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FINAL REPORT

Project

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1   Acknowledgements

Executive Summary

The OHPR project set out to develop an on-line resource which delivered published population reports created between 1801 and 1937 by the Registrar-General's Office(s) and its predecessors.

In July 2003 JISC, as part of its first digitization programme, agreed to fund AHDS History at the University of Essex to undertake a three year project to create a web-based user interface which allowed access to nearly 200,000 images of historical population reports. The main target audience was expected to be researchers in Higher and Further education. This content was to be supplemented by a number of other resources including: a) material from the National Archives (giving an insight into the administrative procedures followed in the collection of these statistics) and b) a series of didactic essays to lead less knowledgeable users into the material.

The methodology by which this objective was to be achieved was to use an in-house team to build a database, create the necessary metadata and develop a website through which the digitised content could be browsed and searched. The scanning and digitising of the content pages was not to be carried out by the project team but rather by a partner institution that specialised in doing this type of work. The original methodology has been adhered to.

Some 710 volumes of population reports have been digitised along with a selection of associated material from The National Archives (TNA). The end product is a sophisticated web-based user interface allowing browsing, searching, viewing and downloading images of the original content. The interface also allows the viewing and downloading of machine-readable versions of a number of statistical tables contained within the reports. This website became fully operational in March 2007.

The digitisation of source material was undertaken by CDDA at Queen's University in Belfast. This aspect of the project was not without its challenges, not least the discovered need to carry out individual page level quality assurance (QA) of the images and its related OCR text. Carrying out QA at this level of granularity placed great strains on the project resources and consequently a number of custom-designed tools were developed to streamline digitisation workflow.

In addition to the population reports two further resources were made available through the website. These were designed to help users contextualise the reports and took the form of a set of essays and a collection of all the legislation relating to civil registration, census taking and population in general. The essays were commissioned from Dr Edward Higgs and Dr Matthew Woollard. These essays contextualise the content found elsewhere on the site, and provide a comprehensive history of registration and population statistics within the British Isles before the Second World War. The availability of these essays to users is arguably a key differentiator for the website as few other comparable sites contain such a rich academic resource. The legislation resource is comprised of the full text of all Acts of Parliament relating to population statistics during the period 1800 to 1937. These texts illuminate the process of both census taking and registration across the period, by describing the "official" procedures laid down by Parliament, and like the essays provide useful contextual information relating to the statistics.

Furthermore, a selection of the tabular material contained in the reports is available as downloadable files in MS Excel format. Initially it was intended that these tables would be captured using OCR then edited and converted into machine-readable formats. In the event this approach proved to be inadequate and too expensive to implement and

alternative means of generating this material was sought. The solution was to employ a manual double keying technique provided by an off-shore supplier. This approach proved to be extremely effective and reasonably cost-effective resulting in some 7,240 tables being made available for download. The availability of these tables has stimulated demand for more downloadable tables and a means by which tables can be up-loaded. Both the functionality and the means necessary for (reviewed) user-submitted tables will be followed up post-project.

The generation and quality assurance of the metadata required to enable the browsing and searching of the website content also proved to be a demanding task. The effort expended in this activity has paid substantial dividends in that it has resulted in a deep source of structural metadata which facilitates effective browsing and searching of the content. Other metadata which complies with the METS, MODS and MIX standards has been generated which allow machine-independent preservation and harvesting.

The OPHR project has predominately used in-house expertise to develop the website, database and metadata. This approach has not been without its local difficulties but on the other hand it has enabled a flexible approach to the development process within the resource constraints imposed by the projects funding limitations. Many lessons have been learnt from this experience in particular the need for other projects to consider the implications of quality assurance in detail, the benefits of having a well founded functional specification, and the need for careful selection of digitisation suppliers. This in-house approach has resulted in an end-product which is much richer, more functional and with a more user-friendly system of content delivery than would have been the case if the database and website had been outsourced. However, this success has not been without its problems and without careful project management it would have been a high risk enterprise.

Although the website has only been available to users for a short time it is clear from the results of a usability assessment exercise, and the feedback coming from users of early trial versions of the website; that for users who have an interest in population history, the OHPR project has delivered an effective and valuable set of resources. Perhaps this can be best summed up by one of the many comment received from users: "...I've been looking extensively for demographic data derived from census returns. It was therefore a delight to find the comprehensive coverage already available ..."

In summary, a comprehensive collection of pre-WW2 population reports has been mounted on the web, along with a huge range of contextual information. The original conceptual framework for the project was not considerably altered, the original outline project plan provided a concrete basis across the three years in which the project was in operation, and the project was in budget.

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2   Background

The OHPR project was formally initiated in March 2004, when JISC, as part of its first digitization programme, funded AHDS History at the University of Essex to undertake a three year project to create a web-based user interface for browsing, searching, viewing and downloading nearly 200,000 images of historical population reports. The content selected embraced all major government published outputs relating to population in the British Isles over the period 1801 to the beginning of the second world war. Effectively this is the main published output of the General Register Offices in England and Wales and Scotland, all the census reports published for Ireland before 1921, and many reports published before the foundation of the various General Register Offices.

The objective of the project has been to provide both digital images and associated content which will enhance the use of these sources for learning, teaching and research in both historical and social science research. The interface has been designed to facilitate access for students and teachers to valuable primary resource materials which will open new areas for enquiry and promote new methodologies across a range of subjects.

The whole project will considerably enlarge the availability of these reports, the additional of contextual material will, additionally, inform potential users, and the consequent promotion of these sources for research, teaching and learning purposes will lead to a greater understanding of the population history of the British Isles.

2.1   Context

The census, both in the British Isles and elsewhere is and has always been more than simply the collection and publication of population data, though the emphasis has always been on 'numbering the people'. For England and Wales, information has been collected on occupations and industries, on housing and families, on ages of the people, on birthplaces and nationality and on physical and mental infirmities. Over the years questions on the use of Gaelic (both Scots and Irish) and Welsh language speaking have been asked. In 1851 special 'censuses' were taken about religious worship and education: in 1911 information on the fertility of marriage was collected, and published in two reports. Furthermore, questions on dependency and orphanhood, workplace and usual place of residence were asked in the 1921 and 1931 censuses. The Irish census, before 1921, was much more a social survey than a census, collecting information and reporting on causes of death, on the type of housing in which people lived, on agricultural conditions and religion. Overall, the census is of prime importance to a nation's economic and social history, giving not only the population, but a very wide range of additional information of considerable value to historians of nationalism and of interest to the growing number of scholars interested in the history and development of statistics.

The published reports relating to the census and civil registration have, to some extent, been overshadowed by the use of the census enumerators' books which contain individual-level information. This state of affairs has to a large extent been intensified by the growth of interest in personal family history, but is mirrored in the academic community where historical microdata has seen more extensive use in a variety of forms of studies. The published returns contain little of interest to genealogists, but are of considerable value to the local and community historian. Widening the availability of this rich source of material, first to Higher and Further Education audiences, and later, subject to further evaluation, to all-comers will be of considerable importance to all these groups.

2.2 Census

The geographical coverage of the first six British censuses (1801–1851) ranged over the whole of Great Britain, while from 1861 two censuses were held each decade, one for England and Wales and the other for Scotland (For further information on the history of the census see: Feery, 1951 and OPCS, 1977, or examine the essays on the histpop website.) The first four censuses in Britain were the responsibility of John Rickman (see Higgs, *Rickman*); following the creation of the General Register Office in London in 1836 the census became the responsibility of the GRO.

Until 1861 the census in Scotland was the responsibility of the GRO when it became the function of the newly created General Registrar Office for Scotland (GRO(S)). The GRO(S) was created in 1854 after the passing of an Act 'to provide for the better registration of births, deaths and marriages in Scotland', GRO(S) has been responsible for taking the census in Scotland since 1861, though provision for these censuses was, after 1920, made through a unified Act of Parliament.

In most respects the English and Welsh, and Scottish censuses collected similar materials, though the Scottish census collected information on language and housing conditions.

The first properly administered census was taken in Ireland in 1821. The censuses of 1821 and 1831 were little more than headcounts, but subsequent censuses collected a very wide range of material leading to their description as social surveys rather than simple population counts. The 1841 census was led by Captain Thomas Larcom, but the 1851 census was taken by the newly-created Registrar-General for Marriages, which in 1857 formally took responsibility for the census until 1911. No census was taken in Ireland in 1921, but both the Republic and Northern Ireland took a census in 1926. [Crawford, 2003; Higgs, *Development*].

This project has digitised all the published census reports for England, Wales, Scotland and Ireland, with the sole exception of the census of the Irish Free State in 1926, for the period 1801–1933. The initial reason for not including the census of the Irish Free State taken in 1926 was due to different Irish copyright laws which last 75 years and some of the reports from this census were published into the 1930s (see Appendix 11.2)

2.3   Registration material

Civil registration was part of the development of national statistics as well as part of the secularisation of society. The *Annual Reports* of the various Registrars-General are the prime source for demographic history for the nation throughout the whole of the nineteenth century and beyond and contain a vast amount of statistical material relating to the medical history of our nation(s). Over the years, the detail included within the Registrar-General for England and Wales's *Annual reports* varied, though much of the material is recurrent. They are a generally neglected source for social and economic history and their contents contain far more than statistical material. The reports of the Scottish Registrar General are more complex than their English counterparts, but only commenced in 1856.

These *Annual Reports* are supplemented by *Decennial Reports*, which not only summarise some of the previous ten-years worth of statistics, but provide additional information, most frequently on occupational mortality. As the main series of the *Annual reports* of the Registrar-General (E&W) ends in 1920 it is considered a convenient point at which to end both the Scottish and English series. This project has digitised all the published registration reports for England, Wales and Scotland, without exception for the period 1801–1920.

2.4   Published miscellaneous material

A small number of miscellaneous Parliamentary Papers relating to the administration of the census or the registration service have also been included within the content delivered by the project. These publications cover a wide range of topics including special returns on the language questions in Scotland and Ireland, a detailed breakdown of occupational groups over three censuses, and the Treasury Committee on the administration of the census.

All of the materials discussed above are of vital importance for the social, economic and demographic history of the United Kingdom and Ireland. There cannot be a serious academic researcher of the nineteenth-century Britain who has not used the published census reports or material derived from them. The registration material has been used by fewer researchers, but almost the whole of our knowledge of the demographic history of the nineteenth and twentieth centuries has been derived from these materials.

The published census reports are one of the most important documents for the social and economic history of the United Kingdom. Their value has been recognised not only by historians but also by sociologists and demographers. Making them available in digital form via the internet will undoubtedly increase their usage, and thus potentially enrich our understanding of the past.

2.5   Purpose

The main justification for this project is that many of these publications are not available in all university libraries. In essence most of the British materials are available in British university libraries in one of three formats: first, original bound volumes; second, microfiche versions, published by Chadwick Healey or microfilm version published originally by Research Microfilms in the 1980s, and third in a selected reprint series published by the Irish University Press.

Only major universities have complete sets of the census materials. Brittle paper and nineteenth-century glue has made many volumes unusable. (The illustration above shows a copy of a census report in the Project Director's collection which was discarded by a government department.) Some libraries contain 'complete' sets through the Chadwick Healey microfiche editions, but precise location of individual documents is difficult, because items are scattered over multiple microfiche. [1] The Research Microfilms edition of the mid-1980s is incomplete and poorly indexed, though represents the best international collection. The Irish University Press reprint series covers only the nineteenth century, and omits some important volumes. [2] A recent reprint of parts of the Irish census volumes is a shoddy and wholly inadequate resource. [3]

Most of the Registrars-General's reports for England and Wales for the pre-1900 period are available on the Chadwick Healey microfiche of British Parliamentary Papers, but suffer from the same indexing and reproduction problems as the census reports in the same format and excludes some of the English Registrar General's reports. Virtually no English University library has any volumes of the Scottish reports (and vice versa) and as far as can be ascertained no (paper) reproductions of these reports have been made. There are no traceable reproductions of the post-1900 Registrar General's Reports.

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[1] This edition provides the basis for the more recent Proquest Nineteenth-Century Parliamentary Papers.

[2] See the useful introduction at: http://www.britishparliamentarypapers.com/BppCat.pdf [Available 8 April 2007].

[3] Published by Edwin Mellen Press in 1998.
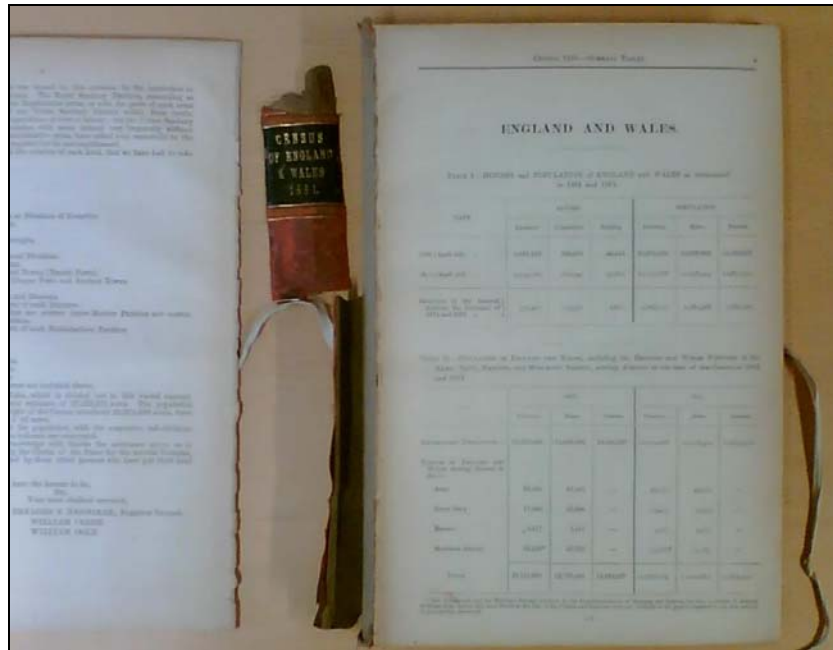
Figure 1: Damaged census report

In summary the materials are of national and international importance for the social and economic history of the British Isles. All previous reproductions are inadequate in one way or another and original versions are increasingly difficult to find, or are too fragile to use.

Research carried out during this project has ascertained that the print runs of many of these reports ran into the hundreds rather than the thousands, which adds to their scarcity.

The purpose of this project has thus been to unite, in such a way as has never really been possible, a complete collection of nineteenth and early twentieth century population reports relating to the British Isles, within a metadata enriched framework, along with countless examples of the rich administrative documents remaining within the TNA and contextual information to guide experienced and non-experienced users throughout the site.

2.6 Previous work

This project builds on the following projects:

- CDDA – had previously digitised parts of some of the Irish census reports. The project covered texts (i.e., no digitisation of statistical material) and also contained no machine-readable material. See: http://www.qub.ac.uk/cdda/iredb/pages.htm (Available 20 March 2007).

- Great British Historical GIS created by Humphrey Southall and others. It's most current incarnation is the Vision of Britain website, predominantly funded by the Big Lottery Fund. Available at: http://www.visionofbritain.org.uk/index.jsp. This project utilises a number of statistical tables.

- There is also a major research project at the University of Glasgow, under the direction of Anne Crowther which deals with the history of the Scottish Register Office.

3   Aims and Objectives

List the aim and objectives agreed at the start of the project, and note if they changed during the project.

3.1   Aims

The project's vision was simple – to bring together a corpus of published material in an integrated digital environment which would be freely available. Integration was to be achieved by both technical and intellectual means.

This main aim of the project was to make easily available all the published reports relating to population created by the Registrar-General's Office(s) and their predecessors, via the internet, along with a significant quantity of contextual historical material for the period 1801–1937. Thus, the aim of the project is to provide integrated access to all population-related reports and a wide range of ancillary material.

This material was to be made available by a web-based interface. This was to allow users browsing, searching, viewing and downloading relevant images. The initial aim was that the interface was also to allow viewing and downloading of machine-readable versions of a number of statistical tables contained within the reports.

Thus, the primary objective of project was to provide deep user access to a corpus of material relating to demographic conditions in the British Isles over the whole of the nineteenth and the first half of the twentieth centuries. This was to be achieved by:

- a comprehensive selection procedure;
- image scans of all pages;
- high-quality text, captured via OCR and manual editing, for searching textual material;
- lower-quality text, also captured via OCR, for searching tabular material;
- individually created "tables of contents" for browsing;
- integration into the site of previously-created tabular material;
- integration into the site of freshly-created tabular material (selected on the basis of significance and use).

At the outset it was decided that neither the high- or lower-quality OCR material was meant to be displayed to the user. The final system was to be capable of delivering, in either image, or textual format the entire collection of published census materials for the British Isles and all registration material for England, Wales and Scotland published before WW2. All previously created resources funded through the JISC, NOF/HLF, ESRC or AHRB in the AHDS History's collection were to be integrated into this system thus allowing under-utilised resources to be promoted and used to their full potential, avoiding duplication of effort and providing the best possible value for money. However, in the event it proved impracticable to carry out this integration entirely, as initially expected (see section 4.9 below).

3.2   Objectives

The key objectives were to:

- Capture the images from approximately 187,000 pages of population reports from a variety of sources;
- Capture the images from approximately 5,000 pages of unpublished archival material at the TNA;

- Capture text from approximately 50,000 pages of population reports at searchable quality;

- Capture and OCR text for display of each and every relevant Act of Parliament;

- Integrate previously existing machine-readable versions of statistical tables from over 200 tables within the database;

- Create approximately 500 further machine readable versions of statistical tables and subsequently integrating these within the database;

- Metadata – Historical content created for each report, describing and contextualizing the series of reports, collection, title and item level metadata for harvesting, title and item level metadata for searching, and item level technical metadata for administrative and preservation purposes;

- Development of a web-based user interface for browsing, searching, viewing and downloading images from the published reports and all ancillary material;

- Establishment and maintenance of the 'database' for Higher and Further education users, within agreed service levels.

3.3   Altered objectives

The only objective we failed to meet was the integration of previously existing machine-readable versions of statistical tables from over 200 tables within the database. The tables which we had chosen to include within the system within the AHDS/UKDA collection suffered from two unrelated problems. The first was the manner in which they had been created. In all cases the tables had been "processed" which meant that while they may be more usable, were distinctly different from what was on the printed page. A clear decision was made during the project that we would adhere to "source-oriented" principles in table construction, in as much as the machine-readable tables would not only replicate the data content as closely as possible, but also the metadata, i.e., column and row headings, would be replicated as closely as possible. The changes that had been made to the material deposited with AHDS History/UKDA broke this rule. The second reason, was related to rights. We believed (correctly) that there was no need for AHDS History to negotiate with the various original depositors for the right to disseminate these previously-deposited materials, as AHDS History/UKDA already had that right; however, we did not have the right to pass on these materials to HEFCE, a provision we needed to make before the project funding was granted. As we did not have time to carry out these negotiations and would have been dealing with an individual who at that time was not sympathetic with the aims and objectives of this project we made a decision not to include these materials. It should be noted that this material could, with very little additional overhead be integrated into the final project output.

4   Methodology

The methodology laid down in the original project plan has been followed in almost all cases. Where it has been deviated from an appropriate note to that effect has been included.

4.1   Strategy

The main element of the website delivery platform is a database which can be used to serve files to the internet. The database contains the details of the digitised documents, and links to the various forms of metadata, which in turn relates to the various digital images.

The design of this database depended heavily on how the volumes of original material are organised which was only revealed as the digitised images became available. Thus the work plan has predominately been based on overlapping flows of work. The first of these was the creation of a database containing all the expected elements of the various documents to be digitised. This metadata was created continuously over the whole of the project, working generally in chronological order. Simultaneously the digital images were captured by a partner organisation and integrated into the database by the OHPR project team as they were delivered.

Despite difficulties maintaining the continuity of digitised image supply this approach has worked well and enabled the database to be developed to fit the content rather than the converse. For large-scale digitisation projects an important methodological issue is to ensure that the "dissemination system" allows the original material to be to (re)conceptualised by the user. This may seem paradoxical in the case of an "enhancement" project, but without doing this the user may be led into ahistorical ways of thinking.

Not only were the workflows relating to metadata overlapping, but the technical aspects of the project were planned to be carried out simultaneously. Hence, the database was under construction at the same time as the website was under development. This dual level approach generally worked well, but with hindsight, it might have been more appropriate to leave the development of the website element of the project until after the construction, development and complete population of the database.

4.2   Image Capture

The project plan laid out that image capture would be carried out in two phases. The most important of which related to the various published reports. These were of relative uniform size, and, we thought, would pose little difficulty to our main supplier, the Centre for Digitisation and Data Analysis at Queen's University, Belfast, with whom at the commencement of the project the AHDS had various arrangements in place. The second phase of scanning was envisaged to take place at The National Archives, with the work being carried out by a dedicated project scanner in situ. These two phases are discussed in the sections below.

4.2.1 Image Scanning (CDDA phase)

The majority of the image capture was sub-contracted to the CDDA at the Queen's University Belfast, under the direction of Dr Paul Ell. The operation and governance of

the image capture process and deliverables were to subject to a service level agreement between the CDDA and University of Essex. This agreement is not reproduced in this document, but is available from the Project Director on application.

Initially the CDDA designed a directory structure into which the captured material was to be placed. These directories were access-limited to staff working on particular tasks, ensuring maximum security and preventing inadvertent file name changing.

Although the access and security features of this approach were entirely adequate, the file naming and organisational structure proved to be inadequate. This shortcoming was rectified by the OHPR project team who devised a comprehensive set of file naming and directory structure guidelines for CDDA to use when digitising images. In hindsight, a more robust directory structure and file naming strategy should have been put in place before any digitisation commenced, but without examining every volume in advance this would have been near to impossible. The trade-off in terms of workflow ultimately proved workable within the project time scale; however we would recommend that in any other project of this type a tried and tested file naming scheme is put in place before scanning starts. This scheme may be subject to change during the scanning process.

CDDA were requested to source original material wherever possible from Queen's University Library, the library members of the British Official Publications Collaborative Reader Information Services (BOPCRIS) consortium, Cambridge University Library and the Office of National Statistics. It was recognised that it may have been necessary to source material from other repositories which may had led to some delays, but these have been factored into the timetable. Material which we considered to be problematic were to have been located at the beginning of the project, and if necessary either purchased or digitised from a microform surrogate. In the event these contingencies were not used as it was possible for the project team to locate alternative sources of the report volumes which CDDA were unable to source for themselves.

It was initially envisaged that all images would be be scanned at 400 dpi binary and saved in an uncompressed TIFF format. The choice of format was based on a number of considerations:

- ability to OCR effectively (level of accuracy in the range of 99.0 to 99.5 per cent);
- size of files for delivery;
- preservation quality.

After capture, each image were to be post-processed in terms of straightening (a vital procedure when using tightly bound volumes), cropping and despeckling, using a variety of image processing software including FRZ ProScan and iPhotoPlus. At the outset of the project CDDA had these software packages in place.

Images were to be delivered to Essex, at an agreed rate, in batches of at least 10,000 images per month. It was anticipated that the whole of the 'basic' image capture would take approximately 26 months. To allow for slippage, difficult to locate volumes and other possible problems during this process, a total of 30 months was allocated for this process. In the event this process took a total of 41 months to complete.

The CDDA were also to capture of all colour images in the various census reports, from the hand-coloured metal engraved maps and diagrams to the heliozincographed maps. These images were to be captured as part of the above process at 400 dpi binary images, but also as 400dpi 16 bit colour images. These colour images were to be tested separately from the binary images to ensure that colour space will be adequately represented on screen and in print. In the event images were captured at a resolution of

24bits because we felt that greater quality could be achieved at this level. In retrospect either resolution would have been acceptable.

CDDA was to undertake to train and provide office space for the scanning assistants to work entirely on the scanning process for this project, though possibly undertaking other tasks under the immediate direction of CDDA Director.

4.2.2 Image scanning (TNA phase)

The National Archives (TNA) granted the OHPR project exceptional access to, and permission to reproduce digitally, a selection of images from the archival material of the General Register Office. In order formalise this access and control the necessary intellectual property rights a memorandum of understanding outlining terms and conditions and licensing was to be entered into by TNA and the University of Essex.

To enable the image capture to be facilitated an A2 book scanner was included within the projects costings. This scanner was to be transported from Essex to Kew and housed in a safe location, while the Project Director with advice from the Project Steering Group was to select the items to be digitised. The digitisation was be carried out by the scanning assistant under the direction of the Project Director. Scanning of the TNA material was to be carried out at no less than two levels of quality. Printed material was to have been scanned as 400 dpi 1-bit binary images, while manuscript material at 400dpi 16-bit colour level. As with the other colour materials, these images were to be tested to ensure that colour space is adequately represented. In the event all images were captured as 24bit images, and random samples were subject to quality tests. The lighting conditions on site were not optimal, but the images obtained were considered to be of reasonable quality.

Images made on-site at TNA were to be stored on the computer system installed at TNA, on TNA's own system (subject to possible restrictions) and backed up weekly on DVD and posted to Essex. In the event images were sent to Essex via ftp with MD5 checksums to ensure no corruption during transmission.

Post-processing of TNA images was to take place at Essex by members of the project team at the end of the capture period. If any images needed to be recaptured this was to be undertaken before the scanner was returned to Essex. In the event most post-processing took place at Essex.

Some documents, in particular maps from RG18, were found to be too large to fit the A2 book scanner. This shortcoming was overcome though the generosity of TNA who supplied the required maps from previously digitised sources of their own. Some of these TNA-supplied images are available on the site, and we have rights to publish them in perpetuity.

This element of the scanning process, being under direct control of the project, was relatively trouble free. The main concerns were about the selection process which was carried out on an ad hoc basis and in situ. This proved relatively trouble free, and despite some possible lacunae this was carried out effectively and efficiently.

4.3   OCR

In addition to image scanning, CDDA were also to OCR all scanned page images resulting in a raw text file for each image file. Some of the 50,000 of these pages were to be OCR'd at an accuracy which is sufficient to allow accurate searching of the text by users of the website. This estimated figure of 50,000 pages was intended to take into account all textual (i.e. non-tabular) material from all identified census and Registrars' General reports. To ensure that these pages were sufficiently accurate the text files were to be converted to Microsoft Word (but note, there was never an intention to store

these files in this format) retaining all codes as well as the page structure. The text was then to be processed through a series of pre-designed macros which would eliminate common errors, and run through a custom spell checker and finally output as plain text (ISO-8859-1). The main purpose of the OCRing was for user-searching, and it was not expected to be 100 per cent accurate.[4] However, the CDDA was to strive to ensure maximum accuracy without proof-reading.

In the event this endeavour proved to be unachievable and measures were put in place for each page to be proof read and fully quality assured. This activity was not carried out by CDDA staff but instead by specially recruited members of the OHPR project team.

The selection of OCR software to be used by CDDA was to vary from source to source and on quality of the original copy. CDDA would use both ProLector and FineReader. Both of these products are fully trainable and thus, for each set of documents a new fontbase could have had to be trained. In the event CDDA almost exclusively used FineReader which proved receptive enough to cope with this material.

We originally envisaged that the OCR'd material would have been included within the master database and output in the form of XML pages. A decision was made during the project not to do this because we could not provide acceptable textual material for *every page* in the collection (which includes the statistical material). Thus to prevent raised user expectation we decided not to make the full texts available on the site. It is probable that all textual material could be made available to researchers interested in using the text for other purposes.

4.4   Numerical material

Scanned numeric data was be transferred into spreadsheet software and verified wherever possible using sub-totals in the original tables for comparison and cross-tabulation. Where appropriate, to ensure the highest levels of accuracy, descriptive statistics were to be extracted using spreadsheet or statistical software. Alphabetical data was be added manually to this tabular material as OCR software is generally poor at processing tabular alpha data and checks were to be made at CDDA to ensure that they were correct. These spreadsheets were to be output in plain text for optimal reuse and for preservation purposes. Where printing errors 'corrected' were found within published errata were to be corrected within the spreadsheets and a note made to ensure that users will not be confused.

In the event, the treatment of numerical data in the way described here proved to be impracticable and too demanding on the resources of CDDA. The measures taken to address these shortcomings are described in the section of this document which deals with "Implementation".

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[4] There are a number of methods of measuring the accuracy of OCR software, and subsequent automatic and manual editing. We suggest that accuracy *per word* should be the benchmark for JISC-funded projects. As an example, if a text contains 10,000 characters and 99 per of them are correct, this means that 100 of them are incorrect. On the basis of an average of five characters per word this text would have 2,000 words, and by simple calculation we would expect 1 in 20 (or 5 per cent) of the words to contain one wrong character. Thus a 99 per cent per character rate (with an average word length of 5 characters per word) equates to a 95 per cent per cent word rate. The same text with a 99.9 per cent character accuracy would only achieve a per word accuracy rate of 99.5 per cent, which would equate to 20 words out of 2000 being incorrectly spelled. The actual rate is to some extent unimportant, but both upper and lower limits along with the units of measurement should be clearly stated in any specification or sub-contract.

4.5   Integration

The integration of the different files types and formats combined with the complex nature of how the original material had been organised was expected to prove to be the greatest challenge to the project.

The issue was to ensure that all the files relating to a single report and separate parts of the report are easily identifiable. The accurate use of the file naming conventions was seen to be the key to ensuring that this process is as seamless as possible.

Integration was to consist of eight main steps:

1. **Database creation.** A database was to be created which listed not only the reports which were to be disseminated, but also contain the start and end page for each significant component of each report. Components would either be chapters, sections of chapters, tables or graphical material. This database would be populated from a table in the form of a spreadsheet known as the ToC (an abbreviation of: Table of Contents) containing details of how the original reports were organised. Each report volume was assign a unique four digit identification number know as the "Master Number" which served as the highest level in the hierarchy of the file naming convention.

2. **TOC creation.** On the receipt of batches of *.tif image and *.doc and *.txt OCR files from the CDDA (at the rate of 10,000 per month) ToCs were to be created, using the published 'Tables of contents' extracted from the delivered files and a structural analysis of the reports. These ToCs were to relate the original volume, section, table and page titles (where appropriate) to the page and display number sequences. Note, both page and display number sequences were necessary as many volumes contained multiple instances of the same page number either because of the use of roman/Arabic numerals, but also because of multiple sequences.)

3. **Table-level metadata.** There are approximately 700 original reports,[5] some of which contain more than 750 tables and it was estimated that the construction of the relevant metadata at this level would take the Metadata Creator almost one year of data entry – an estimate which proved to be about right.

4. **Image creation.** For the purposes of displaying images on the internet it was decided rather than have a single scalable GIF/JPG, to have five matching PNG files of varying magnification (10%, 15%, 20%, 30% and 50%). The consequent increase in file size was not highly significant. The PNG format was chosen because it employs lossless compression, and it suffers from none of the proprietary issues which both GIF and JPG do. However, this decision meant that we were not able to keep compatibility with some of the very old browers. For example IE 3.0 (replaced by IE 4 in 1997) can not handle this file format.[6]

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[5] The number of "reports" varies from one document to another for bibliographical reasons. In constructing master numbers for reports we understood a report to mean something which could be uniquely identified by *both* the command number *and* the parliamentary paper reference. Thus the two parts of the 1901 Census of Ireland's volume on Munster had the same command number (Cd.1058) but because this was split over two parliamentary paper volumes (BPP 1902 CXXIV and BPP 1902 CXXV) we treated this as two separate master numbers, but would only consider this one report. When these reports stopped being published as "command papers" similar logic applied, without the bibliographical references.

[6] Market Share's website gave MS IE 3.0 a market share of 0.00 per cent in 2004. See: http://marketshare.hitslink.com/report.aspx?qprid=6&qpmr=55&qpdt=1&qpct=3&qpcal=1&qpti meframe=Y&qpsp=2004 [Available 8 April 2007].

5. **File management.** Assembly all of the files and file type for each report volume into a sequence of directories identified by their respective Master Number and deposit them in memory on a preservation server located and managed by the UK Data Archive.

6. **Database population 1.** Populate the database (held on the preservation server) with volume, section, table and page number, titles and page labels which have been recorded in the ToCs.

7. **Database population 2.** Populate the database with the text files which correspond to each image file.

8. **Quality assurance.** Using the website to display page images verify that the populated data from the ToC correctly relates to the displayed page.

This process has been effectively used to integrate the content into the database. Some details of this process were only fully explored and initiated during the project and were not planned.

4.6   Website

This website was to be designed to comply with a functional specification and implemented in-house using the resources of the project team.

The functionality of the website was developed in three phases which were informed by user feedback. In essence three versions of the website have been released for public use and feedback. These are known in-house as "Demo A.", "Demo B" and "Release" versions.

"Demo A" was to be reviewed by a user panel which was to carry out an evaluation programme devised and managed by AHDS Visual Arts. The results of this evaluation were to be used to revise and enlarge a functional specification which was in turn was to be used to develop a "Demo B" version which was released in a "plain vanilla – no graphics" form. A graphical interface was to be applied using cascading style sheets to a revised version of "Demo B" for test purposes before the final release version of the website was to be made available for public use.

The technical design was to use open source software components wherever possible with Apache 2 Web server at the front end and a Tomcat servlet serving the database access request. Both were to run under Windows 2003 Server OS rather than an open source operating system. It proved necessary the use Windows 2003 Server because the physical system environment in which the OHPR website was to run after the project was closed will be managed by the UK Data Archive who only operates a Windows environment.

4.7   Essays and Legislation

The essays were originally intended to be written by experts on the census and the development of population statistics, specifically, Dr Edward Higgs and Dr Matthew Woollard. It was envisaged that these essays should be delivered in three batches, with a sample batch to have been delivered early in 2004 for use in the prototype version of "Demo A".

Initially it was envisaged that images of the legislation would be provided, but some uncertainty with the copyright regarding the actual page images a decision was made to render the legislation solely in machine-readable format. Approximately a quarter of a million words needed to be keyed and rendered in a usable html form, and the entire corpus needed to be sourced from a variety of different libraries.

Both Essays and Legislation resources are kept as html files and rendered by through the user's browser when accessed through the website.

4.8 Metadata

The relational database that lies behind the website also contains numerous other details relating to the content of the OHPR project. While the website relies on the content of this database, the longer term preservation process requires that these details be exported to another format. Just as the pages of the population reports are converted to standard digital files, so are the metadata. The various elements of each metadata standard are presented in a formalised structure known as XML (eXtensible Markup Language). Structuring data into an XML format is often used to allow the easy transfer of information between computer systems with vastly different technical architectures that would not otherwise be able to communicate. This simple text format also makes XML ideal for the long term storage of information by reducing the risk that files will be un-readable in 100 years time.

The OHPR project is part of AHDS History and is based at the UK Data Archive (UKDA), the curator of the largest collection of digital data in the social sciences and humanities in the UK. Long-term preservation of the OHPR data will be undertaken within the UKDA, which will ensure that these resources are stored in appropriate environments which will allow all digital content to be migrated to new technologies over time. AHDS History will provide access to the content on request.

A number of specialist methodologies are used to ensure the preservation and dissemination of the content. All scanned pages are stored in the TIFF file format at the same high resolution as is available for download via the website. The use of this popular and well-documented standard helps ensure that future technology will be able to access these images in the future.

Consideration was given to the suitability of the metadata standards which are currently available. These standards were:

- Text Encoded Initiative (TEI). This was rejected as because it was unlikely to be able to handle the complexity of the tables which made up the bulk of the census reports and would have been complex to implement;

- Data Document Initiative (DDI) was found to be too time consuming to implement; METS met the projects needs for structural and preservation metadata;

- MODS was used as it is recommended by METS as a more detailed version of Dublin Core;

- METSRights, again recommended by METS was adequate for the needs of the project;

- MIX is an experimental standard it is particularly suitable for use with TIFF formatted image files which is the format which is to be used by the project.

Difficulties were encountered in making an assessment of metadata standards because of the lack of previous implementations and the availability of appropriate documentation, however, it was possible to formulate a metadata strategy[7] which allowed the generation of a comprehensive set of standard complaint metadata.

Standard-compliant XML text files will be stored with the TIFF images on preservation servers. The simplest descriptive metadata are compliant with the Open Archives

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[7] OHPR Metadata Strategy http://www.histpop.org/project_docs/OHPR_metadata-strategy_03_00.doc

Initiative (OAI) making it possible for other archives to harvest information about the collection. Metadata for each volume are to be 'wrapped' within XML in the Metadata Encoding and Transmission Standard (METS) which includes a structural map based on our detailed tables of contents. Other software could, in the future, be developed to use the structural map for navigating through the OHPR collection without recourse to the website. METS also describes where each file is stored and any technical metadata associated with it. Technical metadata for each file are stored as MIX (Metadata for Images in XML) while descriptive metadata for each volume are available as Dublin Core or Metadata Object Description Schema (MODS).

4.9   Other Considerations

4.9.1 Interoperability

Metadata standards were to be compliant with the Open Archives Initiative Standard ensuring that the metadata and be available for harvesting via an OAI compliant metadata repository.

4.9.2 Evaluation

The initial project plan suggested that the evaluation of the project will focus on quality, performance, functionality, accessibility, usability and achievement of objectives. Both formative and summative evaluations were to be carried out, using both qualitative and quantitative methods.

4.9.3 Usability

It was planned that a user group would be assembled to carry out ongoing reviews of the site once a demonstrator was available. Their function was to be to advise on interface design, site navigation, site structure, functionality, content delivery and performance. It was envisaged that this would be achieved through workshops and online consultation. In the event only a single workshop was deemed necessary.

4.9.4 Accessibility

The proposal stated that the website will achieve level double A compliance with the W3C WAI recommendations. The web site will be available to a wide range of browsers, and would make use of open standards where-ever possible. It was proposed that viewing versions of images would be presented in JPG format allowing low bandwidth users to access the site. However, for reasons noted above, a decision was made to use the PNG file format rather than JPG (or GIF). Hence, the site will support most recent browsers, and the oldest systems to be specifically supported will be Internet Explorer 4, Netscape 4 and Opera 3.5.

As will be seen below, the provision of images has prevented double A compliance with the W3C WAI recommendations, but we have followed the advice of the JISC-funded TechDis in the presentation of images.

5 Implementation

5.1 Planning and Management

The project began in a somewhat disjointed fashion before the Project Manger had been appointed and before the formal project initiation. Ideally, a detailed project plan should have been put in place by January 2004 before the project was initiated, however, the "plan" used at the outset was really an extension of the proposal rather than a plan. In the event a working project plan was not in place until July 2004 some three months after the project was initiated.

Recruitment of the project team and the Advisory Group took place on schedule in March and April 2004.

Although some formal tools were used to monitor the progress of the project, notably Microsoft Project, the size of the project team (5 people initially) lent itself towards a less formal approach using project milestones to steer regular informal progress meetings to review tasks and deal with exceptions.

Some disruption to this process occurred in March 2005 with the resignation of the Project Manager. She was not to be replaced, because of recruitment difficulties, until October. The newly appointed Project Manager resumed the informal project team meeting approach to project management and reviewed and revised the work packages resetting the milestones.

Part of the general management difficulties were the responsibility of the Project Director, but part was due to the timings initially imposed by JISC. In retrospect a trained project manager should have been recruited and in post, approximately three months before the recruitment of other staff in order to prepare a detailed project plan. However, the hit-and-miss approach taken pre-project meant that the project plan benefited from all members of the team providing input which improved productivity, and ultimately the final product.

5.2 File Naming

A file naming convention was devised which ensured that the sequential nature of the content was preserved while accommodating the need to identify page type exceptions such as errata, foldouts, resolution variation and multiple pages tables. The development of this convention required an understanding of how the content was structured and of the digitiser's workflow practices.

This process was rather more involved that discussed in the project proposal, because of a lack of technical knowledge of the Project Director. However, without the immediate knowledge of the Project Director of the various reports considered as content and an understanding of the potential requirements of academic users, the project may have ended up with much more convoluted technical requirements. Detailed knowledge of the material has meant that we can provide a sensible and an intellectually sensible citation for every single page of content on the site, which may not have been possible without this knowledge. It is important to note that a typical volume of content has a minimum of two page sequences, one 'Roman', the other 'Arabic', and that earlier researchers may not have consistently cited these in the past. Hence a combination of the file naming principles and database design allow users to search on both Roman and Arabic page numbers, even if there are multiple pages sequences in the original volume.

For example, page "v" of "Preliminary observations, enumeration abstract appendix, Ireland, 1821" target page is displayed below. This volume has two sections, the first has pages numbered i to xxiv and the second 1 to 396. If the Arabic number 20 is entered into the GO to page box; selecting the GO button will result in the display of a page selection window from which the user may either chose page xx or page 20.

Figure 2: Example of website and goto page function.

Figure 3: Example of multiple pages with same number within a single report.

5.3   Imaging Workflow

Although image scanning was embarked upon in December 2003, 3 months later than anticipated in the original project plan, the file naming and organisation used by CDDA were found to be inadequate for the needs of the project and a full scale revision was devised in February 2004 and the scanning process was essentially re-started of in April 2004. The delay in scanning was caused by delays in the authorisation of the grant, which had intended to start scanning three months before project inception. The delay was perhaps fortunate as it meant that less file re-naming needed to take place.

During the period March to May 2004 difficulties were encountered with the image scanning workflow and image quality. To help overcome these workflow difficulties, two tools were developed by the project team. The first was a shared workplace tool which recorded quality issues and delivery status; this manifested itself as a web-based database application which was known within the project as the "Issue Tracker". This tool allowed the sharing of workflow data between CDDA (the image supplier) and the OHPR project team. The second tool was known as the "Batch Validator" which validated the file naming and structure of each batch of files received from CDDA. These tools came into service in May and June 2004. These two tools have allowed the project to improve both the productivity of the project workflow and to ensure that the end-product is of the highest possibly quality.

With an appropriate file naming and organisational framework in place, significant deliveries of batches of images and corresponding OCR became established by June 2004, however, batches (about 10,000 each) were subjected to prolonged Quality Assurance (QA) iterations, some batches taking up to 24 months to clear all known faults and issues. By November 2004 the QA difficulties being encountered had become so acute and in order to resolve these difficulties the project team was augmented by the recruitment of two part-time QA staff. To cover the cost of the extra personnel JISC granted additional funding. In March 2006 the QA personnel were made full time.

Despite this action delays in approving and closing delivered batches continued, and some batches still took almost many months to recieve full approval.

Some further comments are necessary to describe a QA iteration. A batch of scanned images would be received from CDDA. These would be checked by QA staff at the UKDA. Any images considered to be faulty, for whatever reason, generally, e.g., poor image quality or inconsistent file name and page number would be marked on the Issue Tracker. CDDA would then replace or correct the error. These would be re-checked at UKDA, and if problems remained they would be re-submitted to the Issue Tracker for CDDA's attention. Some individual images went through no less than four iterations of this process. On one occasion CDDA delivered an incorrect "volume", despatching to UKDA a volume with titled "37th Report of the Charity Commissioners", rather than the correct volume which was entitled: "Twenty-fifth Annual report of Registrar General of Births, Deaths and Marriages in Scotland". When this error was pointed out, a new version was returned. Most unfortunately for CDDA the replacement volume turned out to be the "Twentieth Annual Report of the Deputy Master of the Mint for 1889". In this particular case the first material was submitted on the 25th July 2005. The second incorrect volume was submitted on the 13th September. The reason for this second error was reasonably straightforward -- the complete volume in the Queen's University Library had been incorrectly bound and the report which started on page 499 of their particular volume was indeed the Twentieth Annual Report of the Deputy Master of the Mint. This accounts for two iterations of the issue tracker. The particular volume then needed to be resourced, in this case from Leeds University Library, and was eventually re-delivered to Essex in February 2007. The issue tracker shows that there were no faulty images on from this report, but four pages of OCRd texts were corrected in Essex in February. With random QA checks, as had been initially envisaged, one of these two "incorrect" reports could have been included in the final site.

In all, some 18 batches of images and OCR were delivered by CDDA, the last 4 or 5 of which being delivered in relatively quick succession and with fewer and shorter QA iterations. The last batch was delivered by CDDA in February 2007 and approved within three weeks.
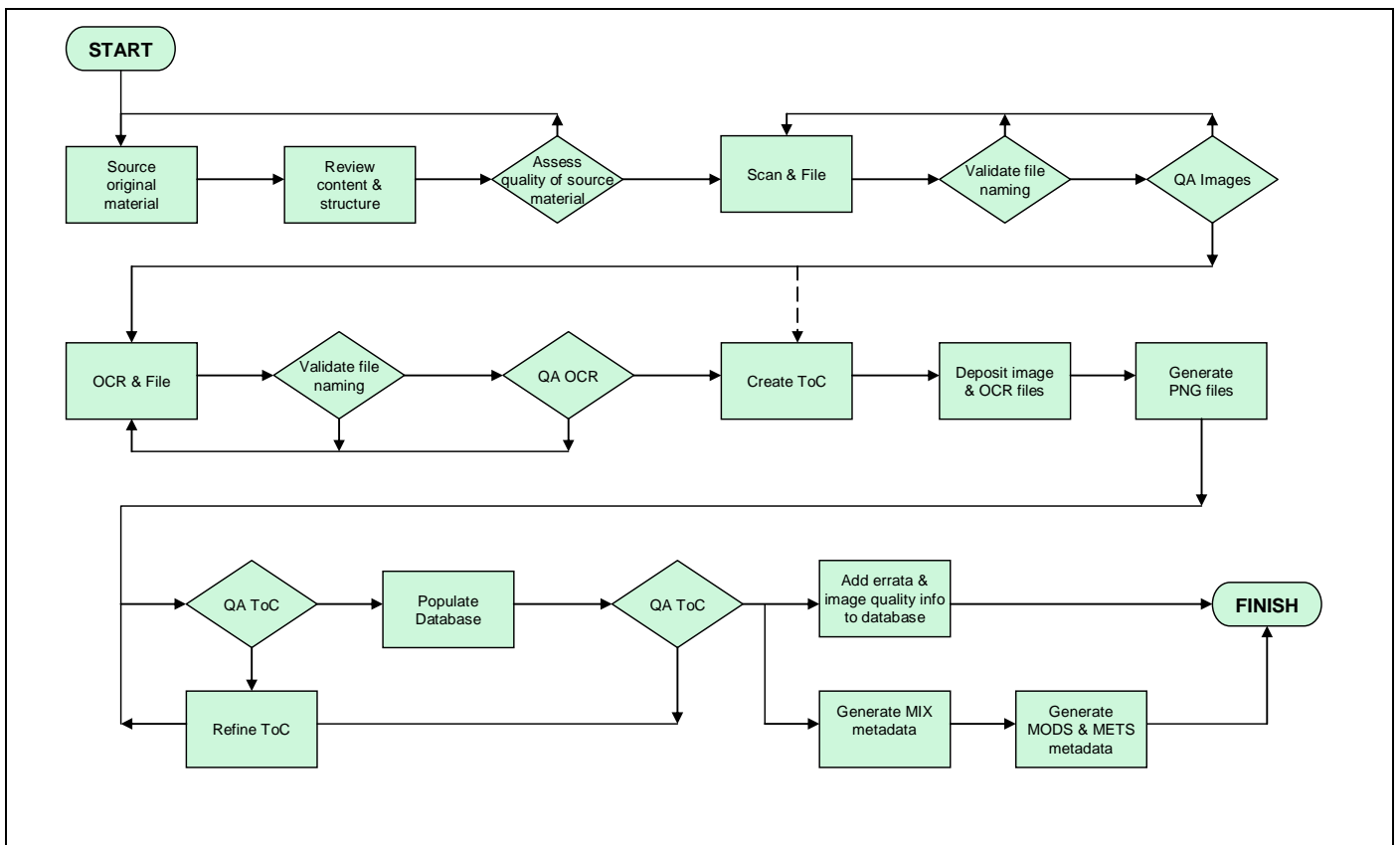
Figure 4: OHPR Digitisation Workflow.

5.4   Quality Assurance

The scale of this aspect of the project was greatly under estimated. It was anticipated that the QA of the images and OCR delivered by CDDA would be on a sampled basis assuming that the error rate would be low and that the remedial workflow would be rapid and effective. Unfortunately these assumptions proved to be incorrect. In addition the need for close scrutiny of the descriptive and structural metadata was under-estimated and proved to be very manpower intensive.

These shortcomings were recognised relatively early and in order to address them additional funding was sought from JISC to allow the recruitment of full time rather than part time QA personnel into the project team. JISC agreed to grant additional funding, and to ensure that the personnel recruited were the most competent people available, a rigorous selection process was followed the result of which was the employment of two motivated and knowledgeable history post graduates.

5.5   Website

The development of the website began on time in July 2004; however, the refinement of a functional specification delayed the completion of a "Demo A" version of the website until May 2005 some 6 months later than planned. Consequently the user-evaluation study was not completed until November 2005. The "Demo A" version of the website was populated with a 6 per cent sample of the printed content.

The user-evaluation workshop and study took place in June 2005 which resulted in a report which contributed toward a comprehensive revision of the functional specification completed in January 2006. This specification was used to build the "Demo B" version of the website which was launched in October 2006. In this version the printed content element was increased to 12 per cent together with the inclusion of early versions of the Essays and Legislation.

The "Demo B" version of the website was initially delivered in a "plain vanilla" minimal graphical form and later enhanced with a custom designed graphical design implemented through the use of cascading style sheets (CSS). The necessary graphical design skills required to design the screen graphics were not available within the project team and a third party was used to design this aspect of the website. This was not anticipated within the original project plan, which had hoped for all design to be carried out in-house. Fortunately, the web developer was only employed on a 0.8 FTE freeing up funds for this to be out-housed.

Problems were encountered when the cascaded style sheets were first implemented concerning their compatible with early versions of the web browsers Internet Explorer (IE), Netscape and Opera. The original project proposal called for compatibility with Internet Explorer 4, Netscape 4 and Opera 3.5 which proved to be difficult and too expensive to achieve using standard compliant cascading style sheets. To overcome time difficulties a request was made to JISC that oldest supported browser requirement was relaxed to be IE 5.5, Netscape 6 and Opera 5. JISC agreed to the request.

By December 2006 a pre-release version of the website replaced "Demo B" which made available 70 per cent of the Census and Registrar-General reports, most of the Essays, all of the Legislation and all of the TNA material. This version of the website functioned well except for the occurrence of intermittent service failures. After an extensive series of investigations three possible causes were identified, two associated with Windows Server 2003 and the other concerned the configuration of the communication channels between the Apache server and the database. Solution of the problems associated with Windows will await the implementation of "hotfixs" from Microsoft or the imminent release of the next Windows Server 2003 service pack in March or April 2007. The third potential cause of the problem depended on the development of a better understanding of how the website application code had been constructed and how the web server–database communications had been configured. To achieve this understanding a third party, Lede Ltd, were commissioned to carry out a code and platform audit the findings of which were used to reconfigure the server-database communication protocol.

This pre-release version of the website was replaced by the final version late in March when all of the content was made available. The delay in this final release was mainly due to the final batch of images being received from CDDA delivery of images on 22 February 2007, some seven months behind schedule, but just in time for the project conclusion.

5.6   Usability Testing

The "Demo A" version of the website was used in a user evaluation study.

This study was undertaken by Dr Mike Pringle, AHDS Visual Arts in June 2005. This study examined usability of the website through the experiences of a panel of typical users drawn for the higher education community. Each member of the panel worked through a number of set exercises recording the time they took to obtain the required responses. They also recorded their opinion of how easy or difficult it had been to obtain the require responses. The usability report can be found at http://www.histpop.org/project_docs/OHPR_Usability_Report.pdf.

In addition to this usability exercise the project's Advisory Group were consulted and their views were canvassed about functionality and usage.

The resulting assessment report identified a number of areas of weakness and recommendations were made which were incorporated into a revised functional specification used to build the "Demo B" version which was ready for user evaluation by June 2006.

This process was useful inasmuch as it gave us pointers to improving the functionality of the site; however, over-reliance on usability testing may lead to creeping featurism, where functionality is added because it might prove useful to a small group of users. Even in a project of this magnitude it is impossible to provide solutions to all user-requirements. We believe that in this type of digitisation project it is absolutely necessary to employ scholars who have intimate knowledge of the content being digitised, and the potential uses to which it can be made, to assist in the decision-making process relating to usability. However, pre-knowledge of some forms of use may stifle innovation, so carrying out usability testing with less informed subjects can be very useful.

5.7   Sourcing

The sourcing of the bulk of the printed content was achieved without too much difficulty as most volumes either sourced from Queen's University Library, Belfast or the private collection of Matthew Woollard. Some twenty or so volumes proved more difficult to source.[8] and after some investigation by the project team half of these were found in the Sheffield University Library and the remainder were located by Bill Noblett, a member of the Advisory Group, in the Cambridge University Library. Both libraries readily agreed to supply these volumes through inter-library loans.

During the course of the scanning process a number of pages were found to be either missing or have blemishes which caused the text to be partially obliterated. In order to address these problems one of three measures were adopted; for missing pages placeholder images were inserted; for blemished pages for which an alternative source could not be found a comment was recorded in the database which will be displayed together with the affected page when viewed by a user through the website, and where an alternative source could be found the page was re-scanned using the book scanner purchased for scanning the TNA material. This last solution may partially affect the integrity of the material since different versions of the same report may have been used, but this is outweighed by the provision of an un-obscured image. The bibliographical difficulties of dealing with this particular source of material are not to be underestimated.

5.8   TNA

The material sourced from TNA was scanned by the kind permission of TNA on their premises at Kew using a book scanner purchased by the OHPR project. Although the recruitment of an appropriate individual to operate the scanner was delayed by 16 months until February 2006, scanning was completed by November 2006 in time for the material to be included in the pre-release version of the website. This achievement was due in no small part to the diligence of the project member who was seconded to TNA to access and scan the material, and also the extraordinary cooperation afforded to us by TNA staff. The delays were caused in part by the company supplying the hardware, the recruitment of a new project manager, and the consequent recruitment of the Scanning Assistant. The project plan had allowed sufficient slippage for this delay to be of little consequence.

5.9   Tables

The methodology planned for the provision of a selection of machine readable tables was to use OCR generated text versions of the table which then to be manually edited

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[8] Sourcing in this case means more than identifying and locating, but comprises the sourcing of a copy in reasonable condition which can be loaned for a sufficient length of time for scanning *and* QAing, which we found to be a minimum of just under two months.

and quality assured. Some 2,100 tables were created by CCDA using this approach, however, this process proved to be very time-consuming for CDDA and the finished quality of the tables fell considerably short of expectations. This was partially due to the lack of a detailed specification for this process.

Despite this setback, the OHPR Advisory Group remained very keen for a selection of tables to be made available so much so that they drew up a "priority" list of tables which they wish to see made available as machine-readable and downloadable from the website.

At the same time detailed guidelines were produced for the transcription of tables in a form which mirrored the original pages, rather than an edited version. A pragmatic decision, based on historical principles, was taken that it would be better to have faithful transcriptions of tables rather than versions which might be slightly more usable to inexperienced users. Here we were guided by the Advisory Group.

In order to address this requirement other means by which tables could be generated were explored resulting in the selection of a manual double keying method being adopted. This technique involved manually transcribing the tables by two independent operators. The resulting machine readable tables are then compared and any inconsistency reconciled resulting in the correction of any errors.

The priority table list compiled by the Advisory Group identified some 7,600 tables for transcribing and the work needed to transcribe these tables was sub-contracted to Rao's InfoCube**,** of Tirupathi, Andhra Pradesh, India. The quality of the transcription has proved to be exceptionally good.

It is also important to note that the database which controls the site is fully extensible, so that in the future more tables could be included within the site.

5.10 Database

The first version of the database requirements and design was completed in August 2004 since when it has been continually enhanced and revised to meet the needs of the website functionality, metadata requirements and an evolving understanding of the structure and subject matter of the content material. A particular example of this evolution was the accommodation of the TNA content which because of its nature did not follow the more regular date and geography demarcation which had existed in the main population reports. Accommodating these differences required additional fields to be added to the database as late as December 2006.

Population of the database proved to be a laborious and time-consuming process despite the development of a number of custom made tools to partially automate the process. Essentially, the database was populated with two type of material; descriptive and structural metadata and text. The metadata components were comprised of a sophisticated distillation of the table of contents in each volume and their relationship to the page structure of the image files and the structure in which they were placed.

5.11 Metadata

The generation of the descriptive and structural metadata, known within the project as Tables of Contents (ToCs), was heavily dependant on the availability of approved sets of images and corresponding OCR generated text. In essence ToCs are the 'glue' which hold page and image sequences together, rather than more straightforward descriptive metadata. ToC generation could begin before approved images had become available, but without the material which they were supposed to describe, both descriptively as well as structurally, it was not possible to finalise them to any degree. The late and

compressed delivery of approved sets of images caused severe resourcing problems which in turn hindered the database population process.

The delivery of the finalised version 1.0 of the MIX specification was delayed throughout 2006 and consequently output was based on the draft 0.2 version of the standard. As a result we comply with the technical and preservation requirements but the extensive structural changes in version 1.0 mean that the internally developed output program may not be appropriate for future use.

Detailed templates were created which complied with the METS, MODS and MIX standards which were annotated to provide examples of all use cases within the resource collection.

The metadata for preservation and harvesting has been designed to comply with the METS, MODS and MIX standards, however, the development of XML generation tools was delayed due to lack of programme coding resource within the project team. This shortcoming was addressed by contracting a third party to develop these tools.

5.12 Outreach

The initial project proposal referred briefly to the need for "marketing" and listed a number of possible conduits. Later, after the first programme meeting, the July 2004 Project Plan expanded upon this theme timetabling activities, publications and presentations. An early activity in that programme was a presentation given at the annual DRH Conference in Newcastle in September 2004. Later after the appointment of the second Project Manager a revised outreach plan was initiated that delivered:

- Poster sessions and demonstrations at:
  - Economic History Society Annual Conference, Reading, March 2006
  - British Society for Population Studies Annual Conference Southampton, September 2006
- Publications
  - Articles in the AHDS Newsletter, March 2006
  - Articles in Institute of Historical Research Newsletter, Spring 2007
  - JISC Press release, January 2007
- Events
  - OHPR Website launch event, British Academy, January 2007
- Pamphlets – a set of seven pamphlets which describe the project and its output were written and printed to coincide with the website launch. These pamphlets are available for distribution at conferences and presentation events.

Marketing of the project does not end with the end of the project. Given that the site was not fully populated until March 2007 it has been useful to delay some publicity until towards the end of the project. This holds user expectation and prevents a flood of emails asking about why such and such a volume is not available.

Further promotional activities are taking place post-project. A short article appeared in the Local Population Studies Society Newsletter in Spring 2007, and a fuller (3,500 words) article will appear in the Spring issue (published in May) of *Local Population Studies*.

The effect of the launch in January 2007 can be seen on the usage figures given in the table below, but it should be noted that much of this additional activity was generated

by a single story on The Register.[9] Usage figures for February and March 2007 seem to be more indicative of usual traffic.

Month	Unique visitors	Number of visits	Pages	Hits	Bandwidth (GB)
Sep-06	919	1,316	8,985	25,279	0.92
Oct-06	940	1,486	11,661	25,075	0.68
Nov-06	896	1,483	28,503	53,607	1.77
Dec-06	723	1,185	9,625	22,742	0.59
Jan-07	7,372	10,858	101,851	315,494	9.23
Feb-07	3,132	5,253	52,679	152,789	3.65
Mar-07	3,091	5,025	59,686	166,066	3.67

5.13 Project Milestones – Planned and Achieved

Even the most well managed projects are subject to slippage and change and the OHPR project was no exception. Here is a month by month timeline which compares the planned and actual milestone events throughout the project.

Plan			Outturn		
CDDA Begin Scanning	Sep-03			Sep-03	
	Oct-03			Oct-03	
	Nov-03			Nov-03	
	Dec-03	CDDA Begin Scanning		Dec-03	Not planned
Project Plan complete Project initiation	Jan-04	Project initiated		Jan-04	On time
CDDA Service Level Agreement in place	Feb-04	File naming and organisation revised		Feb-04	Not planned
Recruitment of Project Team complete	Mar-04	Recruitment of Project Team complete		Mar-04	On time
Recruit Advisory Group	Apr-04	Recruit Advisory Group Restart scanning process		Apr-04	On time Not planned
Equipment purchased & installed Advisory Group Meeting	May-04	Equipment purchased & installed "Issue Tracker" introduced		May-04	On time Not planned
	Jun-04	"Batch Validator" introduced		Jun-04	Not planned
	Jul-04	Project plan complete		Jul-04	Late

---

[9] See the story at: http://www.theregister.co.uk/2007/01/14/19th_century_uk_online/ [Available on 8 April 2007]. This story was picked up from Kablenet.com: See http://www.kablenet.com/kd.nsf/Frontpage/96D1C28C3F498EAF8025725E0052E67D?OpenDocument].

Plan			Outturn		
Advisory Group Meeting	Aug-04			Aug-04	
	Sep-04	Advisory Group Meeting		Sep-04	Late
TNA Scanner Technician appointed	Oct-04			Oct-04	
Demo A Website Launch	Nov-04	Part time QA personnel recruited		Nov-04	Not planned
	Dec-04			Dec-04	
Advisory Group Meeting	Jan-05			Jan-05	
	Feb-05			Feb-05	
	Mar-05	Project Manager Resigned Advisory Group Meeting		Mar-05	Not planned Late
	Apr-05			Apr-05	
	May-05	Demo A Website Launch CDDA Service Level Agreement in place		May-05	Late Late
	Jun-05			Jun-05	
Advisory Group Meeting	Jul-05			Jul-05	
	Aug-05	Quality of tabular material generated using OCR judged to be inadequate. Addition funded granted by JISC for the generation of tabular material.		Aug-05	Not planned Not Planned
Demo B Website Launch	Sep-05			Sep-05	
	Oct-05	New Project Manager Appointed		Oct-05	Not planned
Demo C Website Launch	Nov-05	Usability Testing Complete		Nov-05	Late
	Dec-05			Dec-05	
TNA material scanning complete Advisory Group Meeting	Jan-06			Jan-06	
Demo B Website Launch	Feb-06	TNA Scanning Technician appointed		Feb-06	Late
	Mar-06	Fulltime QA personnel recruited		Mar-06	Not planned
	Apr-06			Apr-06	
	May-06			May-06	
Pre-release Version Website Launched	Jun-06	Double keying of tabular material contract placed with InfoCube		Jun-06	Not planned
Advisory Group Meeting	Jul-06	Advisory Group Meeting		Jul-06	On time
Release Version Website Launched	Aug-06			Aug-06	
	Sep-06			Sep-06	
CDDA Scanning Complete	Oct-06	Demo B Website Launch		Oct-06	Late

Plan		Outturn		
Metadata Generation Complete	Nov-06	TNA material scanning complete	Nov-06	Late
	Dec-06	Double Key Tables Generation Complete	Dec-06	Not planned
Advisory Group Meeting	Jan-07	Pre-release Version Website Launched	Jan-07	Late
	Feb-07	CDDA Scanning Complete	Feb-07	Late
	Mar-07	Release Version Website Launched Metadata Generation Complete Website code audit & stress testing	Mar-07	Project timescale extended by one month

5.14 Project Team

Tony Franklin Project Manager	Responsible for the management of the project, its financial and staffing issues and effective promotion.
Victoria Holmes QA Assistant	Quality assurance for all image, document and table material received in an electronic form from partner suppliers.
Hervé L'Hours Metadata Editor	Responsible for the creation of indices and catalogues of the various items to be captured and ultimately for the creation of administrative metadata.
Juergen Neuhoff Web Developer	Responsible for the development of the technical structure of the system, and to ensure its successful implementation. Also responsible for the maintenance of the website, servers, online service and administrative systems.
Anja Nieth TNA Content Assistant	Responsible for the selection and capture of all material supplied by The National Archive.
Steve Warin Database Manager	Responsible for the design and day-to-day operations of the database, and for the integration of the various elements.
Ole Wiedenmann QA Assistant	Quality assurance for all image, document and table material received in an electronic form from partner suppliers.
Matthew Woollard Project Director	Overall responsibility for the project, its direction, funding and liaison with its stakeholders.

It is important to note that both Hervé L'Hours and Steve Warin, both took additional managerial responsibility in the period when there was no Project Manager in post. Some of the 'technical managerial' roles remained within their remit after Tony Franklin took post.

6   Outputs and Results

Explain the end result of the project work in an objective way. Depending on the project, it might include research results, findings, evaluation results, data, etc. If the project created something tangible like content, a portal, or software, describe it. Engage the reader, and avoid a long list of deliverables.

The project output is divided into four parts;

- the website which provides the technical infrastructure which allowing content to be viewed;

- the digital images and other content, including essays and legislation;

- the descriptive, administrative, and structural metadata which underpins the website and the digitised content;

- the documentation which describes the project and its constituent parts.

The following sections describe in detail these outputs.

6.1   Website

The website offers both the browse and search facilities which are presented in two stages, firstly a table of contents is displayed which lists the volume and section titles from which users can select the page they wish to view. Having made that selection the selected page is displayed as an image together with information about where page is positioned in the volume from where it has been extracted. By means of this information users can navigate to adjacent pages or to other sections in the same original volume.

Figure 5: Metadata example

This ability to navigate is highly appreciated by users, and some of the challenges of creating the descriptive metadata can be seen in the illustration to the left. Here we can see that we are looking at page 540 of a particular volume. This page is within a section which is entitled "England and Wales (Continued)". Within this section is another section entitled "Division vi. North Midland". The "bounds" of this section are shown on the display as being pages 531-608. Within this section is a further subsection entitled "Civil Condition of the People". Again the bounds of this section are displayed. Descriptive metadata of this level of detail is provided for every page, and the lowest level sections can account for half a page, or five pages (as in this example) or up to 25 pages. This descriptive metadata allows users who browse (and indeed search) to drill down to the precise page they might wish to reach.

Considerable effort has been put into ensuring that the browse function is as flexible as possible; 'contents' pages have been designed to reflect the overall structure of each volume of material, and through the use of metadata. These pages are built up of the descriptive metadata described on the previous page. Facility to either page turn or display a specific page numbers has also been provided — the latter being reasonably daunting due to the complexity of page sequencing in some volumes. Every single document in the system can potentially be linked by subject material to other documents. This *Associated Content* feature maximises flexibility in browsing and allows users to move easily from one document to another. Other general facilities include image zooming, rotation and download (in both high resolution TIF and PNG formats), and a printer friendly option.

6.1.1 Downloadable Tables

A facility to download machine readable tabular material has also been provided. Some 7,240 tables have been processed and are available in Microsoft Excel format. Guided by the project's Advisory Group a discrete set of tables were selected from the 1911 census. A list of the volumes from which table were captured is included here in Appendix **12.7** Downloadable Tables Selection .

Feedback received from several users indicate that a facility for uploading tables created by themselves would be a distinct advantage, as too would the availability of many more downloadable tables.

The following illustration shows the manner in which machine-readable tables are embedded within the table of contents of one of the volumes. Clicking on one of the buttons makes the table download.

6.1.2 Website Technical

The website has the following attributes:

- Minimum Browser Configurations
    - Web browser must support common CSS-1 features.
    - No client-side scripting support such as Javascript needed for web browsers.
    - All webpage views are generated on the server-side.
    - Web browser must support PNG image format for viewing.
    - Web pages are dynamically re-sizeable in the web-browser.
    - Recommended minimum screen size is 800x600 pixels.
    - Oldest web-browsers supported are Internet Explorer 5.5 Netscape 6.0 and Opera 5.0.
- Supported Viewers
    - Microsoft Paint (Windows).
    - Microsoft Picture viewer (Windows).

- Adobe Photoshop (Windows).

- The Gimp (Windows, Linux, MacOS X versions).

- KDE Image Viewer (Linux)

- Eye of GNOME 2.x.x.

- Or any other image viewer or software capable of using TIF format.

- Media Formats

  - Downloads of high resolution images in TIF format are available for which users will need a suitable TIF-image viewer.

  - Downloadable tabular material is available in the form of Microsoft Excel formatted spreadsheets.

- Compliance

  - Website pages are XHTML 1.x compliant and fully tested for use with the following rendering engines: IE Explorer, Mozilla (used in Netscape, Mozilla, Firefox, SeaMonkey), KHTML (used in Konqueror and Safari) and Opera.

- Authentication

  - No authentication is required; the website is fully available for public access.

6.1.3 Server Hardware Configuration

The hardware platform upon which the website is built has been designed to be robust, reliable, and in the medium term sustainable. Care has been taken to ensure that the data back-up process is automatic and that service re-connection in the event of failure can be achieved simply and without incurring an undue delay.

As far as possible the development and test environment has been separated from the "live" public access components of the website. However, the system design is such that web (public) access to the primary preservation server (DAOHPRP2) is unavoidable and in order to secure the data it holds its counterpart server (DAOHPRP1) has all web (public) access disabled.

In the unlikely event of both the primary web and preservation servers failing, service can simply be restored be re-naming DAOHPRW2 as DAOHPRW1 and DAOHPRP1 as DAOHPRP2.

OHPR Server Configuration

Public Access
to www.histpop.org

Housed and managed within the UK Data Archive secure server environment

Primary OHPR Web Server "ohpr_live" database

DAOHPRW1
Built-in power supply & RAID redundancy

Back-up from DAOHPRW1 to DAOHPRW2 once a day

DAOHPRW2
Built-in power supply & RAID redundancy

Secondary (Standby) OHPR Web Server. Change over requires System Manager intervention.

Serving images, data and the "ohpr_live" database

Daily Back-up

Secondary OHPR Preservation Server Holding a copy of all OHPR image, data and database resources

DAOHPRP1

Back-up from DAOHPRP2 to DAOHPRP1 once a day

DAOHPRP2

Primary OHPR Preservation Server Holding all OHPR image, data resources and databases "ohpr_live" and "ohpr_democ"

NB. The DAOHPRP1 Server is not Web enabled so cannot be publicly accessed.

RAID disk array with built-in redundancy

Super DLT Tape Robotic Library

Daily Back-up

RAID disk array with built-in redundancy

Serving images, data and the "ohpr_democ" database

OHPR Project Team Access (password protected)

DAOHPR-TEST1

OHPR Test Server used for development and testing using the test database "ohpr_democ"

NB. All changes to are first made to the "ohpr_democ" database and tested using the Test Server DAOHPR-TEST1 before copying to the "ohpr_live" database which serves www.histpop.org through DAOHPRW1

6.2 Content

6.2.1 Census

The website includes all published census volumes for England and Wales and Scotland for the period up to and including 1931. For most of these censuses the volumes published include population statistics for different administrative geographies across the relevant countries. The census reports also contain much more information and commentary on other subjects relating to the society, economy and health of the population. For example, the illustration on the right shows the proportion of men and women in Scotland who signed the marriage register by mark over the period 1855-1904, showing the dramatic reduction of illiteracy in Scotland over the period. For many of the census years there are 'general reports', which provide detailed explanatory information about the census and for a number of years there are ancillary indices of places which can be used to locate administrative units across the country. Also available from the site are the various reports of parish register abstracts which were compiled for each of the British censuses up to and including 1841. These abstracts provide basic statistics for the investigation of population growth in the period 1801 to 1841. The site as a whole contains of almost 200 volumes of reports relating to England and Wales, almost 200 Scottish and almost 150 Irish reports.
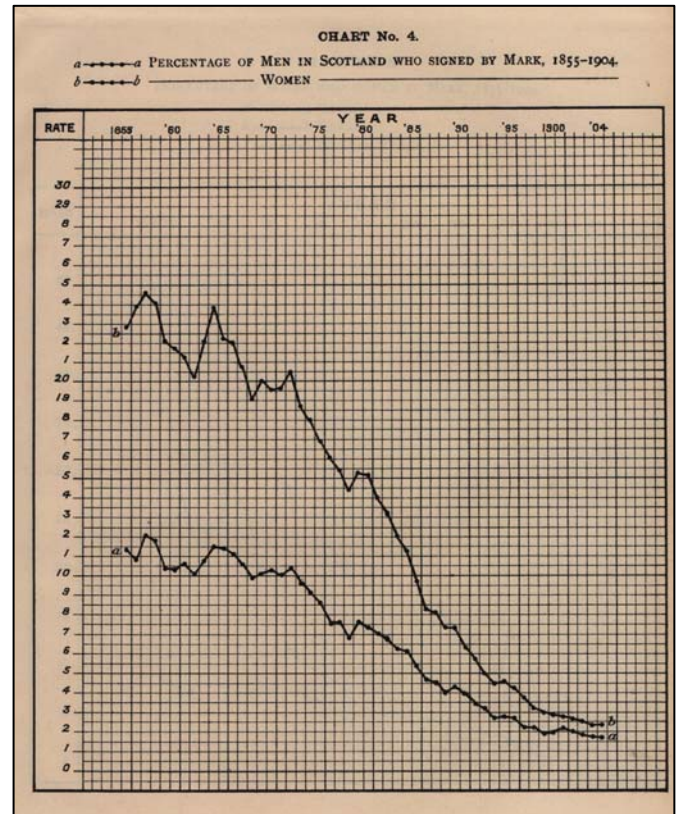
All published census volumes for Ireland up to and including 1911 are incorporated into the site. In many respects the Irish census was the first *modern* census as it brought together reports on many more subjects than its British counterparts. For example, the Irish census included reports on agriculture, housing and vital statistics in a more comprehensive manner than was the case in England or Scotland. The reports of the censuses of Northern Ireland for 1926 and 1937 are also on the site. In all there are 474 volumes of census reports amounting to a total of 108,207 pages. A list of these volumes can be found in Appendix 12.3.

6.2.2 Registrar-General

The website includes all annual reports of the Registrar-General (of England and Wales) published before the change of title to the Registrar-General's *Statistical Review* in 1921.

This includes the eighty-three annual reports of the Registrar-General published between 1836 and 1922 as well as all the decennial supplements issued between 1865 and 1923 and the special supplement issued to report on mortality from influenza during the period 1918-19. These reports were published in the Parliamentary Paper series of Register-General's reports and in addition thirteen of the nineteenth century reports are included which were published in a different version by the Registrar-General are in the collection.

All the annual and detailed annual reports of the Registrar-General of Scotland published up to and including 1921. This includes the sixty-four annual reports and the fifty-eight detailed annual reports as well as the two supplements published in 1895 and 1906. In all there are 238 volumes of registrar-general reports amounting to a total of 78,088 page images. A list of these volumes can be found in Appendix 12.4.

6.2.3 Other parliamentary papers

A selection of other parliamentary papers relating to population also forms part of the collection. These include the report of the committee on taking the 1831 census, a number of papers relating to the costs of the censuses when they were issued separately from the reports themselves, the report on the cholera epidemic of 1866 which was published as a supplement to the twenty-ninth annual report of the Registrar-General, the suggestions made to parliament by the Royal Statistical Society in 1870, the complete text of the Treasury committee of 1890 to investigate the taking of the census and the letter from the Registrar-General apologising to the people of Wales for his provocative commentary on their honesty in answering the Welsh language question in 1891.

In all there are 17 volumes of miscellaneous population reports amounting to a total of 326 page images. A list of these volumes can be found in Appendix 12.5.

6.2.4 Material from TNA

A total of 6,204 pages of images from the TNA's collection, relating to the administration of registration and the census in England and Wales, including some material relating to the Isle of Man and the Channel Islands, can be found on the website. These include a large number of examples of census enumerators' books from the various censuses in full colour, so that researchers can see the different markings used by the tabulators and checkers in the Census Office. The illustration above shows the front cover of an enumeration book for the 1881 census. The handwritten markings at the top left hand corner show the names of the people who carried out the various levels of tabulation.
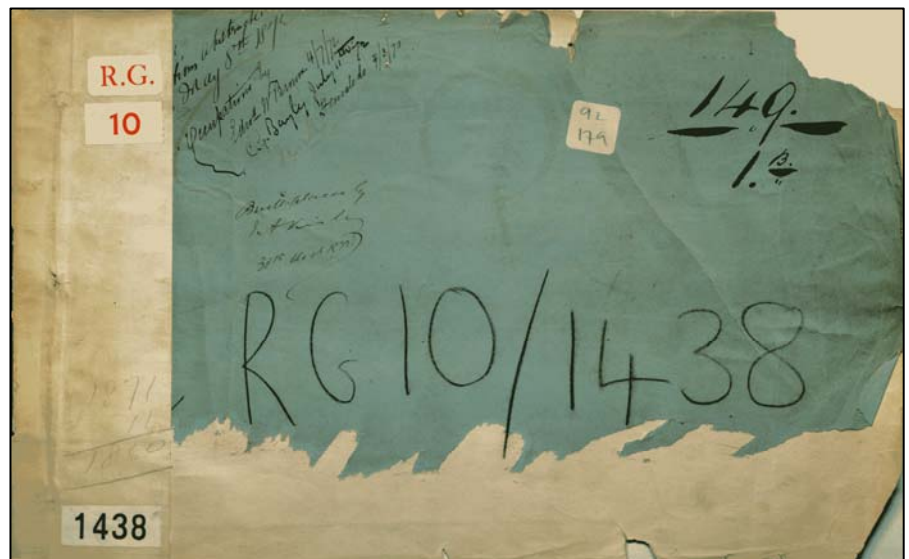
Included within the selection of material are 39 maps which illustrate some of the problems surrounding ensuring that the identical administrative units were used over different censuses.

In all there are 58 selection groups of papers from TNA amounting to 6,244 page images. A list of these volumes can be found in Appendix 12.6.

6.2.5 Legislation

The full texts are available for all of the Acts of Parliament relating to population statistics during the period 1800 to 1937. These texts illuminate the process of both census taking and registration across the period, by describing the "official" procedures

laid down by Parliament. Legislation provides highly important contextual information for the history of the construction of statistics. The text of 59 Acts of Parliament are available on the website. The text of all of these Acts was keyed in and proof-read against photocopies of the originals, obtained from the British Library or the University of Essex library. Each act was individually marked up in html for rendering on the website.

6.2.6 Essays

The original intention was to write approximately 200 essays which were to provide a useful method of understanding the various reports on this site presented within this collection. However, after reconsidering the need and use to which the essay were intended to address this total was reduced to 137 of which 108 have been written and are available on the website, without altering considerably in detail the content of these essays The remainder are expected to be added by Matthew Woollard after the project closes.

Included in the 108 essays which have been written is one on each and every census, questions on industry, migration and workplace, some key demographic information collected, including causes of death, stillbirths. A small selection of essays provide detailed biographical information on key people involved in the registration and census processes including John Rickman who in 1796 wrote a paper suggesting that the government would benefit from a census, and was the author of the first four censuses, and Thomas Stevenson who was the last Superintendent of Statistics in the General Register Office in London in the early twentieth century.

Most of the essays have links embedded in the text which allows users to quickly refer (display) the relevant pages from the other resources available on the website. This relationship matching is known as "Associated Content".

6.2.7 Resumé of files on the site

Census Reports	108,207	
Registrar-General Reports	78,088	
Misc Reports	326	
Total Number of Reports Images	**186,621**	186,621
Legislation	59	
TNA pages images	6,244	
Essays (inc placeholders)	137	
Downloadable Tables	7,094	
Total number of other content files	**13,534**	13,534
Total number of all content files		**200,155**

6.3   Metadata

6.3.1 Tables of Contents

The key structural metadata output are the Tables of Contents which enable effective navigation of the contents throughout the website and provide the METS XML output as structural maps.

ToCs are initially created as a spreadsheet for each report volume or set of content in the resource collection. These spreadsheets are imported into the database enabling the website to access images in a structure manner and show the content hierarchy of an image when it is displayed.

Illustrated here with page 6 highlighted is the ToC for the Population Abstract of the 1801 census of Great Britain. This shows the various begin and end pages of different "sections" within this report. Despite the simplicity of the report, it will be observed that page 6 (illustrated further below) falls within three sections — one which relates to the upper half of page 6 and 7 and contains a table relating to the population of Wales; the second of which relates to a table on men in the armed forces (which is highlighted in the spreadsheet and third, as part of the table General Totals which spans three pages (6, 7 and 8). These overlapping sections can easily be defined within a database or spreadsheet, but rather harder to define in XML.

Descriptive metadata of this level of detail is hard to create, as it is both labour-intensive and reasonably subjective. Despite this, as will be seen below, it is necessary to provide the clearest browsing "experience" for the user; hence, we have ensured that this descriptive metadata is of the highest quality and as detailed as is possible.

Below is the same page as it is displayed through the website – note the correspondence between the ToC and the page position hierarchy display above the page image.

6.3.2 MIX

A MIX V0.6 standard compliant XML file has been generated for every image contained within the OHPR collection. An example is shown here:

```xml
<?xml version="1.0" encoding="UTF-8"?>
<mix xmlns="http://www.loc.gov/mix/" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://www.loc.gov/mix/ http://www.loc.gov/mix/mix.xsd"  >

  <BasicImageParameters>
    <Format>
      <MIMEType>image/tiff</MIMEType>
      <ByteOrder>little-endian</ByteOrder>
      <Compression>
        <CompressionScheme>1</CompressionScheme>
      </Compression>
      <PhotometricInterpretation>
        <ColorSpace>0</ColorSpace>
      </PhotometricInterpretation>
      <Segments>
        <SegmentType>0</SegmentType>
        <StripOffsets>357</StripOffsets>
        <RowsPerStrip>5118</RowsPerStrip>
        <StripByteCounts>2267274</StripByteCounts>
      </Segments>
    </Format>
    <File>
      <ImageIdentifier imageIdentifierLocation="histpop.org">0001/00100/00001.tif</ImageIdentifier>
```

```xml
      <FileSize>2267631</FileSize>
      <Checksum>
        <ChecksumMethod>CRC</ChecksumMethod>
        <ChecksumValue>1599208726</ChecksumValue>
      </Checksum>
      <Orientation>1</Orientation>
      <DisplayOrientation>0</DisplayOrientation>
    </File>
    <PreferredPresentation>Microsoft Office Document Imaging; The Gimp 2.0; Microsoft Paint 5.1 or
later; Adobe Photoshop 7.0 or later; Microsoft Office Picture Manager; OpenOffice.org Draw 2.0 or
later</PreferredPresentation>
  </BasicImageParameters>
  <ImageCreation>
    <SourceType>printed page</SourceType>
    <SourceID>BPP_Census of Great Britain, 1801, Abstract, presented to the House of Commons, of the
      answers and returns made to the Population Act of 41st Geo. III &amp;c._1801_VI</SourceID>
    <ImageProducer>The Centre for Data Digitisation and Analysis, School of Geography, Archaeology and
       Palaeoecology (GAP), Queen's University, Belfast BT7 1NN, Northern Ireland, United
       Kingdom</ImageProducer>
    <Host>
      <HostComputer>CDDA_BP_02 CENTERPRISE PIII, DESKTOP PC</HostComputer>
      <OperatingSystem>Windows</OperatingSystem>
      <OSVersion>98SE</OSVersion>
    </Host>      <DeviceSource>BOOKPAGE SCANNER</DeviceSource>
    <ScanningSystemCapture>
      <ScanningSystemHardware>
        <ScannerManufacturer>BELL &amp; HOWELL FILEMASTER</ScannerManufacturer>
        <ScannerModel>
          <ScannerModelName>PS7000</ScannerModelName>
          <ScannerModelNumber>PS7000</ScannerModelNumber>
          <ScannerModelSerialNo>2500300</ScannerModelSerialNo>
        </ScannerModel>
      </ScanningSystemHardware>
      <ScanningSystemSoftware>
        <ScanningSoftware>FINEREADER</ScanningSoftware>
        <ScanningSoftwareVersionNo>7.0.0.510; PART#3611</ScanningSoftwareVersionNo>
      </ScanningSystemSoftware>
    </ScanningSystemCapture>

    <DateTimeCreated>2004-03-10T09:08:46Z</DateTimeCreated>
    <Methodology>
      The OHPR collection includes all population reports for England, Wales and Scotland published by
      the Registrars-General and its predecessors for the period 1801 to 1920, and all the census
      reports for England, Wales and Scotland for 1801 to 1931, census reports for Ireland until 1921
      and census reports for Northern Ireland for 1926 and 1937.  In addition, ancillary documents
      from The National Archives provide an aid to understanding the contexts, contents and creation
      of the collection. Each original page has been output as a preservation quality tiff file.
    </Methodology>
  </ImageCreation>
  <ImagingPerformanceAssessment>
    <SpatialMetrics>
      <ImageWidth>3543</ImageWidth>
      <ImageLength>5118</ImageLength>
    </SpatialMetrics>
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      <BitsPerSample>1</BitsPerSample>
      <SamplesPerPixel>1</SamplesPerPixel>
    </Energetics>
    <TargetData>
      <TargetType>0</TargetType>
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    </TargetData>
  </ImagingPerformanceAssessment>
  <ChangeHistory>
    <ImageProcessing>
      <DateTimeProcessed>2004-03-10T09:08:46Z</DateTimeProcessed>
      <SourceData>CDDA original scan</SourceData>
      <ProcessingAgency>The Centre for Data Digitisation and Analysis, School of Geography,
        Archaeology and Palaeoecology (GAP), Queen's University, Belfast BT7 1NN, Northern Ireland,
        United Kingdom</ProcessingAgency>
      <ProcessingSoftware>
        <ProcessingSoftwareName>SRZ PROSCAN BOOK, Adobe Photoshop</ProcessingSoftwareName>
        <ProcessingSoftwareVersion>2.1 BUILD 76 FEB 1 2005 (SRZ PROSCAN BOOK), 9 (Adobe
          Photoshop)</ProcessingSoftwareVersion>
      </ProcessingSoftware>
      <ProcessingActions>cropping</ProcessingActions>
      <ProcessingActions>Image cleaning and despeckling</ProcessingActions>
    </ImageProcessing>
  </ChangeHistory>
</mix>
```

6.3.3 METS & MODS

A METS standard compliant XML file has been generated for every master number contained within the OHPR collection. An example is shown below. Elements of this file have been removed, but it is displayed here to demonstrate that all elements of the structure of the collection has been retained within the METS file.

```xml
<?xml version="1.0" encoding="UTF-8"?>
<mets xmlns="http://www.loc.gov/METS/"
  xmlns:mix="http://www.loc.gov/mix/"
  xmlns:rights="http://cosimo.stanford.edu/sdr/metsrights/"
  xmlns:dc="http://purl.org/dc/elements/1.1/" xmlns:dcterms="http://purl.org/dc/terms/"
  xmlns:mods="http://www.loc.gov/mods/v3" xmlns:xlink="http://www.w3.org/1999/xlink"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.loc.gov/METS/ http://www.loc.gov/standards/mets/version15/mets.xsd"

LABEL="Census of Scotland, 1861, Tables of the number of the population, of the families, and children
at school, of the houses, and rooms with windows, in Scotland and its islands, on 8th April 1861"
OBJID="mets_OBJID_36" TYPE="Census" ID="mets_36">

<!-- METS HEADER-->

<metsHdr CREATEDATE="2007-03-31T00:00:00" LASTMODDATE="2006-10-24T08:25:38" RECORDSTATUS="Histpop
approved">
<!--METS HEADER /AGENTS AND ROLES-->
<agent ROLE="ARCHIVIST" TYPE="ORGANIZATION">
   <name>Online Historical Population Reports: Arts and Humanities Data Service-History</name></agent>
<agent ROLE="PRESERVATION" TYPE="ORGANIZATION">
   <name>United Kingdom Data Archive</name></agent>
<agent ROLE="DISSEMINATOR" TYPE="ORGANIZATION">
   <name>United Kingdom Data Archive</name></agent>
<agent ROLE="CUSTODIAN" TYPE="ORGANIZATION">
   <name>Online Historical Population Reports: Arts and Humanities Data Service-History</name></agent>
<agent ROLE="IPOWNER" TYPE="ORGANIZATION">
    <name>University of Essex</name></agent>
<agent ROLE="OTHER" TYPE="ORGANIZATION" OTHERROLE="FUNDING"><name>JISC</name></agent>
</metsHdr>

<!-- METS DESCRIPTIVE METADATA -->

<fileSec>
<!--TIFF FILE GROUP-->
   <fileGrp USE="preservation">
<file ID="TIF_0036_000001_00001"  GROUPID="000001" MIMETYPE="image/tif" SEQ="000000" >
   <FLocat LOCTYPE="URL" xlink:href="http://histpop.org/resources/images/0036/00100/00001.TIF" />
</file>
<file ID="TIF_0036_000002_00002"  GROUPID="000002" MIMETYPE="image/tif" SEQ="000000" >
   <FLocat LOCTYPE="URL" xlink:href="http://histpop.org/resources/images/0036/00100/00002B.TIF" />
</file>
...
</fileGrp>

<!--PNG FILE GROUP-->
   <fileGrp USE="web_10">
<file ID="PNG_0036_000001_00001_10"  GROUPID="000001" MIMETYPE="image/png" SEQ="000000" USE="nav_10" >
   <FLocat LOCTYPE="URL" xlink:href="http://histpop.org/resources/pngs/0036/00100/00001_10.png" />
</file>
<file ID="PNG_0036_000002_00002_10"  GROUPID="000002" MIMETYPE="image/png" SEQ="000000" USE="nav_10" >
   <FLocat LOCTYPE="URL" xlink:href="http://histpop.org/resources/pngs/0036/00100/00002_10.png" />
</file>
...
</fileGrp>

<!--XLS FILE GROUP-->
   <fileGrp USE="spreadsheet">
</fileGrp>
</fileSec>

<!-- PHYSICAL: page by page-->
<structMap TYPE="PHYSICAL" ID="MAP_0036_PHYS" LABEL="page by page">
   <div ID="pmdiv_0036" TYPE="VOLUME"  LABEL="Census of Scotland, 1861, Tables of the number of the
population, of the families, and children at school, of the houses, and rooms with windows, in
Scotland and its islands, on 8th April 1861">
      <div ID="div_000001" TYPE="page" ORDER="1" ORDERLABEL="1" LABEL="page 1">
         <fptr FILEID="TIF_0036_000001_00001" />
...
      </div>
```

```
        <div ID="div_000002" TYPE="page" ORDER="2" ORDERLABEL="2" LABEL="page 2">
            <fptr FILEID="TIF_0036_000002_00002" />
...
        </div>
</structMap>
<!--LOGICAL: by sections for METS Navigator -->
<structMap TYPE="LOGICAL" ID="MAP_0036_NAV_LOG" LABEL="navigator hierarchy">
    <div ID="nvdiv_0036" TYPE="VOLUME"     ORDER="1" LABEL="Census of Scotland, 1861, Tables of the
number of the population, of the families, and children at school, of the houses, and rooms with
windows, in Scotland and its islands, on 8th April 1861">
        <div ID="nav_sdiv_1" TYPE="SECTION" LABEL="Title page" ORDER="3">
            <div ID="nav_pdiv_1_000001" TYPE="page" ORDER="1" ORDERLABEL="1" LABEL="page 1">
                <fptr FILEID="TIF_0036_000001_00001" />
...
            </div>
            <div ID="nav_pdiv_1_000002" TYPE="page" ORDER="2" ORDERLABEL="2" LABEL="page 2">
                <fptr FILEID="TIF_0036_000002_00002" />
                <fptr FILEID="PNG_0036_000002_00002_10" />
...
            </div>
        </div>
    </div>
</structMap>


<!--PRESERVATION_LOGICAL: by sections-->

<structMap TYPE="PRESERVATION_LOGICAL" ID="MAP_0036_PRES_LOG" LABEL="preservation hierarchy">
    <div ID="lmdiv_0036" TYPE="VOLUME"     ORDER="1" LABEL="Census of Scotland, 1861, Tables of the
number of the population, of the families, and children at school, of the houses, and rooms with
windows, in Scotland and its islands, on 8th April 1861">
        <div ID="sdiv_1" TYPE="SECTION" LABEL="Title page" ORDER="3">
            <div ID="pdiv_1_000001" TYPE="page" ORDER="1" ORDERLABEL="1" LABEL="page 1">
...
            </div>
            <div ID="pdiv_1_000002" TYPE="page" ORDER="2" ORDERLABEL="2" LABEL="page 2">
               <fptr FILEID="TIF_0036_000002_00002" />
               <fptr FILEID="PNG_0036_000002_00002_10" />
...
            </div>
        </div>
        <div ID="sdiv_2" TYPE="SECTION" LABEL="Introduction &amp; contents" ORDER="3">
            <div ID="pdiv_2_000003" TYPE="page" ORDER="3" ORDERLABEL="3" LABEL="page 3">
                <fptr FILEID="TIF_0036_000003_00003" />
...
            </div>
            <div ID="pdiv_2_000004" TYPE="page" ORDER="4" ORDERLABEL="4" LABEL="page 4">
                <fptr FILEID="TIF_0036_000004_00004" />
...
            </div>
        </div>
    </div>
</structMap>
</mets>
```

6.4 Tools

During the course of the project a number of purpose built tools were developed.

Three tools were designed to assist the project team manage and facilitate the imaging workflow and comprised of the Issue Tracker, Batch Validator and PNG File Generator. A fourth tool was also developed to enable the editing of descriptive and structural metadata after the population of the database. This tool was required to ease the difficulties in quality assuring this metadata which could not be done effectively until the database had been populated with the metadata. Editing this metadata outside of the database requires subsequent database re-population; a process which itself is error prone. Editing the database directly using this tool avoided this problem.

The generation of METS and MODS metadata was also done using a purpose-built tool which enabled a flexible approach to the creation of these resources.

6.4.1 Issue Tracker

The Issue Tracker was developed to manage the imaging workflow and quality assurance process.

Essentially the issue tracker allowed QA assistants at the UKDA to report issues in image quality or other problems to the scanning workers at CDDA but also meant that a permanent record of each issue is retained. Here is an example screen shot of the Issue Tracker which illustrates the example previously cited in this document under the heading.

Figure 6: Issue Tracker

6.4.2 Batch Validator

The Batch Validator is a tool which can be used to ensure that the files in a select directory structure exist and are named in a consistent and contiguous sequence.

Below is an illustration of the validator in use on a batch of images files received from CDDA. In this case the batch identification is "M2" meaning it is the second quality assurance iteration on the batch named "M"; the master number directory selected for validation in batch "M2" is 0556. The validator has reported that in chunk "00300" the image files 00015.tif, 00016.tif and 00044.tif could be missing.
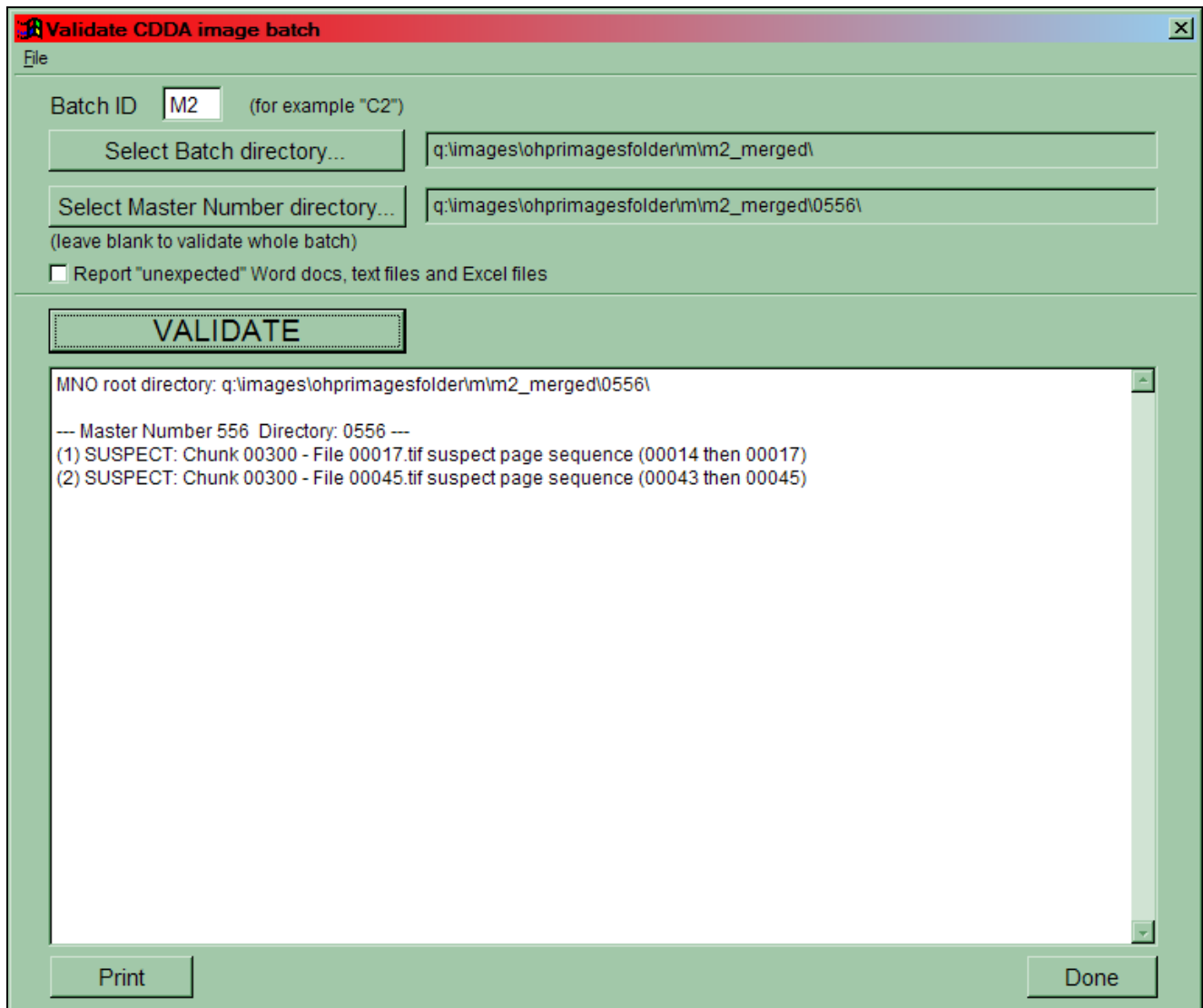
Figure 7: Batch Validator

This tool has been customised to such an extent that it is unlikely to be of value to other projects, but the principle of the batch validator is an important one especially when dealing with particularly complex file structures.

6.4.3 TIF to PNG Converter

The images displayed on the website are delivered as PNG files at five levels of magnification. (While PNGs are a "better" file format for the display of images across a network than JPGs, they have the failing that they do not scale well, hence a decision was made, to gives users the opportunity of viewing five correctly scaled PNGs on the site.). The image format conversion tool "Any Image" from FMJ Software[10] was used to convert image files from the TIF to PNG format. However, this tool is only really suitable to use on small batches of images in simple directory structures. Using it with the complex directory structures in place in this project, for multiple levels of image magnification proved to be very labour intensive and prone to error. Consequently, the TIF to PNG Converter tool was developed to overcome these problems. This tool takes the TIF files of a complete volume and converting them into PNG files of five different sizes and filing them in the correct preservation directory.

This tool took about five working days to develop and its use probably saved about three working months of time.

Although this tool was developed specifically for the OHPR image file-naming and directory structures it could be modified to match other structures.
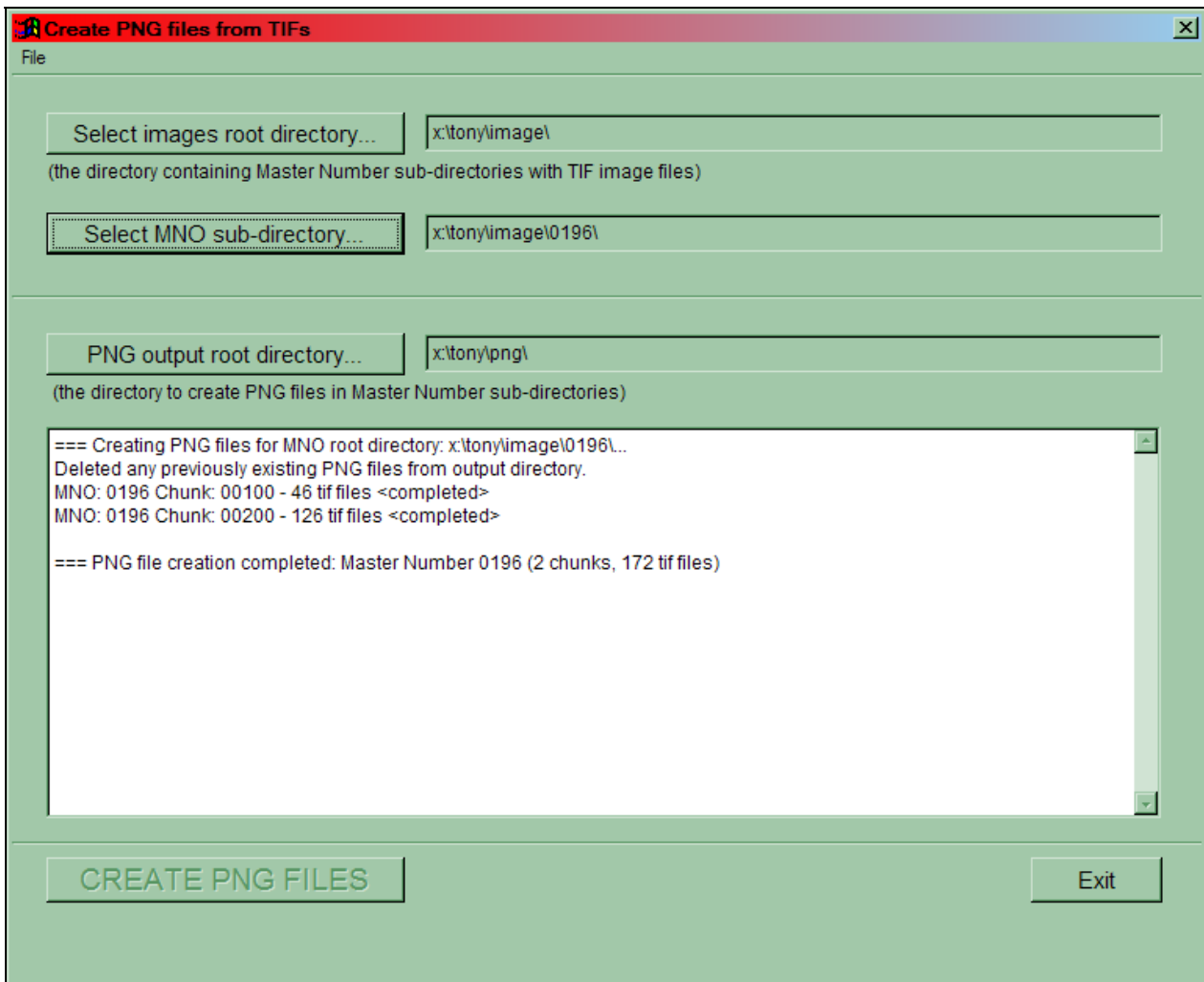
Figure 8: TIF/PNG Converter Interface

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[10] FMJ Software http://www.fmjsoft.com/anyimage.html

6.4.4 Database and Content Maintenance Tool

This tool was developed in the late in the project to enable the descriptive and structural metadata at volume, table of contents and page level to be edited without the need to re-populate the underling database. The main purpose is to allow continued maintenance of the descriptive metadata after the end of the formal project. If minor errors in the ToCs are discovered, they can be "edited" via this tool, before updating the live site. It also allows relationships between various elements of the site to be managed without using the more flexible but less user-friendly php interface to the various databases used by the system.

The volume edit screen is illustrated here in two parts. The first shows basic descriptive metadata editing. So, the volume illustrated has been allocated to "Great Britain" and is shown as such in the browse trees of the website. To change this in the database would be difficult without a good knowledge of the database structure, so this tool allows these variables to be altered within certain parameters. The second screen shows how rights-related metadata can be altered.

Figure 9: Admin GUI. Example 1

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Figure 10: Admin GUI. Example 2

6.4.5 MIX Generation Tool

This tool manifests itself as a command line script which is runs from within the Command Line window of Windows 2000.

This script uses the Java Image I/O API to generate a SQL-script to copy the metadata in each TIF file into a database table. MIX XML for each TIF file is then generated from that table and deposited into a directory in the OHPR preservation server.

6.4.6 METS & MODS Generation Tool

[Yet to be written]

6.5 Outreach

A selection of information pamphlets have been written and printed which have been used to promote the OHPR project and the website at various conferences and events.

These pamphlets are:

- "**histpop online** / user guide" – a brief explanation of how to use the website.
- "**histpop online** / resources" – a description of the content in the site.

- "**histpop online** / material from TNA" – a review with illustrations of the type of material available.

- "**histpop online** / trivia" – a snap shot of some of the more colourful narratives to be found.

- "**histpop online** / metadata" – our approach and implementation.

- "**histpop online** / a taster" – this pamphlet was the first to be written in March 2006 and it provides an overview of the OHPR project.

- "**histpop online** / quality assurance" – an insight into how we went about QA.

- "**histpop online** / website technical" – a brief technical description of the website.

To mark the public launch of the histpop website a formal launch event was held at the British Academy on 9 January 2007. This event was introduced by Duncan Macniven, Registrar-General, GRO Scotland and a closing address was given by Dr Malcolm Read, Executive Secretary, JISC.

In addition to a presentation of the website and its functionality given by Matthew Woollard, a series of presentations about how it could be used were given by Colin Pooley, Lancaster University, Paul Glennister, University of Essex, Anne Hardy, Wellcome Trust Centre for the History of Medicine, Andrew Hinde, University of Southampton, Paul Ell, Queen's University, Belfast and Tony Franklin, University of Essex.

The project and its outputs were very well received at this launch.

6.6 Documentation

Documentation relating the project has been made freely available through the "Project" tab on the website. This documentation includes specifications, policies, guidelines, and publicity material. At the final release the following documents are available on the website.

- Project Proposal Oct 2003

- Project Plan 2004

- Security Policy

- User Requirements

- Usability Report

- Website Functional Specification

- Website Technical Overview

- Website Technical Specification

- File Naming

- Tables Requirements

- Table Creation Guidelines

- Content Management

- Content Approval Process

- Tables Approval Process

- Metadata Strategy

- Metadata: ToC Creation Process

- Metadata: DC OAI

- Metadata: DC OAI Template

- Metadata: MODS

- Metadata: MODS Template

- Metadata MIX

- Metadata MIX Template

- Metadata: METS

- Metadata: METSRights Template

- Metadata: METS Template

- Metadata: XML Generator User Requirements

- Metadata: XML Generator Functional Specification

- Metadata: XML Generator Technical Specification

Copies of these documents can be found under the website Project Tab or access directly at:
http://www.histpop.org/ohpr/servlet/Category?page=Project&path=Project/Links/Project%20Documents&active=yes

7 Outcomes

7.1 Achievements

In almost all respects the project has met the set objectives in provided a rich and assessable reference source of data to researcher, educationalists and students who are studying the population history of United Kingdom and Ireland. Its easy to use browse facility and powerful search tools allow all interested parties to use the site with ease.

Set against the objectives the achievements can be summarised as follows:

OBJECTIVES	ACHIEVEMENTS
Capturing the images from approximately 187,000 pages of population reports from a variety of sources.	All of the Census and Register-General reports from 1801 to 1937 have been sourced either from the personal collection of Matthew Woollard: Queen's University, Belfast; University of Sheffield Library; or Cambridge University Library. A total of 709 volumes (187,218 pages) have been sourced and scanned. (Note that the original estimate of page scans was reliable.)
Capturing the images from approximately 5,000 pages of unpublished archival material at the TNA.	A total of 6,227 TNA images have been made available in the contents collection. Of these are 27 image are maps were supplied directly by TNA, the remainder were scanned by OHPR.
Capturing text from approximately 50,000 pages of population reports at searchable quality	OCR has been carried out on a total of 187,218 images of which 26,418 have been refined to ensure a high degree of accuracy when used for searching text.
Capturing and OCR text for display of each and every relevant Act of Parliament.	All relevant Acts of Parliament have been captured and available on the website.
Integrating previously existing machine-readable versions of statistical tables from over 200 tables within the database.	These tables have not been incorporated into the database, instead some 3,214 table have been source using double keying methods which has resulted in a set on machine readable tables which are extremely accurate version of the original paper copies

Creating approximately 500 further machine readable versions of statistical tables and subsequently integrating these within the database	Follow to advice and recommendation of the Advisory Group a further 3,976 tables have been included in the database.
Metadata – Historical content created for each report, describing and contextualizing the series of reports, collection, title and item level metadata for harvesting, title and item level metadata for searching, and item level technical metadata for administrative and preservation purposes.	The tables of contents of each volume in the collection has been generated and incorporated into the navigational component of the website. Metadata has been generated fro the entire collect which complies with the MIX, MODS and METS standards.
Development of a web-based user interface for browsing, searching, viewing and downloading images from the published reports and all ancillary material.	A function rich, user orientated web-base user interface, www.histpop.org, has been created, tested and put into service.
Establishment and maintenance of the 'database' for Higher and Further education users, within agreed service levels.	The 'database' is embodied in the website which is public access and therefore fully accessible to all educational and non-educational users.

7.2 Impact

The use of the OHPR resource by individual and organisation is expected to be a gradual process which will be stimulated by promotion, discovery and word of mouth all of which is already happening.

Organisations already using the resource are:

- Office for National Statistics, Census Customer Services.
- Trinity College Carmarthen - Learning Resource Centre
- TNA Reader Information Services, Family Records Centre

Organisation interested in adding material to the resource:

- Northern Ireland Statistics and Research Agency, Demography and Methodology Branch
- General Register Office for Scotland, Registrar General for Scotland
- Office for National Statistics, Census Customer Services

During the course of the project the website and its contents have been exposed to public scrutiny on a number of occasions; user testing, conference presence, public launch event and user feedback. The exposure of the website in this way throughout its development has resulted in a great deal of critical and constructive feedback being received which has enabled the functionality of the website to more effectively meet the needs of the users.

The impact which website is having is perhaps best summed up by quoting some of the unsolicited comments received from users when they first encounter the website:

" .this is a godsend…"

"… yes, this looks very useful but what I what is the quarterly Reg Gen returns…"

"… I need it now…."

"… its fantastic…"

"… yes, I use census reports….. this will be a great help…."

"… It will save me a journey of a couple of hours each time I want to go to the library to access this material …"

"… I've been looking extensively for demographic data derived from census returns. It was therefore a delight to find the comprehensive coverage already available …"

"…You have 2 sections titled Devon 1901, the 2nd should be titled Dorset 1901 …"

"… congratulations on the latest version of your site, which is a truly invaluable resource .."

"…Congratulations all round for making this data and, in particular, document images, available online. We have already found it extremely useful in our work here at the Family Records Centre…"

"…I just want to say what a fantastic resource this is. I came across the site by accident when almost despairing, trying to find local hard copy locations for the Census Reports and Registrar General reports, and here it all is…."

7.3 Lessons

During the course of the project lessons have been learnt or in some cases re-learnt. The headline lessons are:

- Have sound commercial agreement(s) in place with suppliers.

- Digitising should not commence until the structure of the content is understood and an agreed and working series of relevant (and in this case historically and bibliographically informed) file naming conventions has been agreed.

- Understand the needs of your users.

- Workflow, QA processes and data organisation should be specified, before the image scanning process starts.

- A functional specification should be drawn up which includes details of data structure before the code development of the web portal is commenced.

- Functional specifications, like project plans can not be set in stone. It is necessary to be aware that functional specifications may need to be revised to meet the discovered and perceived needs of the user.

- Data should, wherever possible, be verified programmatically.

- Assess the availability of the tools necessary to carry out the QA process and manage the data and use the best. Where necessary be prepared to develop bespoke tools to meet this need.

- Avoid the "*would-it-not-be-nice*" temptation to add cosmetic functionality. This can be a waste of human and financial resources.

- Understand the needs of the funding agency beyond that to the project proposal.

- When using in-house project team members ensure that they are sufficiently competent especially in small team where there is no room for expertise diversity.

- Invest in verification, validation and testing from day one.

- Be prepared to make partial re-specification of the project plan to meet unexpected events.

7.3.1 In-House vs. Outsource

The in-house development approach adopted by the OHPR project has worked well thanks to the expertise and diligence of the project team. The end product is a much richer and a more functional website than would have resulted if its creation had been outsourced.

However, this success has not been without its problems, and without careful project management, the in-house approach would have been a high risk enterprise. Its success is highly dependant upon not only the expertise but also the temperament of individual team members and their ability to work together and in a cooperative manner. Careful selection and recruitment of team members is a key area and great care must be applied during the recruitment phase to ensure the expertise and temperament is well matched. Although it is possible to replace team members, doing so places a heavy burden on project managers at a time when they should be focusing of making the project plan work.

On the other hand the out source approach allows the project team to focus the content creation workflow, quality assurance and the organisation of content for presentation on the website. To ensure the success of this approach water-tight agreements with suppliers and task specification are essential.

7.3.2 Digitisation Workflow

In a project of this nature this is perhaps the most critical element. The digitisation process in this project was highly dependant on the close coordination and cooperation between the digitisation supplier (CDDA), the quality assurance members of the project team and the aims of the project. The key message is "understanding" — the supplier understanding the needs of the project, and the project team's understanding of the workflow management processes used by the supplier.

The overall workflow must be a blending of needs and processes. In the early part of the project this blend did not exist and consequently the supplier launched into the digitisation of content without paying sufficient attention to the file naming and structure needs of the project. As result a significant number of content volumes needed to be re-worked following the imposition by the project team of a structured file naming convention. This problem was effectively one of poor planning and a lack of dialogue between the supplier and the Project Director. It soon became clear that the vaunted experience of the supplier was not as great as expected and that while the quality of digitisation per se was acceptable, neither the Project Director nor the supplier had sufficient experience of working within a large-scale digitisation project involving an online resource. The demands for an online resource are different to more straightforward research projects. Both the supplier and the Project Director have learned considerably from this project.

Although the supplier carried out their own quality assurance, the quality level which the project required was not being achieved. This was partially due to untrained and uninterested staff working for CDDA. Inevitably, this situation caused a considerable amount of friction between the project and the supplier which, if it had been left unchecked, would have resulted in a breakdown in communications. When this situation occurs effective measures must be employed to ensure that matters do not get out of hand.

The project team took a number of measures to resolve this situation. Firstly, the devolvement and introduction of the Issue Tracker (already highlighted in **6.4.1 Issue**

Tracker) a website fronted database which allowed the supplier and the project to record the quality issues image by image. The second measure was the deployment of quality assurance team within the project team who carried out a 100 per cent inspection of both the images and the OCR text. The size of this team grew to three people towards the end of the project and additional funded was granted by JISC to partly cover the cost of this expansion to the project team.

The final measure adopted was one of common sense management and accommodation by the project of the supplier's organisational environment. In essence this was achieved by ensuring that the communication channel between the project and the supplier was cordial and effective.

7.3.3 Specifications

There were four key specification documents written during the course of the project; Website Technical Specification, Website Functional Specification, Database Design and Metadata Strategy. Each of these documents was subject to change especially so the Functional Specification which was governed by user requirements and accessibility dictates enforced by JISC. These two controls do sometimes conflict; an example in point could be a user requirement which can only be achieved by using "client side scripting" which if implemented would breach the accessibility which required the website to be independent of any functionality of the user's computer. Another example is the browser backwards compatibility requirement, again imposed by JISC, which when applied by the project proved to be incompatible with the use of cascading style sheets in the website application code. While the first example proved to be inviolate, on application to JISC, they were prepared to relax the backward compatibility requirement to enable emerging techniques and standards to be used in developing the website application code.

The lesson to be learnt here is not to accept dictates at face value; challenge them and put forward rational arguments for change. Often the door is half open.

Of the four specification documents the Functional Specification proved to be the most controversial and difficult to finalise within the project. This difficult was largely due to the in-house website development approach adopted by the project. Because the website code was being developed within the team the temptation was to continually change the functionality usually in minor way but on occasions in a way which had a major impact on the development timescales. If left unchecked this tendency will protract the project timescale and can prove to be costly. This situation is best dealt with by guillotining the specification process and recording the desired and suggested changes separately for implementation at a later date if sufficient resources are available.

The changes left outstanding at the end of the project have been recorded in Appendix 8 of the Functional Specification which can be found at http://www.histpop.org/ohpr/servlet/Category?page=Project&path=Project/Links/Projec t%20Documents&active=yes .

7.3.4 Testing

This is an area which can easily be neglected in an in-house development programme; put off until the last minute, and thereby not executed with the same vigour as it would if development had been outsourced.

The temptation is to rely on ad hoc testing of the whole system through the website rather than adopt a systematic approach using test specifications, test harnesses and test scripts during each stage of the development programme.

The project used to ad hoc testing approach to good affect at the functional level, however, at the deeper technical level this approach proved not to be very effective. At the time of the application code was frozen in early January 2007 the website started to suffer from service failure events; periodically it would stop responding the user requests. In an attempt to resolve this problem the project team undertook an exhaustive review of the web server application code identifying a number of possible causes of the problem but no definitive solutions.

In these circumstances an independent view is often useful and can be very effective. Indeed, this is exactly what the project did by commissioning a suitable experienced and qualified party to carry out a review of the website application software and an audit of the web server platform. The recommendations emerging from this exercise were implemented resulting in a much improved level of service reliability and up to a 10 fold increase in the website response time.

The lesson to be learned from this experience is that a project should not be complacent about the expertise within the team – always treat the deliverable as though they had been outsourced.

7.3.5 Tools

The tools developed during the course of the project have largely been used to improve productivity and to avoid unnecessary manual operations which are prone to error. This was necessary for two reasons; to improve the digitisation workflow, and automate some aspects of the images processing and database population.

The in-house approach has required the development of some of these tools especially the Issue Tracker which would have been avoided if the whole to the digitisation workflow had been outsourced.

However, this is not the case for the automation tools because of the need to handcraft the database which is almost unavoidable when creating the fine detail metadata which the project was bound to deliver.

When planning a project similar to the OHPR project, allowance needs to be made for the devolvement of specialised tools to match the needs of the data.

7.3.6 Supplier Relationships

The partnership relation culture which permeates through JISC projects need to be handling carefully when partners are in a supplier/customer mode.

It is not sufficient to rely on best endeavours in these circumstances or indeed a loose service level agreement, or worse, a memo of understanding. It is in the interest of both parties to have supplier agreement in place which need have the strictures to be found in a commercial contract, but must precisely define what is expected of both parties and the remedial measures which at their disposal.

8   Conclusions

The conclusion which can be draw from the three years of work which the project has involved and from the feedback from users can be summarised as follows:

- An effective and highly functional user interface has been created which allows users to maintain the context and placement of individual page images within the whole collection. It is not enough to offer a means of page turning and the crude selection of pages for viewing.

- At this time the use of OCR to create machine readable versions of complicated and densely populated tabular material is not an effective method of achieving this objective.

- The manual re-keying of tabular material proved to be very accurate and while at ~£1 per page is relatively more expensive than OCR it is very much more effective.

- The use of the PNG file format for image display has proved to be effective and economical to implement.

- Image creation workflow requires close attention to the nature of the content being digitised.

- The in-house custom built approach use in this project has been relatively expensive but it has allowed the tailoring of functionality to more precisely meet the needs of users.

- Metadata standards continue to emerge and evolve which in turn results in a lack of understanding amongst potential practitioners especially where it relates to access to preserved digital images.

- The contextual resources; TNA, Essays and Legislation, substantially improves the accessibility of the population report resources; Census and Registrar-General reports.

- Early indications from uses indicate that, for those who have an interest in historical demography, the histpop website is an extremely valuable asset.

9   Implications

The main implications for developing the project fall under the following headings:

- There is clearly a demand to meet the educational needs which the histpop website is provoking. This demand will drive the need to increase content available; enhance content (i.e., full OCR of all text pages), improve access through "additional content" and refined functionality.

- It will be necessary to more effectively address the preservation needs which the digitisation of this type of resource brings about. At the time of the projects closure a "metadata snapshot" was taken which proved the concept and validated the XML output files against the current metadata standards. However, despite the best endeavours of the project the resources collection is not stable; there are some missing pages, some pages need to be replaced when better quality images become available, it is expected that there will be an increasing demand to make additional content available. Each time one of these needs is met then the content will change and updating the website will bring new challenges in

ensuring that relevant preservation metadata can be reconstructed. At present altering a single file means running the METS capture for the whole document.

- One very popular facility which the histpop website offers is that of the ability to download machine readable tables. The creation of these tables is expensive and as the census reports contain many thousands of tables, care will need to be exercised if this demand is to be met.

- The cost, at an operating level, of sustaining the histpop website and the content it delivers is relatively low. However, the cost website application code maintenance and enhancement will be high and measure may need to be taken to address these costs. There are a number of options available to meet these costs which include:

  - Do not maintain the website application code or undertake any enhancements.
  - Identify new funding sources and opportunities.
  - Fund website application code maintenance and enhancement through charging a levy on parties wishing to add content.

10 Recommendations

List any specific recommendations for the teaching, learning, or research communities.

- Promote the use of the collection and website in both the higher and secondary education sectors.

- Consider implementing the additional functionality identified by users.

- Complete the Essays series.

- Develop a machine readable tables upload facility in order to capture user generated machine readable tables.

- Increase the number of downloadable tables available.

- Re-write the website application code in line with the recommendation of the application software code audit.

- Enlarge the content collection to include census and Registrar-General report up to the most recent census.

- Develop the database and content maintenance tools to enable it to be used to add new content and amend existing content.

11 References

List any references to the work of others you have cited (e.g. articles, reports, studies, standards), and any explanatory notes. Provide URLs for any materials available on the web.

E. M. Crawford, Counting the people. A survey of the Irish censuses, 1813-1913 (Dublin: Four Courts Press, 2003).

Edward Higgs, John Rickman (1771-1840): http://www.histpop.org/ohpr/servlet/View?path=Browse/Essays&mno=2137

Edward Higgs, The development of the General Register Office of Ireland: http://www.histpop.org/ohpr/servlet/View?path=Browse/Essays&mno=2004

[L. M. Feery], Guides to official sources. No. 2. Census reports of Great Britain, 1801-1931 (London: HMSO, 1951).

Office of Population Censuses and Surveys & General Register Office, Edinburgh, Guide to Census Reports, Great Britain 1801-1966 (London: HMSO, 1977).

12 Appendixes

Include any appendixes that readers will find helpful to understand the work described or the results. For example, include a questionnaire if you conducted a survey, or technical details that support technical development carried out. A glossary of acronyms and technical terms is often helpful.

12.1 Glossary

GRO	General Register Office	See ONS (below).
AHDS	Arts and Humanities Data Service	http://ahds.ac.uk/
CDDA	Centre for Data Digitisation and Analysis	http://www.qub.ac.uk/cdda/
Client-side Scripting	Client-side scripting generally refers to the class of computer programs on the web that are executed client-side, by the user's web browser, instead of server-side (on the web server)	http://en.wikipedia.org/wiki/Client-side_scripting
CSS	Cascading Style Sheets is a style sheet language used to describe the presentation of a document written in a mark-up language	http://en.wikipedia.org/wiki/CSS
DOC	Microsoft Word file extension	
Javascript	JavaScript is the name of Netscape Communications Corporation's and now the Mozilla Foundation's implementation a scripting language based on the concept of prototype-based programming. The language is best known for its use in websites (as client-side JavaScript), but is also used to enable scripting access to objects embedded in other applications.	http://en.wikipedia.org/wiki/Javascript
JISC	Joint Information Systems Committee	http://www.jisc.ac.uk/
METS	Metadata Encoding and Transmission Standard	http://www.loc.gov/standards/mets/
MIX	Metadata for Images in XML	http://www.loc.gov/standards/mix/
MODS	Metadata Object Description Schema	http://www.loc.gov/standards/mods/
ONS	Office for National Statistics	The ONS has provided a centralised statistical function to the British government. The function relating population censuses and surveys (OPCS) was in existence from 1970 to 1996. The predecessor of the OPSC was the GRO (formed 1837). These three organisations were primarily responsible for the creation of population statistics in the England and Wales.
OPCS	Office of Population, Censuses and Surveys	See ONS (above).
PNG	Portable Network Graphics is a bitmapped image format that employs lossless data compression. (Some wags have suggested that PNG stands for PNG's Not GIF.)	http://www.libpng.org/pub/png/
TEI	Text Encoding Initiative metadata	http://libraries.mit.edu/guides/subjects/metadata/standards/tei.html
TIF	Tagged Image File Format (abbreviated TIFF or TIF) is a file format for mainly storing images, including photographs and line art.	http://en.wikipedia.org/wiki/TIFF
TNA	The National Archive	http://www.nationalarchives.gov.uk/
TXT	Text file extension	
UKDA	UK Data Archive	http://www.data-archive.ac.uk/
XML	eXtensible Markup Language	http://www.w3.org/XML/

12.2 Irish Census Reports of 1926

These reports are listed to show which reports could have been included in the original selection without impinging current copyright law. The Irish copyright law extends for a period of 75 years, so only those published in 1931 and before could possibly have been included in the original selection. It is perhaps worth noting that the estimated number of pages in these reports is around 2,250.

Census of Ireland, 1926, *Preliminary report* (1926).

Census of Ireland, 1926, *Vol. I. Population, area and valuation of each district, electoral division and of each larger unit of area* (1928)

Census of Ireland, 1926, *Vol. II. Occupations of males and females in each province, county, county borough, urban and rural district* (1928).

Census of Ireland, 1926, *Vol. III. Part 1. Religions. Part 2. Birthplaces* (1929).

Census of Ireland, 1926, *Vol. IV. Housing* (1929).

Census of Ireland, 1926, *Vol V. Part 1. Ages, orphanhood and conjugal conditions classified by areas only* (1929).

Census of Ireland, 1926, *Vol V. Part 2. Ages and conjugal conditions classified by occupations and industry* (1930).

Census of Ireland, 1926, *Vol. VI. Industrial status (preliminary analysis)* (1931).

Census of Ireland, 1926, *Vol. VII. Industries* (1932)

Census of Ireland, 1926, Vol. VIII. Irish language (preliminary analysis) (1932)

Census of Ireland, 1926, *Vol. VIII. Irish language with special tables for Gaeltacht areas* (1932)

Census of Ireland, 1926, *Vol. IX. Dependency* (1933)

Census of Ireland, 1926, *Vol. X. General report* (1934)

12.3 Census reports

12.3.1   Census reports, 1801 Great Britain

Census of Great Britain, 1801, *Abstract, presented to the House of Commons, of the answers and returns made to the Population Act of 41st Geo. III &c.* BPP 1801 VI (140).

Census of Great Britain, 1801, *Abstract of the answers and returns made pursuant to an Act, passed in the forty-first year of His Majesty King George III. intituled "An act for taking an account of the population of Great Britain, and the increase or diminution thereof". Enumeration. Part I. England and Wales. Part II. Scotland.* BPP 1801-02 VI (9).

Census of Great Britain, 1801, *Abstract of the Answers and returns made pursuant to an Act, passed in the forty-first year of His Majesty King George III. intituled "An act for taking an account of the population of Great Britain, and the increase or diminution thereof". Parish-registers.* BPP 1801-02 VII (112).

12.3.2   Census reports, 1811 Great Britain

Census of Great Britain, 1811, *Comparative statement of the population of the several counties of Great Britain, in the years 1801 and 1811.* BPP 1812 X.171 (12).

Census of Great Britain, 1811*, Abstract of the answers and returns made pursuant to an Act, passed in the fifty-first year of His Majesty King George III. intituled "An act for taking an account of the population of Great Britain, and of the increase or diminution thereof". Preliminary observations. Enumeration abstract.* BPP 1812 XI.1 (316).

Census of Great Britain, 1811, *Abstract of the answers and returns made pursuant to an Act, passed in the fifty-first year of His Majesty King George III. intituled "An act for taking an account of the population of Great Britain, and of the increase or diminution thereof". Parish register abstract.* BPP 1812 XI.547 (317).

12.3.3   Census reports, 1821 Great Britain and Ireland

Census of Ireland, 1821, *Abstract of the Population of Ireland, according to the late census….* BPP 1822 XIV.737 (36).

Census of Great Britain, 1821, *Comparative statement of the population of the several counties of Great Britain, in the years 1801; 1811 and 1821.* BPP 1822 XXI.631 (8).

Census of Great Britain, 1821, *Abstract of the answers and returns made pursuant to an Act, passed in the first year of the reign of His Majesty King George IV, intituled, "An Act for taking an account of the population of Great Britain, and of the increase or diminution thereof". Preliminary observations. Enumeration abstract. Parish register abstract, 1821.* BPP 1822 XV.1 (502).

Census of Ireland, 1821, *Abstract of answers and returns made pursuant to an act of the united parliament passed in the 55th year of the reign of his late majesty George the third … Preliminary observations, enumeration abstract, appendix.* BPP 1824 XXII.411 (577, 1823).

Census of Great Britain, 1821, *Return of the population, according to the last census, of Isle of Wight, in the County of Southampton.* BPP 1831 XVI.359 (144).

12.3.4   Census reports, 1831 Great Britain and Ireland

Census of Great Britain, 1831, *An account of population of the several counties of Scotland, as enumerated in May 1831.* BPP 1831 XV1.361 (258).

Census of Great Britain, 1831, *Comparative account of the population of Great Britain in the years 1801, 1811, 1821 and 1831; with the annual value of real property in the year 1815: also, a statement of progress in the inquiry regarding the occupations of*

families and persons, and the duration of life, as required by the Population Act of 1830. *BPP 1831 XVIII.1 (348).*

Census of Great Britain, 1831, *Abstract of the answers and returns made pursuant to an Act, passed in the eleventh year of the reign of His Majesty King George IV. intituled, "An Act for taking an account of the population of Great Britain, and of the increase or diminution thereof." Enumeration Abstract. Vol. I.* 1831. BPP 1833 XXXVI.1 (149).

Census of Great Britain, 1831, *Comparative statement of the population, under the latest census, of England, Wales, Scotland and Ireland, respectively; distinguishing each county, and the number of members now sent, and which it is proposed shall be sent, by each county and the towns therein.* BPP 1831-32 XXXVI.291 (182).

Census of Ireland, 1831, *Return of population of the several counties in Ireland, 1831.* BPP 1831-32 XXXVI.299 (60).

Census of Great Britain, 1831, *Abstract of the answers and returns made pursuant to an Act, passed in the eleventh year of the reign of His Majesty King George IV. intituled, "An Act for taking an account of the population of Great Britain, and of the increase or diminution thereof." Enumeration Abstract. Vol. II. 1831.* BPP 1833 XXXVII.1 (149).

Census of Great Britain, 1831, *Abstract of the answers and returns made pursuant to an Act, passed in the eleventh year of the reign of His Majesty King George IV. intituled, "An Act for taking an account of the population of Great Britain, and of the increase or diminution thereof." Parish register abstract. Vol. III.* 1831. BPP 1833 XXXVIII.1 (149).

Census of Ireland, 1831, *Return of population of the counties of Ireland, 1831.* BPP 1833 XXXIX.1 (254).

Census of Ireland, 1831, *Comparative abstract of the population in Ireland as taken in 1821 and 1831, arranged in order of parishes, boroughs, counties and provinces.* BPP 1833 XXXIX.3 (23).

Census of Ireland, 1831, *Abstract of answers and returns under the population acts. Enumeration 1831.* BPP 1833 XXXIX.59 (634).

12.3.5   Census reports, 1841 Great Britain and Ireland

Census of Great Britain, 1841, *Account of the total population, according to census, taken, 1841, of each county in Great Britain; distinguishing males and females…; comparative statement of the population and number of houses…; Account of population of each city and royal and parliamentary burgh in Scotland ….* BPP 1841 Session 2 II.277 (52).

Census of Great Britain, 1841, *Abstract of the answers and returns made pursuant to acts 3 & 4 Vic. c.99 and 4 Vic. c.7 intituled respectively "An act for taking an account of the population of Great Britain," and "An act to amend the acts of the last session for taking an account of the population." Enumeration Abstract.* BPP 1843 XXII.1 (496).

Census of Great Britain, 1841, *Index of names of places in the enumeration abstract of England and Wales and Islands in the British Seas.* BPP 1843 XXII.515 (511).

Census of Great Britain, 1841, *Abstract of the answers and returns made pursuant to acts 3 & 4 Vic. c.99 and 4 Vic. c.7 intituled respectively "An act for taking an account of the population of Great Britain," and "An act to amend the acts of the last session for taking an account of the population." Scotland. Enumeration Abstract.* BPP 1843 XXII.597 (498).

Census of Great Britain, 1841, *Index of names of places in the enumeration abstract of Scotland.* BPP 1843 XXII.679 (506).

Census of Great Britain, 1841, *Abstract of the answers and returns made pursuant to acts 3 & 4 Vic. c.99 and 4 Vic. c.7 intituled respectively "An act for taking an account of the population of Great Britain", and "An act to amend the acts of the last session for taking an Account of the Population". Age Abstract. Part I. England and Wales and Islands in the British Seas.*. BPP 1843 XXIII.1 (497).

Census of Ireland, 1841, *Report of the commissioners appointed to take the census of Ireland for the year 1841.* BPP 1843 XXIV.1 (504).

Census of Ireland, 1841, *Abstract of census of Ireland for the year 1841.* BPP 1843 LI.319 (459).

Return of the total population in England, Ireland and Scotland according to the census of 1841… A return of the total population in Ireland accompanied by an abstract … ascertained … to belong each religious persuasion, 1834. BPP 1843 LI.321 (354).

Census of Great Britain, 1841, *Abstract of the answers and returns made pursuant to acts 3 & 4 Vic. c.99 and 4 Vic. c.7 intituled respectively "An act for taking an account of the population of Great Britain", and "An act to amend the acts of the last session for taking an Account of the Population". Occupation abstract, 1841. Part I. England and Wales and Islands in the British Seas.* BPP 1844 XXVII.1 (587).

Census of Great Britain, 1841, *Abstract of the answers and returns made pursuant to acts 3 & 4 Vic. c.99 and 4 Vic. c.7 intituled respectively "An act for taking an account of the population of Great Britain", and "An act to amend the acts of the last session for taking an Account of the Population". Occupation abstract, 1841. Part II. Scotland.* BPP 1844 XXVII.385 (588).

Census of Great Britain, 1841, *Abstract of the answers and returns made pursuant to acts 3 & 4 Vic. c.99 and 4 Vic. c.7 intituled respectively "An act for taking an account of the population of Great Britain", and "An act to amend the acts of the last session for taking an Account of the Population". Parish register abstract. England and Wales and Islands in the British Seas.* BPP 1845 XXV.493 (623).

12.3.6   Census reports, 1851 Great Britain and Ireland

Census of Great Britain, 1851, *Forms and instructions prepared under the direction of one of her Majesty's principal secretaries of state, for the use of persons employed in taking an account of population of Great Britain.* BPP 1851 XLIII.1 (1339).

Census of Great Britain, 1851, *Tables of the population and houses in the divisions, registration counties, and districts of England and Wales, in the cities, and burghs of Scotland, and in the Islands in British Seas.* BPP 1851 XLIII.73 (1399).

Census of Ireland, 1851, *A comparative view of* Census of Ireland, 1841-*1851 distinguishing the several unions and electoral divisions, and showing the area and population of those districts respectively.* BPP 1852 XLVI.357 (373).

Census of Ireland, 1851, *Part. I showing the area, population and number of houses, by townlands and electoral divisions, County of Carlow.* BPP 1852 XLVI.401 (1465).

Census of Ireland, 1851, *Part. I showing the area, population and number of houses, by townlands and electoral divisions, County of Kildare.* BPP 1852 XLVI.421 (1481).

Census of Ireland, 1851, *Part. I showing the area, population and number of houses, by townlands and electoral divisions, County of Kilkenny.* BPP 1852 XLVI.483 (1486).

Census of Ireland, 1851, *Part. I showing the area, population and number of houses, by townlands and electoral divisions, King's County.* BPP 1852 XLVI.493 (1488).

Census of Ireland, 1851, *Part. I showing the area, population and number of houses, by townlands and electoral divisions, County of Longford.* BPP 1852 XLVI.521 (1492).

Census of Ireland, 1851, *Part. I showing the area, population and number of houses, by townlands and electoral divisions, County of Louth.* BPP 1852 XLVI.541 (1503).

Census of Ireland, 1851, *Part. I showing the area, population and number of houses, by townlands and electoral divisions, County of Meath.* BPP 1852 XLVI.561 (1494).

Census of Ireland, 1851, *Part. I showing the area, population and number of houses, by townlands and electoral divisions, Queen's County.* BPP 1852 XLVI.601 (1502).

Census of Ireland, 1851, *Part. I showing the area, population and number of houses, by townlands and electoral divisions, County of Westmeath.* BPP 1852 XLVI.629 (1504).

Census of Ireland, 1851, *Part. I showing the area, population and number of houses, by townlands and electoral divisions, County of Wexford.* BPP 1852 XLVI.661 (1527).

Census of Great Britain, 1851, *Population tables, I. Number of the inhabitants in 1801, 1811, 1821, 1831, 1841 and 1851. Vol. I*. BPP 1852-53 LXXXV.1 (1631).

Census of Great Britain, 1851, *Population tables, I. Number of the inhabitants in 1801, 1811, 1821, 1831, 1841 and 1851. Vol. II.* BPP 1852-53 LXXXVI.1 (1632).

Census of Great Britain, 1851, *Index to the names of the parishes, townships, and places in the population tables of Great Britain.* BPP 1852-53 LXXXVII.1 (1633).

Census of Great Britain, 1851, *Population Tables, II. Ages, civil conditions, occupations and birth-place of the people with the numbers and ages of the blind, the deaf-and-dumb, and the inmates of workhouses, prisons, lunatic asylums, and hospitals. Vol. I.* BPP 1852-53 LXXXVIII Pt.I. 1 (1691.I).

Census of Great Britain, 1851, *Population Tables, II. Ages, civil conditions, occupations and birth-place of the people with the numbers and ages of the blind, the deaf-and-dumb, and the inmates of workhouses, prisons, lunatic asylums, and hospitals. Vol. II.* BPP 1852-53 LXXXVIII Pt.II. 1 (1691.II).

Census of Great Britain, 1851, *Religious worship. England and Wales. Report and tables.* BPP 1852-53 LXXXIX.I (1690).

Census of Great Britain, 1851, *Education. England and Wales. Report and tables.* BPP 1852-53 XC.1 (1692).

Census of Ireland, 1851, *Part. I showing the area, population and number of houses, by townlands and electoral divisions, County of Carlow.* BPP 1852-53 XCI.5 (1465).

Census of Ireland, 1851, *Part. I showing the area, population and number of houses, by townlands and electoral divisions, County and City of Dublin.* BPP 1852-53 XCI.25 (1553).

Census of Ireland, 1851, *Part. I showing the area, population and number of houses, by townlands and electoral divisions, County of Kildare.* BPP 1852-53 XCI.57 (1481).

Census of Ireland, 1851, *Part. I showing the area, population and number of houses, by townlands and electoral divisions, County of Kilkenny.* BPP 1852-53 XCI.89 (1486).

Census of Ireland, 1851, *Part. I showing the area, population and number of houses, by townlands and electoral divisions, King's County.* BPP 1852-53 XCI.129 (1488).

Census of Ireland, 1851, *Part. I showing the area, population and number of houses, by townlands and electoral divisions, County of Longford.* BPP 1852-53 XCI.157 (1492).

Census of Ireland, 1851, *Part. I showing the area, population and number of houses, by townlands and electoral divisions, County of Louth.* BPP 1852-53 XCI.177 (1503).

Census of Ireland, 1851, *Part. I showing the area, population and number of houses, by townlands and electoral divisions, County of Meath.* BPP 1852-53 XCI.197 (1494).

Census of Ireland, 1851, *Part. I showing the area, population and number of houses, by townlands and electoral divisions, Queen's County.* BPP 1852-53 XCI.237 (1502).

Census of Ireland, 1851, *Part. I showing the area, population and number of houses, by townlands and electoral divisions, County of Westmeath.* BPP 1852-53 XCI.265 (1504).

Census of Ireland, 1851, *Part. I showing the area, population and number of houses, by townlands and electoral divisions, County of Wexford.* BPP 1852-53 XCI.297 (1527).

Census of Ireland, 1851, *Part. I showing the area, population and number of houses, by townlands and electoral divisions, County of Wicklow.* BPP 1852-53 XCI.347 (1544).

Census of Ireland, 1851, *Part. I showing the area, population and number of houses, by townlands and electoral divisions, County of Clare.* BPP 1852-53 XCI.383 (1552).

Census of Ireland, 1851, *Part. I showing the area, population and number of houses, by townlands and electoral divisions, County of Cork (E. Riding).* BPP 1852-53 XCI.429 (1550).

Census of Ireland, 1851, *Part. I showing the area, population and number of houses, by townlands and electoral divisions, County of Cork (W. Riding).* BPP 1852-53 XCI.499 (1551).

Census of Ireland, 1851, *Part. I showing the area, population and number of houses, by townlands and electoral divisions, County of Roscommon.* BPP 1852-53 XCI.515 (1555).

Census of Ireland, 1851, *Part. I showing the area, population and number of houses, by townlands and electoral divisions, County of Kerry.* BPP 1852-53 XCI.547 (1543).

Census of Ireland, 1851, *Part. I showing the area, population and number of houses, by townlands and electoral divisions, County of Limerick.* BPP 1852-53 XCI.601 (1554).

Census of Ireland, 1851, *Part. I showing the area, population and number of houses, by townlands and electoral divisions, County of Tipperary (N. Riding).* BPP 1852-53 XCI.649 (1549).

Census of Ireland, 1851, *Part. I showing the area, population and number of houses, by townlands and electoral divisions, County of Tipperary (S. Riding).* BPP 1852-53 XCI.685 (1545).

Census of Ireland, 1851, *Part. I showing the area, population and number of houses, by townlands and electoral divisions, County of Waterford.* BPP 1852-53 XCI.723 (1546).

Census of Ireland, 1851 *Part. I showing the area, population and number of houses, by townlands and electoral divisions, County of Armagh.* BPP 1852-53 XCII.45 (1547).

Census of Ireland, 1851 *Part. I showing the area, population and number of houses, by townlands and electoral divisions, County of Cavan.* BPP 1852-53 XCII.69 (1563).

Census of Ireland, 1851 *Part. I showing the area, population and number of houses, by townlands and electoral divisions, County of Donegal.* BPP 1852-53 XCII.107 (1567).

Census of Ireland, 1851 *Part. I showing the area, population and number of houses, by townlands and electoral divisions, County of Down.* BPP 1852-53 XCII.159 (1570).

Census of Ireland, 1851 *Part. I showing the area, population and number of houses, by townlands and electoral divisions, County of Fermanagh.* BPP 1852-53 XCII.191 (1574).

Census of Ireland, 1851 *Part. I showing the area, population and number of houses, by townlands and electoral divisions, County of Londonderry.* BPP 1852-53 XCII.231 (1571).

Census of Ireland, 1851 *Part. I showing the area, population and number of houses, by townlands and electoral divisions, County of Monaghan.* BPP 1852-53 XCII.259 (1575).

Census of Ireland, 1851 *Part. I showing the area, population and number of houses, by townlands and electoral divisions, County of Tyrone.* BPP 1852-53 XCII.293 (1579).

Census of Ireland, 1851 *Part. I showing the area, population and number of houses, by townlands and electoral divisions, County of Galway.* BPP 1852-53 XCII.339 (1557).

Census of Ireland, 1851 *Part. I showing the area, population and number of houses, by townlands and electoral divisions, County of Leitrim.* BPP 1852-53 XCII.425 (1548).

Census of Ireland, 1851 *Part. I showing the area, population and number of houses, by townlands and electoral divisions, County of Mayo.* BPP 1852-53 XCII.453 (1542).

Census of Ireland, 1851 *Part. I showing the area, population and number of houses, by townlands and electoral divisions, County of Antrim.* BPP 1852-53 XCII.5 (1565).

Census of Ireland, 1851 *Part. I showing the area, population and number of houses, by townlands and electoral divisions, County of Sligo.* BPP 1852-53 XCII.555 (1560).

Census of Ireland, 1851, *Part II. Returns of agricultural produce in 1851.* BPP 1852-53 XCIII.1 (1589).

Census of Ireland, 1851. *Part III. Report on the status of disease in Ireland.* BPP 1854 LVIII.1 (1765).

Census of Great Britain, 1851, *Religious worship and education. Scotland. Report and tables.* BPP 1854 LIX.301 (1764).

Census of Ireland, 1851, *Part IV. Report on ages and education.* BPP 1856 XXIX.1 (2053).

Census of Ireland, 1851, *Part. V. Tables of deaths. Vol. I.* BPP 1856 XXIX.261 (2087-I).

Census of Ireland, 1851, *Part. V. Tables of deaths. Vol. II.* BPP 1856 XXX.1 (2087-II).

Census of Ireland, 1851. *Pt. VI. General report.* BPP 1856 XXXI.1 (2134).

12.3.7   Census reports, 1861 England and Wales, Scotland and Ireland

Census of England and Wales, 1861, *Tables of the population and houses enumerated in England and Wales, and in the Islands in the British Seas on 8th April 1861.* BPP 1861 L.855 (2846).

Census of Ireland, 1861, *Enumeration abstracts of number of inhabitants in Ireland, 1841, 1851 and 1861. Religious profession, 1861. Number of Houses and families, 1841, 1851 and 1861.* BPP 1861 L.885 (2865).

Census of Scotland, 1861, *Tables of the number of the population, of the families, and children at school, of the houses, and rooms with windows, in Scotland and its islands, on 8th April 1861.* BPP 1861 L.911 (2870).

Census of England and Wales, 1861, *Population tables. Numbers and distribution of people of [and index to names of places in] England and Wales. Volume 1.* BPP 1862 L.1 (3056).

Census of Scotland, 1861, *Population tables and report. Number of inhabitants, families, children at school, houses, and rooms with windows, in the civil counties and parishes, registration counties and districts, burghs, towns, villages, and islands of Scotland: also a classification of families according to their sizes….* BPP 1862 L.945 (3013).

Census of Ireland, 1861, *General alphabetical index to the townlands and towns, parishes and baronies of Ireland.* BPP 1862 LI.1 (2942).

Census of England and Wales, 1861, *General report [Vol. III.].* BPP 1863 LIII. Pt. I.1 (3221).

Census of England and Wales, 1861, *Population tables. Ages, civil condition, occupations, and birth-places of people: with the ages and occupations of the blind, of the deaf-and-dumb, and of the inmates of certain public institutions..* BPP 1863 LIII. Pt. II.1 (3221).

Census of England and Wales, 1861, *Population tables. Ages, civil condition, occupations, and birth-places of people: with the ages and occupations of the blind, of the deaf-and-dumb, and of the inmates of certain public institutions..* BPP 1863 LIII. Pt. I.265 (3221).

Census of Ireland, 1861, *Part I showing the area, population and number of houses by townland and electoral divisions. Vol. I. and II. Provinces of Leinster and Munster..* BPP 1863 LIV.1 (3204).

Census of Ireland, 1861, *Part I showing the area, population and number of houses by townland and electoral divisions. Vol. III. and IV. Provinces of Ulster and Connaught.* BPP 1863 LV.1 (3204).

Census of Ireland, 1861, *Part II. Report and tables on ages and education. Vol. I.* BPP 1863 LVI.1 (3204-I).

Census of Ireland, 1861, *Part II. Report and tables on ages and education. Vol. II.* BPP 1863 LVII.1 (3204-I).

Census of Ireland, 1861, *Part III. Vital statistics. Vol. I. Report and tables relating to the status of disease.* BPP 1863 LVIII.1 (3204-II).

Census of Ireland, 1861, *Part III. Vital statistics. Vol. II. Report and tables relating to the status of disease.* BPP 1863 LVIII.1 (3204-II).

Census of Ireland, 1861, *Part. IV. Report and tables relating to the religious professions, education and occupations of the people. Vol. I..* BPP 1863 LIX.1 (3204-III).

Census of Ireland, 1861, *Part. IV. Reports and tables relating to religious professions, education and occupations. Vol. II..* BPP 1863 LX.1 (3204-III).

Census of Ireland, 1861, *Part. V, General report.* BPP 1863 LXI.1 (3204-IV).

Census of Scotland, 1861, *Population tables and report. Ages, civil or conjugal condition, occupations, and birth places of the people in Scotland: with the number and ages of the blind, the deaf-dumb. and the inmates of poorhouses, prisons, lunatic asylums, and hospitals. Vol. II.* BPP 1864 LI.49 (3275).

12.3.8   Census reports, 1871 England and Wales, Scotland and Ireland

Census of Ireland 1871, *Abstract of enumerators returns..* BPP 1871 LIX.801 (C.375).

Census of England and Wales, 1871, *Preliminary report, and tables of the population and the houses enumerated in England and Wales, and in the Islands in the British Seas on 3rd April 1871.* BPP 1871 LIX.659 (C.381).

Census of Scotland, 1871, *Tables of the number of the population, of the families, of children receiving education, of houses, and rooms with windows, in Scotland and its Islands, on 3d April 1871.* BPP 1871 LIX.813 (C.380).

Census of Scotland, 1871, *Eighth decennial census of the population of Scotland taken 3d April 1871, with report. Vol. I..* BPP 1872 LXVIII.I (C.592).

Census of Ireland, 1871, *Part I. Area, houses, and population: also the ages, civil condition, occupations, birthplaces, religion, and education of the people. Vol. I. Province of Leinster.* BPP 1872 LXVII.1 (C.662).

Census of England and Wales, 1871, *Population tables. Area, houses, and inhabitants. Vol. I. Counties.* BPP 1872 LXVI Pt. I.1 (C.676).

Census of England and Wales, 1871, *Population tables. Area, houses, and inhabitants. Vol. II. Registration or Union Counties.* BPP 1872 LXVI Pt. II.1 (C.676-I).

Census of England and Wales, 1871, *Index to the population tables of England and Wales and islands in the British seas.* BPP 1872 LXVI Pt. II. (C.676-II).

Census of Scotland, 1871, *Eighth decennial census of the population of Scotland taken 3d April 1871, with report. Vol. II..* BPP 1873 LXXIII.1 (C.841).

Census of England and Wales, 1871, *Population abstracts. Ages, civil condition, occupations, and birth-places of the people. Vol. III.* BPP 1873 LXXI Pt. I. 1 (C.872).

Census of England and Wales, 1871, *General report. Vol. IV.* BPP 1873 LXXI Pt. II. 1 (C.872-I).

Census of Ireland, 1871, *Part I. Area, houses, and population: also the ages, civil condition, occupations, birthplaces, religion, and education of the people. Vol. II. Province of Munster*. BPP 1873 LXXII. Pt. I.1 (C.873).

Census of Ireland, 1871, *Part II. Vital statistics. Vol. II. Report and tables relating to deaths.* BPP 1873 LXXII. Pt. II.477 (C.876).

Census of Ireland, 1871, *Part I. Area, houses, and population: also the ages, civil condition, occupations, birthplaces, religion, and education of the people. Vol. III. Province of Ulster.* BPP 1874 LXXIV. Pt. I.1 (C.964).

Census of Ireland, 1871, *Part II. Vital statistics. Vol. I. Report and tables relating to the status of disease.* BPP 1873 LXXIV.Pt. III.1 (C.1000).

Census of Ireland, 1871, *Part I. Area, houses, and population: also the ages, civil condition, occupations, birthplaces, religion, and education of the people. Vol. IV. Province of Connaught.* BPP 1874 LXXIV. Pt. II.1 (C.1106).

Census of Ireland, 1871, *Part III. General report, with illustrative maps and diagrams, summary tables, and appendix.* BPP 1876 LXXXI.1 (C.1377).

Census of Ireland, 1871, *Alphabetical index to townlands and towns of Ireland.* BPP 1877 LXXXVII.1 (C.1711).

12.3.9   Census reports, 1881 England and Wales, Scotland and Ireland

Census of Ireland, 1881. *Preliminary report; Abstract of enumerators' summaries.* BPP 1881 XCVI.159 (C.2931).

Census of England and Wales, 1881, *Preliminary report, and tables of the population and houses enumerated in England and Wales, and in the Islands in British Seas on 4th April 1881.* BPP 1881 XCVI.1 (C.2955).

Census of Scotland, 1881, *Tables of the number of the population, of the families, of houses, and of rooms with windows, in Scotland and its islands on 4th April 1881..* BPP 1881 XCVI.143 (C.2957).

Census of Ireland, 1881, *Part I, Area, population and number of houses; occupations, religion and education. Vol. I. Province of Leinster.* BPP 1881 XCVII.1 (C.3042).

Census of Ireland, 1881, *Part I, Area, population and number of houses; occupations, religion and education. Vol. II. Province of Munster.* BPP 1882 LXXVII.1 (C.3148).

Census of Ireland, 1881, *Part I, Area, population and number of houses; occupations, religion and education. Vol. III. Province of Ulster.* BPP 1882 LXXVIII.1 (C.3204).

Census of Ireland, 1881, *Part I, Area, population and number of houses; occupations, religion and education. Vol. IV. Province of Connaught.* BPP 1882 LXXIX.1 (C.3268).

Census of Scotland, 1881, *Ninth decennial census of the population of Scotland taken 4th April 1881, with report. Vol. I..* BPP 1882 LXXVI.1 (C.3320).

Census of Ireland, 1881, *Part II, General report, with illustrative maps and diagrams, tables, and appendix.* BPP 1882 LXXVI.385 (C.3365).

Census of Ireland, 1881, *Supplement to alphabetical index of townlands and towns of Ireland.* BPP 1882 LXXIX.697 (C.3379).

Census of England and Wales, 1881, *Vol. I. Area, houses, and population. Counties.* BPP 1883 LXXVIII.1 (C.3562).

Census of England and Wales, 1881, *Vol. II. Area, houses, and population. Registration counties.* BPP 1883 LXXIX.1 (C.3563).

Census of Scotland, 1881, *Ninth decennial census of the population of Scotland taken 4th April 1881, with report. Vol. II..* BPP 1883 LXXXI.1 (C.3657).

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Census of England and Wales, 1881, *Islands in the British Seas. Isle of Man, Jersey, Guernsey and adjacent islands.* BPP 1883 LXXX.707 (C.3643).

Census of England and Wales, 1881, *Volume. IV. General report.* BPP 1883 LXXX.583 (C.3797).

12.3.10   Census reports, 1891 England and Wales, Scotland and Ireland

Census of England and Wales, 1891, *Preliminary report, and tables of the population and houses enumerated in England and Wales and in the Islands in the British Seas, on 6th April 1891.* BPP 1890-91 XCIV.1 (C.6422).

Tables of the number of the population, of the families, of houses, and of rooms with windows, in Scotland and its islands on 5th April 1891. BPP 1890-91 XCIV.153 (C.6390).

Census of Ireland 1891, *Preliminary report. Abstract of enumerators' summaries.* BPP 1890-91 XCIV.175 (C.6379).

Census of Ireland, 1891. *Part I, Area, houses, and population also the ages, civil condition, occupations, birthplaces, religion, and education of the people. Vol. I. Province of Leinster.* BPP 1890-91 XCV.1 (C.6515).

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Census of Ireland, 1891. *Part I, Area, houses, and population also the ages, civil condition, occupations, birthplaces, religion, and education of the people. Vol. III. Province of Ulster.*BPP 1892 XCII.1 (C.6626).

Census of Ireland, 1891. *Part I, Area, houses, and population also the ages, civil condition, occupations, birthplaces, religion, and education of the people. Vol. IV. Province of Connaught.* BPP 1892 XCIII.1 (C.6685).

Census of Scotland, 1891, *Tenth decennial census of the population of Scotland taken 5th April 1891, with report. Vol. I.* BPP 1892 XCIV.1 (C.6755).

Census of Ireland, 1891, *General report with illustrative maps and diagrams, tables and appendix.* BPP 1892 XC.1 (C.6780).

Census of Ireland, 1891, *Supplement to alphabetical index of townlands and towns of Ireland.* BPP 1892 XC.635 (C.6781).

Census of Scotland, 1891, *Tenth decennial census of the population of Scotland taken 5th April 1891. Supplement to Vol. I… With report.* BPP 1893-4 CVII.65 (C.6936).

Census of Scotland, 1891, *Tenth decennial census of the population of Scotland taken 5th April 1891, with report. Vol. II. Part. I.* BPP 1893-4 CVII.215 (C.6937).

Census of England and Wales, 1891, *Area, Houses and Population. Vol. I. Administrative and ancient counties.* BPP 1893-4 CIV.1 (C.6948).

Census of England and Wales, 1891, *Area, houses and population. Vol. II. Registration areas and sanitary districts.* BPP 1893-4 CV.1 (C.6948-I).

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Census of England and Wales, 1891, *Vol. IV General report, with summary tables and appendices.* BPP 1893-4 CVI.629 (C.7222).

12.3.11   Census reports, 1901 England and Wales, Scotland and Ireland

Census of Ireland, 1901. *Preliminary report, with abstracts of the enumerators, summaries, &c..* BPP 1901 XC.179 (Cd.613).

Census of England and Wales, 1901, *Preliminary report and tables of the population and houses enumerated in England and Wales, and in the Islands in the British Seas on 1st April 1901.* BPP 1901 XC.1 (Cd.616).

Census of Scotland, 1901, *Preliminary report containing tables of the number of the population, of the families, of houses, and of rooms with windows, in Scotland and its Islands, on 31st March, 1901.* BPP 1901 XC.203 (Cd.644).

Census of Ireland, 1901, *Part I. Area, houses, and population, also the ages, civil or conjugal condition, occupations, birthplaces, religion and education of the people, Vol. I. Province of Leinster [Part 1].* BPP 1902 CXXII.1 (Cd.847-I).

Census of Ireland, 1901, *Part I. Area, houses, and population, also the ages, civil or conjugal condition, occupations, birthplaces, religion and education of the people, Vol. I. Province of Leinster [Part 2].* BPP 1902 CXXIII.1 (Cd.847-II).

Census of England and Wales, 1901, *County of London. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1902 CXX.1 (Cd.875).

Census of Scotland, 1901, *Parliamentary burghs, districts of burghs and counties in Scotland, and showing the numbers of families, houses, population, &c., in 1901, with corresponding particulars in 1891.* BPP 1902 CXXIX.1133 (Cd.898).

Census of England and Wales, 1901, *County of Lancaster. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1902 CXIX.389 (Cd.1002).

Census of Ireland, 1901, *Part I. Area, houses, and population, also the ages, civil or conjugal condition, occupations, birthplaces, religion and education of the people, Vol. II. Province of Munster [Part 1].* BPP 1902 CXXIV.1 (Cd.1058-I).

Census of Ireland, 1901, *Part I. Area, houses, and population, also the ages, civil or conjugal condition, occupations, birthplaces, religion and education of the people, Vol. II. Province of Munster [Part 2].* BPP 1902 CXXV.1 (Cd.1058-II).

Census of Ireland, 1901, *Part I. Area, houses, and population, also the ages, civil or conjugal condition, occupations, birthplaces, religion and education of the people, Vol. IV. Province of Connaught.* BPP 1902 CXXVIII.1 (Cd.1059).

Census of England and Wales, 1901, *County of York. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1902 CXXI.639 (Cd.1107).

Census of Ireland, 1901, *Part I. Area, houses, and population, also the ages, civil or conjugal condition, occupations, birthplaces, religion and education of the people, Vol. III. Province of Ulster [Part 1].* BPP 1902 CXXVI.1 (Cd.1123-I).

Census of Ireland, 1901, *Part I. Area, houses, and population, also the ages, civil or conjugal condition, occupations, birthplaces, religion and education of the people, Vol. III. Province of Ulster [Part 2].* BPP 1902 CXXVII.1 (Cd.1123-II).

Census of England and Wales, 1901, *County of Stafford. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1902 CXXI.1 (Cd.1125).

Census of England and Wales, 1901, *County of Durham. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1902 CXVIII.673 (Cd.1147).

Census of England and Wales, 1901, *County of Essex. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1902 CXVIII.769 (Cd.1148).

Census of England and Wales, 1901, *County of Kent. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1902 CXIX.279 (Cd.1171).

Census of England and Wales, 1901, *County of Warwick. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1902 CXXI.389 (Cd.1175).

Census of Ireland, 1901, *Part II. General report, with illustrative maps and diagrams, tables and appendix.* BPP 1902 CXXIX.1 (Cd.1190).

Census of England and Wales, 1901, *County of Middlesex. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1902 CXX.195 (Cd.1211).

Census of England and Wales, 1901, *County of Glamorgan. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1902 CXVIII.869 (Cd.1212).

Census of England and Wales, 1901, *County of Chester. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1902 CXVIII.143 (Cd.1213).

Census of Scotland, 1901, *Eleventh decennial census of Scotland taken 31st March 1901 with report. Vol. I..* BPP 1902 CXXIX.687 (Cd.1257).

Census of England and Wales, 1901, *County of Hants (Southampton). Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1902 CXIX.95 (Cd.1270).

Census of England and Wales, 1901, *County of Devon. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1902 CXVIII.487 (Cd.1271).

Census of England and Wales, 1901, *County of Surrey. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1902 CXXI.207 (Cd.1272).

Census of England and Wales, 1901, *County of Gloucester. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1902 CXIX.1 (Cd.1289).

Census of England and Wales, 1901, *County of Sussex. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1902 CXXI.287 (Cd.1290).

Census of England and Wales, 1901, *County of Nottingham. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1902 CXX.347 (Cd.1292).

Census of England and Wales, 1901, *County of Worcester. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1902 CXXI.553 (Cd.1293).

Census of England and Wales, 1901, *County of Northumberland. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1902 CXX.613 (Cd.1294).

Census of England and Wales, 1901, *County of Lincoln. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1902 CXIX.689 (Cd.1304).

Census of England and Wales, 1901, *County of Norfolk. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1902 CXX.425 (Cd.1305).

Census of England and Wales, 1901, *County of Devon. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1902 CXVIII.601 (Cd.1320).

Census of England and Wales, 1901, *County of Oxford. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1902 CXX 705 (Cd.1322).

Census of England and Wales, 1901, *County of Cambridge. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1902 CXVIII.73 (Cd.1323).

Census of England and Wales, 1901, *County of Derby. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1902 CXVIII.399 (Cd.1303).

Census of England and Wales, 1901, *County of Suffolk. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1902 CXXI.113 (Cd.1345).

Census of England and Wales, 1901, *County of Leicester. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1902 CXIX.609 (Cd.1346).

Census of England and Wales, 1901, *County of Somerset. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1902 CXX.775 (Cd.1347).

Census of England and Wales, 1901, *County of Northampton. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1902 CXX.527 (Cd.1359).

Census of England and Wales, 1901, *County of Cornwall. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1902 CXVIII.251 (Cd.1360).

Census of England and Wales, 1901, *County of Monmouth. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1902 CXX.273 (Cd.1361).

Census of England and Wales, 1901, *County of Berks. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1902 CXVIII.1 (Cd.1362).

Census of England and Wales, 1901, *County of Cumberland. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1902 CXVIII.331 (Cd.1376).

Census of England and Wales, 1901, *County of Hertford. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1902 CXIX.209 (Cd.1377).

Census of England and Wales, 1901, *County of Wilts. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1902 CXXI.475 (Cd.1378).

Census of England and Wales, 1901, *County of Bedford. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1903 LXXXIV.415 (Cd.1406).

Census of England and Wales, 1901, *County of Buckingham. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1903 LXXXV.1 (Cd.1407).

Census of England and Wales, 1901, *County of Carnarvon. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1903 LXXXV.217 (Cd.1410).

Census of England and Wales, 1901, *County of Carmarthen. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1903 LXXXV.165 (Cd.1411).

Census of England and Wales, 1901, *County of Denbigh. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1903 LXXXV.271 (Cd.1412).

Census of England and Wales, 1901, *County of Cardigan. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1903 LXXXV.115 (Cd.1425).

Census of England and Wales, 1901, *County of Hereford. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1903 LXXXV.373 (Cd.1426).

Census of England and Wales, 1901, *County of Salop. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1903 LXXXVI.81 (Cd.1430).

Census of England and Wales, 1901, *County of Westmorland. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1903 LXXXVI.157 (Cd.1431).

Census of England and Wales, 1901, *County of Pembroke. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1903 LXXXV.575 (Cd.1432).

Census of England and Wales, 1901, *County of Montgomery. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1903 LXXXV.527 (Cd.1435).

Census of England and Wales, 1901, *County of Merioneth. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1903 LXXXV.479 (Cd.1436).

Census of England and Wales, 1901, *County of Brecknock. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1903 LXXXV.65 (Cd.1437).

Census of England and Wales, 1901, *County of Huntingdon. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1903 LXXXV.433 (Cd.1438).

Census of England and Wales, 1901, *County of Flint. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1903 LXXXV.329 (Cd.1439).

Census of England and Wales, 1901, *County of Anglesey. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1903 LXXXIV.371 (Cd.1447).

Census of England and Wales, 1901, *County of Rutland. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1903 LXXXVI.45 (Cd.1448).

Census of England and Wales, 1901, *County of Radnor. Area, houses and population; also population classified by ages, condition as to marriage, occupations, birthplaces, and infirmities.* BPP 1903 LXXXVI.1 (Cd.1449).

Census of England and Wales, 1901, *Islands in the British Seas. Isle of Man. Jersey. Guernsey and adjacent Islands.* BPP 1903 LXXXIV.313 (Cd.1473).

Census of Scotland, 1901. *Eleventh decennial census of population taken 31st March, 1901, with report. Vol. II. Ages, marital condition, education and birthplaces.* BPP 1903 LXXXVI.205 (Cd.1481).

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12.3.12   Census reports, 1911 England and Wales, Scotland and Ireland

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Census of Ireland, 1911, *Area, houses, and population: also the ages, civil or conjugal condition, occupations, birthplaces, religions, and education of the people. Province of Munster.* BPP 1912-13 CXV.1 (Cd.6050).

Census of Ireland, 1911, *Area, houses, and population: also the ages, civil or conjugal condition, occupations, birthplaces, religions, and education of the people. Province of Ulster.* BPP 1912-13 CXVI.1 (Cd.6051).

Census of Ireland, 1911, *Area, houses, and population: also the ages, civil or conjugal condition, occupations, birthplaces, religions, and education of the people. Province of Connaught.* BPP 1912-13 CXVII.1 (Cd.6052).

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Census of England and Wales, 1911. *Areas, families or separate occupiers, and population. Vol. II. Registration areas.* BPP 1912-13 CXI.679 (Cd.6259).

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Census of England and Wales, 1921, *County of Cardigan.* (London, 1923/4).

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Census of England and Wales, 1921, *County of Devon.* (London, 1923/4).

Census of England and Wales, 1921, *County of Dorset.* (London, 1923/4).

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Census of England and Wales, 1921, *County of Essex.* (London, 1923/4).

Census of England and Wales, 1921, *County of Flint.* (London, 1923/4).

Census of England and Wales, 1921, *County of Glamorgan.* (London, 1923/4).

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Third Annual report of the registrar-general. BPP 1841 Session 2 VI.1 (345).

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Nineteenth Annual report of the registrar-general (1856). BPP 1857-58 XXIII.1 (2431).

Twentieth Annual report of the registrar-general (1857). BPP 1859 Session 2 XII.1 (2559).

Twenty-first Annual report of the registrar-general (1858). BPP 1860 XXIX.543 (2712).

Twenty-second Annual report of the registrar-general (1859). BPP 1861 XVIII.1 (2897).

Twenty-third Annual report of the registrar-general (1860). BPP 1862 XVII.1 (2977).

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Twenty-eighth Annual report of the registrar-general (1865). BPP 1867 XVII.1 (3913).

Twenty-ninth Annual report of the registrar-general (1866). BPP 1867-68 XIX.1 (4006).

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Thirty-second Annual report of the registrar-general (1869). BPP 1871 XV.1 (C.453).

Thirty-third Annual report of the registrar-general (Summary of Marriages, Births and Deaths registered 1861-70) (1870). BPP 1872 XVII.1 (C.667).

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Fifty-first Annual report of the registrar-general (1888). BPP 1889 XXV.1 (C.5846).

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Fifty-third Annual report of the registrar-general (1890). BPP 1890-91 XXIII.1 (C.6478).

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Sixty-first Annual report of the registrar-general (1898). BPP 1899 XVI.1 (C.9417).

Sixty-second Annual report of the registrar-general (1899). BPP 1900 XV.1 (Cd.323).

Sixty-third Annual report of the registrar-general (1900). BPP 1901 XV.1 (Cd.761).

Sixty-fourth Annual report of the registrar-general (1901). BPP 1902 XVIII.1 (Cd.1230).

Sixty-fifth Annual report of the registrar-general (1902). BPP 1904 XIV.1 (Cd.2003).

Sixty-sixth Annual report of the registrar-general (1903). BPP 1904 XIV.533 (Cd.2197).

Sixty-seventh Annual report of the registrar-general (1904). BPP 1905 XVII.1 (Cd.2617).

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Second Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1857 Session 2 IV.367 (2184).

Third Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1857-58 XXIII.233 (2343).

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Sixth Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1861 XVIII.545 (2780).

First detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1861 XVIII.257 (2814).

Second detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1862 XVIII.9 (2917).

Seventh Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1862 XVIII.15 (2925).

Third detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1862 XVIII.293 (2963).

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Eighth detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1866 XIX.365 (3593).

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Ninth detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1867 XVII.369 (3765).

Twelfth Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1867 XVII.317 (3809).

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Thirteenth Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1867-68 XIX.309 (3991).

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Twelfth detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1868-69 XVI.409 (4122-I).

Thirteenth detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1870 XVI.457 (C.8).

Fifteenth Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1870 XVI.297 (C.63).

Fourteenth detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1871 XV.393 (C.235).

Sixteenth Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1871 XV.339 (C.305).

Seventeenth Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1872 XVII.571 (C.538).

Eighteenth Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1873 XX.399 (C.757).

Fifteenth detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1873 XX.479 (C.781).

Sixteenth detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1874 XIV.81 (C.897).

Nineteenth Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1874 XIV.1 (C.974).

Twentieth Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1875 XIX.1 (C.1201).

Seventeenth detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1875 XIX.85 (C.1299).

Twentieth-first Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1876 XIX.451 (C.1488).

Eighteenth detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1876 XIX.143 (C.1578).

Twenty-second Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1877 XXV.761 (C.1710).

Nineteenth detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1877 XXV.445 (C.1847).

Twenty-third Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1878 XXII.753 (C.2021).

Twentieth detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1878 XXII.441 (C.2118).

Twenty-fourth Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1878-79 XIX.441 (C.2294).

Twentieth-first detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1880 XVII.1 (C.2494).

Twenty-fifth Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1880 XVII.603 (C.2526).

Twenty-second detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1880 XVII.301 (C.2618).

Twenty-sixth Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1881 XXVII.411 (C.2973).

Twenty-third detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1881 XXVII.501 (C.3018).

Twenty-fourth detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1882 XIX.499 (C.3203).

Twenty-seventh Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1882 XIX.411 (C.3273).

Twenty-fifth detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1883 XX.467 (C.3557).

Twenty-eighth Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1883 XX.381 (C.3596).

Twenty-sixth detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1884 XX.365 (C.3867).

Twenty-ninth Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1884 XX.759 (C.3974).

Twenty-seventh detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1884-85 XVIII.1 (C.4218).

Thirtieth Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1884-85 XVIII.909 (C.4370).

Twenty-eighth detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1884-85 XVIII.453 (C.4499).

Thirty-first Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1886 XVIII.549 (C.4708).

Twenty-ninth detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1886 XVIII.1 (C.4791).

Thirtieth detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1887 XXIV.1 (C.4950).

Thirty-second Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1887 XXIV.519 (C.5023).

Thirty-first detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1888 XXXI.1 (C.5278).

Thirty-third Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1888 XXXI.1047 (C.5378).

Thirty-second detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1888 XXXI.521 (C.5608).

Thirty-fourth Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1889 XXVI.1 (C.5665).

Thirty-third detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1889 XXVI.87 (C.5857).

Thirty-fifth Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1890 XXVI.499 (C.5989).

Thirty-fourth detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1890-91 XXIV.89 (C.6241).

Thirty-sixth Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1890-91 XXIV.1 (C.6309).

Thirty-fifth detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1890-91 XXIV.607 (C.6452).

Thirty-seventh Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1892 XXV.1 (C.6629).

Thirty-sixth detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1892 XXV.89 (C.6754).

Thirty-eighth Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1893-1894 XXII.1 (C.6959).

Thirty-seventh detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1893-94 XXII.89 (C.7246).

Thirty-ninth Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1894 XXVI.1 (C.7292).

Thirty-eighth detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1894 XXVI.91 (C.7482).

Supplement to the thirty-eighth detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1895 XXIV.91 (C.7583).

Fortieth Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1895 XXIV.1 (C.7676).

Thirty-ninth detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1895 XXIV.323 (C.7914).

Forty-first Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1896 XXIII.747 (C.7985).

Fortieth detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1896 XXIII.203 (C.8178).

Forty-second Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1897 XXII.745 (C.8362).

Forty-first detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1897 XXII.201 (C.8571).

Forty-third Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1898 XIX.553 (C.8786).

Forty-second detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1898 XIX.1 (C.8981).

Forty-fourth Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1899 XVII.553 (C.9200).

Forty-third detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1899 XVII.1 (C.9483).

Forty-fifth Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1900 XVI.551 (Cd.87).

Forty-fourth detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1900 XVI.1 (Cd.296).

Forty-sixth Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1901 XVI.551 (Cd.507).

Forty-fifth detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1901 XVI.1 (Cd.777).

Forty-seventh Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1902 XIX.553 (Cd.1035).

Forty-sixth detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1902 XIX.1 (Cd.1258).

Forty-eighth Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1903 XVI.763 (Cd.1517).

Forty-seventh detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1904 XV.1 (Cd.1923).

Forty-ninth Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1904 XV.647 (Cd.2016).

Forty-eighth detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1905 XIX.1 (Cd.2316).

Fiftieth Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1905 XIX.657 (Cd.2456).

Supplement to the forty-eighth detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1906 XXI.1 (Cd.2790).

Forty-ninth detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1906 XXI.335 (Cd.2794).

Fifty-first Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1906 XXII.695 (Cd.2870).

Fiftieth detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1906 XXII.1 (Cd.3200).

Fifty-second Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1907 XVI.917 (Cd.3417).

Fifty-first detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1907 XVI.233 (Cd.3650).

Fifty-third Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1908 XVIII.677 (Cd.4015).

Fifty-second detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1908 XVIII.1 (Cd.4275).

Fifty-fourth Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1909 XII.695 (Cd.4597).

Fifty-third detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1909 XII.1 (Cd.4808).

Fifty-fifth Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1910 XI.1 (Cd.5108).

Fifty-fourth detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1910 X.255 (Cd.5251).

Fifty-sixth Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1911 XII.691 (Cd.5617).

Fifty-fifth detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1911 XII.1 (Cd.5879).

Fifty-seventh Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1912-13 XIV.937 (Cd.6143).

Fifty-sixth detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1912-13 XIV.249 (Cd.6380).

Fifty-eighth Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1913 XVI.813 (Cd.6843).

Fifty-seventh detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1914 XIV.405 (Cd.7332).

Fifty-eighth detailed annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1914-16 X.1 (Cd.7699).

Fifty-ninth Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1914-16 X.571 (Cd.7893).

Sixtieth Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1914-16 XI.1 (Cd.8160).

Sixty-first Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1916 VI.109 (Cd.8339).

Sixty-second Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1918 VI.451 (Cd.9104).

Sixty-third Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1919 X.945 (Cmd.287).

Sixty-fourth Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1920 XII.1 (Cmd.655).

Sixty-fifth Annual report of Registrar General of Births, Deaths and Marriages in Scotland. BPP 1920 XII.603 (Cmd.980).

12.5 Miscellaneous reports relating to population

Committee on Bill for taking Account of the population of GB. BPP 1830 IV.721,733 (385, 460).

Return of expenses under Population Act in Ireland, 1821-9. BPP 1830-31 XIV.273 (93).

Detailed account of expenses incurred under Population Act of Ireland, 1831. BPP 1833 XXXIX.45 (442).

Return of expense for census of GB, 1841 and 1851. BPP 1854 XXXIX.333 (442).

Copies of acts for taking census of UK in 1851. BPP 1860 LXI.521 (411).

Return of expense for Census of England and Wales, 1861; Number of persons enumerated. BPP 1863 XXIX.249 (544).

Report on the cholera epidemic of 1866 in England: supplement to the twenty-ninth annual report of the Registrar General. BPP 1868 (C.4072).

Suggestions to Home Department by Statistical Society in relation to ensuing census. BPP 1870 LVI.585 (350).

Table of allowances to Superintendent registrars, registrars and enumerators employed in the Census of England and Wales, 1871. BPP 1871 XXXVII.143 (57).

Return of expense for census of England, Wales, Scotland and Ireland, 1871. BPP 1875 XLII.155 (377).

Return of numbers of gaelic-speaking people of Scotland, under census of 1881. BPP 1882 L.855 (46).

Return of population of Scotland at each decennial period. BPP 1883 LIV.315 (161).

Treasury Committee to inquire into questions connected with taking of census report. Minutes of evidence, appendices. BPP 1890 LVIII.13 (C.6071).

Letter of Registrar General relative to complain against certain remarks in census report of 1891 as regards inhabitants of Wales, speaking Welsh only. BPP 1894 LXIX.1 (331).

Return of number of males and females in England and Wales at censuses 1871, 1881, and 1891 under occupational headings. BPP 1895 LXXX.245 (468).

Return of population enumerated in Civil Parishes in Administrative county of London, Mar. 1896, pursuant to Section 3 of London (Equalisation of Rates) Act, 1894. BPP 1896 LXXII.889 (C.8265).

Census Bill (1920). Memorandum on the financial resolution. BPP 1920 XL.575 (Cmd.869).

12.6 TNA Resources

Clergyman's returns, 1831 census

Example of Census Enumerators' Books, 1841

Example of Census Enumerators' Books, 1851

Example of Census Enumerators' Books, 1861

Example of Census Enumerators' Books, 1871

Example of Census Enumerators' Books, 1881

Example of Census Enumerators' Books, 1891

Example of Census Enumerators' Books, 1901

Examples of maps from Registrar General's Collection, 1861 to 1921

Census of Great Britain, 1841.

Example of Enquiry form for 1851 census

Census of England, Wales and Islands in the British Seas, 1861.

Census of England and Wales, 1861. Inquiry form

Census of England and Wales, 1861. Registrar's plans and lists

Census of England, Wales and Islands in the British Seas, 1871

Census of England, Wales and Islands in the British Seas, 1881

Census of England and Wales, 1881

Census of England, Wales and Islands in the British Seas, 1891

Census of England and Wales, 1901

Census of England and Wales, 1901.

Recommendations regarding the 1901 Census

Documents relating to the preparation of the 1901 census

Documents relating to aspects of the tabulation and publication of the 1901 census results

Correspondence relating to the adjustment of administrative boundaries, 1901

Documents relating to the preparation of the 1909 census of Eastbourne

Census of England, Wales and Islands in the British Seas, 1911

Documents relating to the preparation of the 1911 census

Census of England, Wales and Islands in the British Seas, 1921

Documents relating to the preparation of the 1921 census

Documents relating to 1921 census statistics

Census of England, Wales and Islands in the British Seas, 1931

Documents relating to the preparation of the 1931 census

Documents relating to the tabulation and publication of 1931 census data

Documents relating to publicity for the 1931 census

Sample of GRO correspondence and papers relating to the census of 1931

Examples of inspectors' reports on Superintendent Registrars and Registrars, 1837 to 1924

Sample of miscellaneous foreign returns (1870)

Treasury papers , 1841

Extracts from GRO letterbooks, 1842

Treasury papers, 1895 and 1919

Treasury papers, 1882

Extracts from GRO letterbooks, 1896 to 1901

Sample of GRO correspondence with local registration districts (1836 to 1929)

Sample of Registration Office Vacancy and Appointment Registers for England and Wales (1906-1939)

Instructions to registrars of marriages, 1875

GRO instructional circulars regarding the registration of births, deaths and marriages, 1908 to 1933

Instructions to Registration Officers, 1914 to 1926

Instructions to registrars of births and deaths

Registration Regulations, 1927

Documents relating to the RG's responsibility to interpret, administer and enforce statutory requirements for the registration of births, deaths and marriages

Sample of correspondence of the GRO Statistical Branch with government departments etc.

National Registration, 1915 to 1920

National Registration, 1939

Documents relating to the implementation of compulsory military training, 1939

Reports on National Registration, 1919 to 1947

Documents relating to National Registration, 1939

Documents relating to the disposal of public records, 1884 to 1929

Papers relating to the organisation of the GRO, 1920 to 1926

12.7 Downloadable Tables Selection

A facility to download machine readable tabular material has also been provided. Some 7,240 tables have been processed and are available in Microsoft Excel format.

Guided by the projects Advisory Group the tables were selected from:

Census of Scotland, 1911, *Report on the twelfth decennial census of Scotland. Vol. I. Cities and Counties, Part 1.* BPP 1912-13 CXIX (Cd.6097).

Census of Scotland, 1911, *Report on the twelfth decennial census of Scotland. Vol. I. Counties, Part 2.* BPP 1912-13 CXX (Cd.6097).

Census of Scotland, 1911, *Report on the twelfth decennial census of Scotland. Vol. II.* BPP 1913 LXXX.45 (Cd.6896).

Census of Scotland, 1911, *Report on the twelfth decennial census of Scotland. Vol. III.* BPP 1914 XLIV.393 (Cd.7163).

Census of England and Wales, 1911, *Vol. VII. Ages and condition as to marriage in administrative counties, urban and rural districts, and registration counties and districts.* BPP 1912-13 CXIII.379 (Cd.6610).

Census of England and Wales, 1911, *Vol. VIII. Tenements in administrative counties and urban and rural districts.* BPP 1913 LXXVII.1 (Cd.6910).

Census of England and Wales, 1911, *Vol. IX. Birthplaces of persons enumerated in administrative counties, county boroughs, &c., and ages and occupations of foreigners).* BPP 1913 LXXVIII.1 (Cd.7017).

Census of England and Wales, 1911, *Vol. X. Occupations and Industries [Part 1].* BPP 1913 LXXVIII.321 (Cd.7018).

Census of England and Wales, 1911, *Vol. X. Occupations and Industries [Part 2].* BPP 1913 LXXIX.1 (Cd.7019).

Census of England and Wales, 1911, *Vol. X. Appendix. Classified and alphabetical lists of occupations and the rules adopted for classification.* BPP 1914-16 LXXXI.1 (Cd.7660).

Census of England and Wales, 1911, *Summary tables.* BPP 1914-16 LXXXI.385 (Cd.7929).

Census of England and Wales, 1911, *General report with appendices.* BPP 1917-18 XXXV.483 (Cd.8491).