. Today the maps used in this atlas are now just another 'population projection'. To introduce this atlas, we first show the regions and countries of the UK and selected towns and cities. As an aid to easy navigation we reproduce these two maps on the inside front and inside back covers. These are followed by locator maps of Local Authorities. On these locator maps, Unitary Authorities in England are coloured purple. The English District Councils within each county are distinctly shaded, and Scotland, Wales and Northern Ireland are individually coloured. We then begin our commentary by looking at population density, explaining and looking at what population potential is, before moving on to show distributions of poverty, wealth, riches, and those who are neither rich nor poor.

Many of these introductory maps are measures that Census data helps us make, but which cannot be constructed simply by using the Census. There is still much missing from the UK Census form, and just as questions about sinks and hot water had to be added in the 1960s, so there are new questions we should be asking in future Censuses about the most pressing problems of today. Hopefully the maps that follow will help highlight some of those problems.

For those readers less familiar with the administrative geography of the UK, the Appendix presents Local Authorities in the standard geographical order used by ONS, as well as an alphabetical list. We use ampersands where a council name includes an 'and', thus Kensington & Chelsea, Redcar & Cleveland and Dumfries & Galloway refers to three places.