

Knowledge is Power

A Short History of Official Data Collection in the UK

Basil Mahon

Commissioned by Karen Dunnell, National Statistician,
to mark the 175th Anniversary of the Royal Statistical Society

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Introduction

When he wrote 'Knowledge is power' the Elizabethan philosopher Francis Bacon was simply stating a fact well known to governments through the ages. His saying encapsulates their justification for carrying out censuses of the population and, by extension, for collecting whatever other data are needed. Whether the power is to be exercised benignly or tyrannically, the reasoning is the same: the government needs the facts from statistics to do its job.

From the first, censuses have helped rulers to levy taxes and raise armies, and as the role of governments in Britain and elsewhere expanded during the 19th and 20th centuries they found the need to collect statistics not only on the population but on health, commerce, employment, law enforcement, education and all the other concerns of a modern nation state. The process has not been entirely smooth and the experience of Britain is typical: almost every significant addition to the range of statistics collected for government has been supported by campaigning reformers but opposed by those who questioned its value or resented the intrusion into people's personal or business affairs. All governments try to economise where they can and ours has from time to time taken a sharp pruning knife to its data collection operations, but in general the reformers have prevailed and over the years the outcome has been inexorable growth.

A substantial part of today's great range of National Statistics comes from the Government's own administrative data – tax revenues, numbers of people receiving benefits and so on. From early days, UK governments have made use of administrative data in this way. But in this short history we will focus on the data that they have collected specifically for statistical purposes. Most have sprung from two early sources – the censuses of population and production. The two streams developed independently of one another until the Second World War but since then have largely come together. The story thus falls naturally into three chapters: the census of population and social statistics up to 1940 when data collection was put on a war footing; the census of production and business statistics, also up to 1940; and the bringing of everything together over the past 69 years. The third chapter has many strands and to help both reader and writer I am presenting it in three parts: wartime and the periods before and after the creation of the Government Statistical Service in 1968.

The census of population, and social statistics, up to 1940

When the Statistical Society of London was founded in 1834, the population of Great Britain was about 17 million, news from the far colonies took months to arrive, and the Westminster Parliament had a five month holiday every year. One baby in six died before reaching its first birthday and those that survived had a life expectation of

about 47 years. The business of government was conducted in what we would view as a leisurely fashion, but things were moving. Censuses in 1801, 1811, 1821 and 1831 had not only given a reasonably accurate count of the population but had shown that it was growing fast – each decade brought about 2 million more mouths to feed. The Reform Act of 1832 had done away with rotten boroughs and given the middle classes a say in Parliamentary affairs – the franchise now included about one man in five.

Two events in 1837 turned out to be the seeds of momentous changes to come. One was the installation of the first working telegraph in Britain. William Fothergill Cooke and Charles Wheatstone were contracted by Robert Stephenson, Engineer to the London and Birmingham Railway, to run a trial of their telegraph signalling system on Camden Bank, a sharp mile-long incline out of Euston station up which trains were pulled by mechanical cable. Their venture, together with those of other electrical pioneers, led on to the transatlantic telegraph cable, the telephone, radio, television, the Internet, and everything else that now carries the vast traffic of instant information that people and governments all over the world rely on to conduct their day-to-day business.

The other key event of 1837 was the formation of the General Register Office for England and Wales, headed by a Registrar General appointed by the King. Though its primary role was administrative – to provide a reliable and legally effective system for registering births, marriages and deaths – the new Office was also a natural base for official statistics on the population: the Registrar General was required to prepare annual ‘abstracts’ of the numbers of births, marriages and deaths, and was given the job of running the censuses of population.

Censuses have a long history – the Babylonians, the Egyptians, the Chinese and the Romans all found them effective instruments of government. But not all attempts to count populations had happy outcomes. The Book of Samuel reports that when King David tried to carry out censuses in Israel and Judah he incurred the wrath of God, who sent a plague that killed 70,000 men. Fear of similar consequences played a part in delaying the introduction of regular censuses in Britain until 1801, by which time they were well-established in some other European countries.

In fact, Britain had come close to leading the way. In 1753, Thomas Potter, MP for St Germans in Cornwall, proposed a Bill to carry out *annual* censuses. He argued that the statistics would be ‘of singular advantage to the public and a great satisfaction to ourselves’ and many of his colleagues agreed. But not all: Matthew Ridley, MP for Newcastle upon Tyne, was not alone in fearing that a British census, like David’s, would bring divine retribution and that the people would oppose it ‘in riotous manner’. Despite these worries, the Bill was passed by a large majority in the House of Commons, only to be rejected by the Lords.

Late in the 18th century the debate took a new turn. Some people worried that the population was falling and that this would lead to military humiliation by rampant France. On the other side, followers of Thomas Malthus feared that the population was growing in geometric progression and, if not checked, would outstrip the food supply, which could only increase by arithmetic progression. But both sides agreed on the need for proper data and a new Bill was put to Parliament in 1800 for a census the following year. It had an easy passage through both Houses and the census was under way in Britain.

The census of 1801 was carried out by Overseers of the Poor in England and Wales, and by schoolmasters in Scotland. They counted, for each parish or township, the

numbers of people of each sex, the numbers employed in each of four categories (agriculture, trade, manufacturing or handicraft, and other), the number of families, and the number of houses, both occupied and empty. To try to get some idea of whether the population was growing or declining, an accompanying request went to the clergy for data on baptisms and burials over the preceding 100 years, but it was only after the second census, in 1811, that the upward trend became clear.

Censuses in 1811, 1821 and 1831 followed the same pattern, though with progressively better guidance to enumerators and an expanded set of occupation categories in 1831. Each time, the clergy sent in data on baptisms and burials for the 10 years since the preceding census; and, to furnish the emerging life insurance industry with life tables, a one-off categorisation of the population by age was included in the census of 1821.

The man entrusted with preparing and presenting the results from these early censuses was John Rickman, a former House of Commons Clerk who had helped to draft the 1800 Census Bill. He took on the task with passion and aplomb, and became, in effect, the first Head of Government Statistics. No dry number cruncher, he was, like many of his successors, a man of influence and culture. Among his friends were the poet Robert Southey, who described him as 'a fine rattling fellow', and the engineer Thomas Telford, whose fame spread when he became widely known as 'the Colossus of Roads', a soubriquet Rickman had given him.

The first four censuses had shown the way but it was the fifth, in 1841, that really put data collection on a professional footing. The new Registrar General, Thomas Lister, had already set up around 2,000 registration districts in England and Wales. For the census, these were divided into smaller areas, each to be covered by one enumerator, who was to deliver a self-completion form to every householder and collect it within a few days of the specified census date. Lister held a thorough trial to test all the procedures and to decide the appropriate workloads for enumerators. These turned out to vary greatly: enumerators in sparsely populated areas had as few as 25 houses to cover and those in cities as many as 200. All this will be very familiar to anyone who has done field work on a recent census: the method used in 1841 has stood the test of time amazingly well and has needed very little alteration over the years.

The Scots were not entirely left behind. They applied Lister's method as far as possible and in 1855 established their own registration service under a Registrar General for Scotland. In Ireland the first attempt at a census had failed in 1812 but one in 1821 was a success. From then censuses followed the same 10 yearly (decennial) pattern as those in England, Wales and Scotland, and in 1864 Ireland acquired its own Registrar General.

Meanwhile, one of the most remarkable men of the age was making his mark. William Farr was the son of a Shropshire farm labourer but was adopted by the local squire who saw to his early education and left him a legacy that enabled him to train as a doctor in Paris and at University College, London. He saw early on that statistical analysis could be a powerful force for good and, while practising as a young GP, wrote an influential chapter on vital statistics for John Ramsay McCulloch's *Statistical Digest of the British Empire*. In 1839 he became the Registrar General's 'Compiler of Abstracts' – a post he held for over 40 years, though its title was soon changed to 'Superintendent of Statistics'.

Farr took the science of demography to a new level and led the world in the use of medical statistics for the prevention of diseases. Combining data from the census

with those from the registered births and deaths, he produced life tables that were far more sophisticated and far more useful than anything seen before. He brought in a much more precise and effective set of categories for the types of work people did – a rough prototype for today’s standard classifications of occupation and industry – and used it together with a framework of his own devising for classifying diseases, which he called a ‘nosology’. The name, not surprisingly, didn’t catch on but his work here led directly to the International Classification of Diseases and all the benefits that flowed from it.

Through the wayward channels of posterity he is most widely remembered today for his part in establishing the cause of cholera but, in fact, this was not his finest hour. His penetrative and meticulously presented statistical analyses did indeed confirm Dr John Snow’s theory that the cholera came from polluted water supplies but for some time Farr was obstinate in holding to his own theory that the disease was borne by the air. To his credit, he admitted his mistake, came in strongly behind Snow, and campaigned with all his usual zeal for better sanitation and water supplies.

Campaigning featured strongly in the annual reports produced by Farr and his long-time colleague, Registrar General George Graham. They saw themselves not merely as providers of information but as protagonists for reform. An extract from the twelfth Annual Report gives an idea of their style.

The causes of typhus, of cholera and the like diseases will not long ... remain in undisturbed possession of the earth and air of this city ... once that putrid, decaying, noisome atmosphere exhaled by churchyards, slaughter houses, the tanks of dirty water companies, cesspools, sewers and crowded dwellings is purified and dissipated.

Times have changed. Even if they were translated into flat modern prose, one cannot imagine such evangelical statements issuing from the ONS today. Perhaps this is partly a sign of Farr and Graham’s success: their campaigning helped to bring about measures like the Public Health Acts of 1872 and 1875 that transformed the health of the people and, by the same token, did away with many of the reasons for protest.

Farr’s influence extended well into the 20th century: the very idea that statistics should be gathered and used to devise effective disease-prevention measures was his. Back in 1839 he pointed out the benefits that could flow from a government-sponsored study of large cohorts of people over an extended period, and accused governments in general of being ‘singularly inattentive to their duty in this respect’. It took 132 years for his proposal to be taken up. From 1971 onwards, the records of a sample of about one per cent of people enumerated in the census have been linked to the following census, and to events recorded on the National Health Service Central Register, in the now well-established Longitudinal Study. The study has shed new light on such topics as family formation and occupational mortality, and has given authoritative information on issues of public concern, for example demonstrating clearly the effects on mortality rates of inhaling asbestos dust or drinking too much alcohol for too long.

The range of topics covered by the population census changed little in the second half of the 19th century and the early part of the 20th, but William Farr and his successors refined the questions and made much fuller use of the data. From the start, a cardinal principle in the collection of all census data had been confidentiality – people answered personal questions on the understanding that the data would be used only for statistical purposes. The principle was put to the test in the 1890s when the Local Government Board, pleading their duty to improve public health, asked the

Registrar General, Sir Brydges Henniker, to pass some of the personal data collected in the 1891 census to the Sanitary Authorities. He refused, and all similar requests have been refused since.

Thanks to the assurance of confidentiality there were few public protests against the census in England, Wales and Scotland. But things were not so quiet in Ireland, where the intrusion into people's private affairs was more keenly felt. In 1891, John Dineed of Incheens near Kilvargan expressed popular feelings in a protest song. One verse runs:

They will ask you if your dwelling house was built of mud and stones,
Or if the roof is thatched or slated by Brown, Hennesy or Jones.
They will ask you how many inches of a tail is on your pig,
And how many hairs old granny wears when she takes off her wig.

Luckily, feelings did not spill over from mockery into violence.

Several important innovations came with the 1911 census. It was the first to use automatic data processing – punched cards which could be mechanically selected and sorted – and the first to use householders' completed forms as the master records: previously the enumerators had transcribed the entries into their own record books. It was also the first census to ask separate questions on occupation and industry – making it possible to record, for example, that someone worked as a carpenter for a mining company. The very concept of occupation had been slow to evolve – in the early years of the census, it was thought of not as what one did but what one was: students were ascribed their potential occupations and retired people their previous ones. William Farr had begun to clarify things but only now had the concept become something like the one we hold today. In fact, there was still some way to go – for example, the category 'unemployed' was not brought in until the great depression forced the issue in 1931 – but this didn't stop Dr THC Stevenson, Superintendent of Statistics at the London GRO, from making what turned out to be a far-reaching move when he divided the 1911 occupation categories into eight groups intended to reflect 'wealth and culture'. Their number was reduced to five after the next census and they became known to all as the Registrar General's Social Classes.

Another innovation was prompted by worries about the birth rate, which had been falling since the 1870s. The 1911 census included a special enquiry into fertility within marriage. Registrars General in England and Wales had paid great attention to mortality but had been much slower than their Scottish colleagues in recognising that fertility was not simply a constant determined by the number of marriages – it was a highly variable factor that needed to be monitored in its own right.

What about education? There had been an ambitious enquiry in the 1851 census into schools, pupils, teachers and subjects taught, as well as evening classes for adults, but the attempt was forlorn and no results were published. Only in 1921 was the topic broached again, this time successfully, and censuses from then on asked increasingly detailed questions on educational qualifications.

The 1921 census also broke ground in another way. Each census up to 1911 had required its own primary legislation but the 1920 Census Act gave the Government power to carry out censuses whenever it wished, as long as they were separated by at least five years. Details of any proposed census were to be set out in secondary legislation – a Census Order, to be approved by Parliament. This arrangement is still in force.

Contrary to the general trend, the 1931 census form was shorter than its predecessor. Costs had to be cut because the country's economy was in a dire state – more of this later. There was talk of another 'short form' census in 1936, but that came to nothing and war put a stop to plans for the next census in 1941. The preparatory work served instead to help build the National Register that was used for issuing wartime identity cards and ration books. When rationing ended in 1952 the register changed its role and became the National Health Service Central Register.

By the fourth decade of the 20th century many people inside and outside government were using the Registrars General's statistics routinely in their work*. The 10-yearly census snapshots of the population and regular reports from the registration of births, marriages and deaths gave a reliable core of statistical information on the nation's people, how they lived, their health, their education and the kinds of work they did. But the business of government was steadily extending its range and government departments needed more information on social conditions than the census alone could provide. The need became acute when war broke out in 1939 and new surveys were rapidly commissioned. More of this later, but first we must catch up with the other main strand of data collection – the statistics of production and trade.

The census of production, and business statistics, up to 1940

Back in 1834, any founder member of the Statistical Society of London who wanted to form a statistical picture of how the country was faring would have been well-served on matters to do with the number and condition of the people – results from the first four population censuses were readily available. But there were no corresponding figures on business affairs – the censuses of production and distribution did not begin until the 20th century. From our distant perspective it seems odd that Britain, leader of the industrial revolution and the most prosperous country in the world, should lag behind others in this matter of good housekeeping – the United States, for example, had held its first census of production in 1810. What makes the omission still more surprising was that Britain was relying on tax receipts from ever-burgeoning production to pay off the huge national debt by which it had financed the war against Napoleon. In the 1830s about half of all the revenue from taxes went to pay charges on the debt. But such was Britain's confidence in its colonies overseas and its industry at home that no one worried too much about the details of national accounting. Short of wars, other demands on the national purse were kept to a minimum – the great public health reforms were still some way off and any idea of a welfare state seemed as fanciful as a moon-landing – so the Government felt no pressing need to organise comprehensive data collection on production and trade.

But some steps had been taken. A start was made as early as 1696, when Customs and Excise officials published the first annual statement of the balance of trade. In 1786, the Board of Trade was established. It gathered data piecemeal in the course of business and, in 1832, set up a statistical department to bring things together. The new department began to publish a yearbook which gave fairly full information on imports and exports but, as yet, only a little on domestic production. The production sector of most interest at this time was agriculture, where yields were failing to keep pace with the growing population – the wheat harvest no longer gave a big surplus that could be exported and there was even fear of possible famine. Several attempts were made in the early part of the century to collect relevant data – for example, enumerators in the first population census in 1801 were asked to collect

* Northern Ireland acquired its own Registrar General and GRO in 1922.

additional information on crop areas – but it was not until 1865 that Parliament voted money for the regular collection and publication of agricultural statistics. Strange as it seems now, field work for the first agricultural census the following year was carried out by the Inland Revenue, though the Board of Trade processed and published the figures.

By the end of the 19th century, the Government's ministries and departments were collecting quite a lot of data for various purposes. The work was, for the most part, ad hoc and uncoordinated but some of it became well-established. For example, the Home Office collected data annually from mines and quarries and at longer intervals from factories and workshops, and a new labour branch in the Board of Trade's statistics department collected and published information on wages and employment. This new branch soon spread its wings: in a pioneering move it published the first report on wholesale and retail prices in 1903.

Not everyone approved of the way things were going. There was fire from both flanks: many people resented the creeping intrusion into their business affairs but others argued for a more comprehensive and systematic approach to data collection, citing in particular the need for full information on domestic production to give an accurate comparison with imports. The controversy came to a head in 1906 when the President of the Board of Trade, David Lloyd George, presented a Bill to Parliament for a Census of Production. There were staunch supporters – one called it 'a most important bill of a very far-reaching and revolutionary character' – but opponents, led by Joseph Chamberlain, laid into the proposal with venom. One said it would be 'a great invasion of public liberty' while others deplored 'prying into the secrets of ... trade and commerce' and feared that people would be 'sacrificing their liberty to a gang of clerks in Downing Street'. The stormy debate was dominated by two questions that have resounded down the years: was the burden on respondents justified, and would the data remain truly confidential? Thanks in large part to Lloyd George's powerful advocacy, a majority in the House of Commons took a favourable view on both issues, though the amount of detail in the data to be collected had to be trimmed severely to get the Bill passed. The Lords followed, and the 1906 Census of Production Act entered the statute book.

Though smaller in scale, the census of production was in some ways more demanding than a population census. It was not enough to take a snapshot on a given day; the sum of activity throughout a year had to be measured. Figures for the number of employees had to represent average values over the year and where sales were used as a measure of production they had to be adjusted for changes in stocks. And before anything could happen, businesses all over the country had to be identified and classified. A formidable task, but this was serious Government business. Lloyd George himself took a hands-on role, chairing the advisory committee; the preparations were completed and data were collected in 1908, covering the previous year, 1907.

The plan was to hold a census of production every five years but for a while it looked as though this would go the way of many other 'best laid schemes o' mice and men'. A second census was indeed taken for 1912 but the partly completed processing was halted when war began in 1914. A census in 1917 was out of the question – war was at its height and the overwhelming thrust of production was on munitions. With the country's economy in a poor state and troubles in Ireland, the Government had to abort census preparations for 1920, and the same thing happened two years later. A successful census of production was finally taken for 1924, the Northern Ireland part being taken by the Board of Trade on behalf of its new Ministry of Commerce.

Progress in business statistics during the 1920s and 30s was far from smooth. The Census of Production Act of 1906 had set data collection on a formal footing but in the view of critics, including the Royal Statistical Society, the resulting statistics gave a far from adequate picture of what was happening. For example, the Act did not allow information on wages to be collected as part of the census and it restricted the description of the types of goods produced to a fairly broad set of categories known as the 'import and export list'. On the other side, businesses complained that the burden of form-filling was already too great. But by far the greatest obstacle to improvement in statistical coverage was cost.

Business in Britain was slow to pick up after the Great War. To pay for the war effort the Government had sold many foreign assets, thus making the country's economy more dependent on exports. But the war had eroded Britain's trading status by destroying 40 per cent of its merchant fleet and forcing its traditional overseas customers for coal, steel and textiles to find new suppliers. To make things worse, the Government decided in 1925 to restore the Pound Sterling to the gold standard. The aim was to protect the currency but the result was to halt the economy's stumbling recovery in its tracks by making British-produced goods too expensive to sell in export markets. When industry managers tried to reduce costs by cutting wages there was a country-wide strike that lasted 10 days. And all this was *before* the New York stock market crashed in 1929, precipitating the great depression of the early 1930s.

Judged against this background, Government statisticians did well to make some progress. There were setbacks – for example, agriculture and forestry were dropped from the census of production for 1930, leaving the relevant departments to fend for themselves – but a new Import Duties Act in 1932 gave the Board of Trade powers to collect more detailed data on some types of domestically manufactured goods. By invoking this Act along with the original Census of Production Act of 1906, the Board was able to expand and improve the parts of the census of production for 1935 that covered industries which produced goods which would have attracted import duty if they had been imported.

There were other frustrations for the statisticians. For example, they needed information on wage rates for the census of production but under the existing legislation they were allowed to include only a voluntary question on the aggregate wage bill in the census itself. To try to fill in the picture they used data on wages and hours worked from a separate voluntary survey run by the Ministry of Labour. The match rate between the two sources was poor and a lot of effort went into making the best of a bad job.

One way to improve the range and usefulness of business statistics at relatively modest cost was to give the whole census of production the same data collection powers that were available under the Import Duties Act. In 1939, probably after much lobbying behind the scenes, the Census of Production Act was amended in exactly this way. But a few months later the country was at war again and the new data collection powers were, for a while, rendered irrelevant.

Britain was in peril; invasion loomed; Parliament passed the Emergency Powers (Defence) Act and the Government's imperative was to turn the whole country into an effective war machine. This meant taking control of many aspects of its people's lives – a job that required a great deal of new statistical information. Getting facts from figures became a prime task for all Government departments. They put together the best estimates they could, drawing on their existing statistical and administrative sources and collecting new data where needed.

The results were not satisfactory. In November 1940 the Prime Minister, Winston Churchill, wrote to the War Cabinet Secretary:

Many of the executive departments have set up and developed their own statistical branches ... I have my own statistical branch under Professor Lindemann ... It is essential to consolidate and make sure that agreed figures only are used. The utmost confusion is caused when people argue on different statistical data. I wish all statistics to be concentrated in my own branch as Prime Minister and Minister of Defence, from which alone the final authoritative working statistics will issue.

Pray look into this and advise me how my wish can be most speedily and effectively achieved.

The outcome was the foundation of the Central Statistical Office.

Bringing it all together: 1940 to 2009

War work: 1940 to 1945

The wartime Central Statistical Office had a small staff and collected no data. Its task was to sift, sort and summarise the vast quantity of data collected by departments, to reconcile discrepancies and to present the results. The man chosen to lead this work was Harry Campion. He had joined the War Cabinet's Central Economic Intelligence Service in 1939 and, apart from a short break after the war to set up the United Nations Statistical Office, went on to serve in his new post for 27 years, consolidating the role of the Central Statistical Office and, by the same token, laying the foundations for the Government Statistical Service we have today. In its early years the CSO gave the War Cabinet the service that Churchill had asked for and published digests which covered the whole range of statistical information.

Almost so, anyway. The Minister of Information, Duff Cooper, saw value in the kind of data gathered by private organisations like the Gallup Poll, Mass Observation, and the British Institute of Public Opinion. He wanted more and in 1941 set up the Wartime Social Survey, initially as a small independent organisation run from the London School of Economics. The enthusiastic new staff there were soon busy running surveys to meet requests from the Ministry of Information and other departments for information about the views and behaviour of ordinary people. Their efforts met opposition. One journalist accused them of 'asking a lot of silly questions and upsetting the public' and the interviewers were widely derided in the press as 'Cooper's Snoopers' But the fuss turned out to be illusory. Most of the people who actually took part were happy to co-operate – one source* estimates the response rate to early surveys as 99 per cent – and government social surveys were here to stay. The new organisation was soon formally incorporated into the Ministry of Information as the Government Social Survey and it thrived under an inspiring director, Louis Moss, who remained in post until he retired in 1970.

Another national institution began life during the war. In 1941 two young academic economists in the War Cabinet's Secretariat, James Meade and Richard Stone, had a go at tabulating the country's whole income and expenditure in double entry book-keeping form. With the data then available the results were brief and rough but they were published as the first official estimates of UK national income and expenditure.

* 60 Years of Social Survey, HMSO, 2001 (Available on ONS website.)

The exercise was repeated each year during the war and has continued ever since. Meade and Stone's set of three tables, expanded and refined over the years, became the National Accounts, authoritative annual statements of the country's economic activity and performance.

Developments leading to the creation of the Government Statistical Service: 1945 to 1968

The census of production resumed in 1946, though in restricted form and still under wartime legislation. Abundant statistics had played a significant part in running the war effort and the new Labour Government wanted to apply the same principles in its effort to bring about peacetime recovery. Early in 1947 it put a Statistics of Trade Bill to Parliament, proposing powers to hold a census of production every year and to collect a range of other data on businesses. The Bill met general approval from both Houses and became law, but not everyone was happy. In fact, some people were alarmed, fearing the Government would use the new statistical powers to help it nationalise everything. The *Daily Graphic* warned its readers that the Bill 'portends ... the organisation and management of the entire economy on the Nazi model'.

Perhaps *Daily Graphic* readers were reassured of the unlikelihood of any such outcome when progress on the census of production was held up by an old-fashioned turf battle between the Board of Trade and the new Ministry of Fuel and Power. The Board insisted that its census office should run the whole show but the Ministry wanted to keep authority over data collection in its own domain. The resulting compromise went largely the Board's way – its census office was indeed tasked with planning the censuses, collecting the data and presenting the results, but all under the supervision of an interdepartmental committee. Foreshadowing changes to come, the chairmanship of this committee went to the Central Statistical Office.

The first in the new series of annual censuses of production was held for 1948. It set the pattern for those that followed: topic coverage was much improved and each industry was assigned a place in the first Standard Industrial Classification, SIC48. The statisticians were able to produce useful kinds of new information; for example, sales could now be tabulated both by industry and by type of product. In 1950 the census of production was complemented by one of distribution – essentially wholesale and retail trading. Once again, Britain was behind other countries – the US had held its first census of distribution in 1929. All the same, this was a big step forward. Although the census of distribution was held only at roughly five-year intervals, information from the two censuses and some supplementary surveys now gave a reasonably full picture of the country's business activity.

A new Conservative Government took office in 1951. It went along with most of the outgoing Labour Government's expensive social reforms in such matters as health and education but sought to trim public spending where it could. One way to reduce the cost of statistics would be to use sampling rather than full enumeration in the census of production and this was done in the annual censuses from 1952 to 1957. But by then the sampling frame, which was based on the 1951 census, needed updating, and from 1958 a full census of production was held every five years, with smaller sample-based censuses in the intervening years. Something similar happened with the five yearly censuses of distribution, where sample censuses alternated with full ones. At the same time, the burgeoning National Accounts needed fuller statistics on businesses, so the censuses of production and distribution were supplemented by an increasing number of smaller surveys, both regular and ad hoc.

The Social Survey unit did not escape the Government's pruning shears: its staff complement was halved and the Survey of Sickness, which had been running for eight years, had to be dropped. But it took over the National Food Survey from the Ministry of Food and ran a new Household Expenditure Survey in 1953 and 1954. The survey's purpose was to measure the prices and quantities of goods purchased in a typical household's 'shopping basket' and so provide weighting factors for the Retail Prices Index. As Britain recovered from the war, spending patterns were changing: the 'basket' of the early 1950s no longer represented what people bought and it became clear that the weighting factors needed to be updated year by year. The Household Expenditure Survey was re-launched in 1957 as the Family Expenditure Survey and has been running ever since. It was followed in 1961 by the International Passenger Survey. Every day, a sample of travellers at sea and air ports were interviewed about where they were going and why, and about the money they had spent, or planned to spend, during the visit. The survey gave highly valued business information to the tourist and transport industries and gave the Treasury an estimate of the tourist component of the balance of payments. Most importantly, it became the Government's prime source of information on immigration and emigration. Like the FES, it has run ever since.

By the 1960s, statisticians of the Government Social Survey had developed unrivalled expertise in sampling, questionnaire design and interviewing techniques. Their counterparts in business statistics had acquired a rather different set of skills. Good questionnaire design was vital here too, but with different criteria. There were more compromises: the forms had to yield adequate data while imposing the smallest possible burden on respondents, not all of whom were of a mind to cooperate. The statisticians became adept at following up and correcting omissions, errors and inconsistencies in the responses and at imputing sensible values where, for whatever reason, data could not be obtained.

The General Register Office housed yet other kinds of skills. In the tradition of William Farr, statisticians there were at the cutting edge of demography and medical statistics. And the long tradition of population censuses was kept up: after the enforced wartime break the 10-yearly sequence was resumed in 1951. In the following census, enumerators were given the extra job of identifying trading establishments to help their business statistics colleagues with the census of distribution – an admirable example of cooperation between departments. But the main feature of the 1961 population census was the introduction of fully automated data processing: the GRO then had no computer of its own but, in another example of inter-departmental cooperation, the army helped by allocating time for census processing on the Royal Army Pay Corps computer.

The 1961 census was also the first to have a post enumeration survey, in which a sample of households was independently enumerated again, to check on the quality of the first enumeration. The results were very encouraging, showing a tiny net undercount, but sampling was tried in another way with less satisfactory results. To save costs and reduce the burden on the public, only a 10 per cent sample of households was given the full form to fill in – the rest had a shorter form which left out the questions on employment, education, household formation and migration. The results turned out to be severely biased because the enumerators shrank from giving the long form to old people and others who, they thought, would have difficulty answering the questions. Later censuses have also used sampling for such questions, but only at the processing stage. Field sampling was tried again in 1966 when the first, and only, 'mid-term' census was held. The idea was to enumerate 10 per cent of households, but again the field procedures proved inadequate – the results were biased and of limited use.

By this time, most Government departments had their own statistical teams, who collected data or put administrative records to statistical use. And a quarter-century on from its wartime inception, the Central Statistical Office was now the well-established nerve centre of the country's statistics on economic matters. It still collected no data of its own but had a strong influence on what was collected by the departments responsible for industry and commerce. Besides taking a leading role in drafting the 1947 Statistics of Trade Act and the 1948 Standard Industrial Classification, it had from early days orchestrated the construction and publication of the National Accounts. It developed particular expertise, indeed flair, in the packaging and presentation of statistics in publications. The annual National Accounts came to be presented in the *National Income and Expenditure Blue Book*, which first appeared in 1952 and the *Balance of Payments Pink Book*, which began in 1960. Other titles that have become national institutions include the *Monthly Digest of Statistics* (first published in 1946), *The Annual Abstract* (1948), and *Economic Trends* (1953). When the architect of all this, the long-serving head of the CSO, Harry Champion, retired in 1967, there was an important post to fill. The choice, perhaps surprisingly at the time, fell on a professor at the London School of Economics with little experience of Government statistics who had, only two years before, been turned down for a job at the CSO on the grounds that he was a former enemy alien. His name was Claus Moser.

Moser was the son of Jewish parents who had left Nazi Germany to settle in England. When the war started they were sent to an internment camp, along with many others in the same situation, and it was there that he acquired his love of statistics. To help pass the time, he collected and analysed data from the other inmates on their background and circumstances. It was engaging work, but what captivated him was the depth of information revealed by the results. He was never a mathematical statistician – he confesses to taking fright when Maurice Kendall asked him to give lectures to LSE students on the analysis of variance – but the wartime experience gave him a robustly intuitive feel for the whole statistical process, from deciding on what data should be collected (and how) to presenting the results and putting them to good use.

It was a brave and inspired appointment, and the person at the heart of it was Prime Minister Harold Wilson. Later a President of the Royal Statistical Society, he is probably the only British Prime Minister who would not have blanched if asked to calculate a standard deviation. He believed in progress through the application of science in all its forms and had spoken of a changed Britain that would be 'forged in the white heat' of the technological revolution. Government statistics had to play their part in the forging; he and Claus Moser reviewed the situation. Britain's system of official statistics was nothing like the standard model, in which a central agency collected all the data, processed them and published the results. Such an arrangement had obvious advantages: economies of scale, concentration of expertise, and ease of ensuring coherence and compatibility across the whole range of national statistics. It also allowed the central agency to have a degree of independence, thus insulating the statistics against political tampering. But in Moser's view it had an overriding flaw: it distanced professional statisticians from the sphere of action. Statisticians in UK government departments were in a position to ensure, by personal contact with ministers, that the statistics produced were relevant to the task and that policies were made in full light of the statistical facts. To assign all statistical work to a central agency would be to throw away this advantage.

The product of these thoughts was the Government Statistical Service, established in 1968. Professional statisticians stayed in departments, close to the action, but at the

same time became members of a service-wide statistical corps, headed by Claus Moser. He oversaw the appointment of a Director of Statistics in each department and the directors formed a service-wide professional council under Moser's chairmanship. He remained Director of the CSO but that was a separate appointment. The CSO itself had no control over operations in departments but statisticians there could, if needed, call on the support of the Head of the GSS; and Moser had the ear of the Prime Minister. The organisational changes were slight but, in Moser's hands, they were inspirational. Government statisticians had a new spring in their step, a new comradeship and a new confidence: anything now seemed possible.

Recent times: 1968 to the present day

One of the first objectives of the Government Statistical Service was to construct a comprehensive register of businesses in both the production and services sectors, to act as a mailing list for the full surveys and a sampling frame for the sample ones. It proved to be an immense task. By a great deal of work behind the scenes, statisticians put together a much-improved register for a new series of full annual censuses of production that began in 1970 along with a new quarterly survey giving a breakdown of sales, but it was not until 1984 that the job was finished, in the shape of the Inter-Departmental Business Register. The long gestation of the IDBR exemplifies the intrinsic difficulty of collecting data from businesses – information for the new register had to be gleaned from many sources, including the PAYE and VAT registers, and then painstakingly cross-checked and assembled. By contrast, household social surveys had a ready-made sampling frame in the electoral register and, later, an even better one in the postcode address file.

Another aim of the Government Statistical Service was to make fuller and better use of its disparate pockets of expertise. As we have seen, Claus Moser did not want to make changes that would distance statistics from ministers but there were two changes that could be made without any such penalty. One was to bring together all the work of collecting and processing business statistics in a single purpose-designed office and this was accomplished when the Business Statistics Office was opened in 1969 as a specialist branch of the Department of Trade and Industry, which had taken over from the Board of Trade. It was based in Newport, South Wales, where land was relatively cheap and good local staff could be readily recruited, but the Director of Statistics at the DTI remained in London, close to ministers.

The other change was to merge the General Register Office for England and Wales with the Government Social Survey in 1970. Both gained. For example, social survey experts could run the post-enumeration surveys which evaluated each population census and medical statisticians could play a part in the household surveys that covered health matters. The only unfortunate aspect of the merger was that nobody could think of an appealing name for the new body – it was saddled with the title Office of Population Censuses and Surveys. Two important new surveys were soon launched – the General Household Survey in 1971 and the Labour Force Survey in 1973. Both came to be regarded as indispensable, the GHS almost at once and the LFS rather later – starting as a biennial survey, it became annual in 1984 and quarterly in 1992. During the early and mid-1970s, government departments took an increasingly scientific approach to policy making and, to meet the need for fuller statistical evidence, they kept the OPCS busy with ad hoc surveys as well as the regular ones. The ad hoc surveys - some small, some large - covered a huge range

of topics, from recruitment of prison officers to surgical footwear and Scottish drinking habits.

In 1978 Claus Moser left to take up a directorship at Rothschilds and to give time to his many other interests – notably music: he was Chairman of the Royal Opera House, Covent Garden. He had led the Government Statistical Service through 10 good years. Although the country had been in economic difficulty since the international oil crisis of 1973, people at the heart of government still believed that a good future would be found by taking a scientific approach to problems, and that statistics were part and parcel of the endeavour.

But the fair weather didn't last. In the late 1970s economic problems led to a public sector pay freeze, to mass strikes during the 'winter of discontent', and to the ousting of the Labour Government in favour of Margaret Thatcher's Conservatives. The new Prime Minister took what she saw as the vital first step in putting the country to rights. Determined to cut all inessential government spending, she brought in an Efficiency Unit run by Sir Derek Rayner, formerly of Marks and Spencer, to find sources of potential savings. He soon identified statistical operations as one of the prime targets and many statisticians were interviewed in what became known as the Rayner Review of the Government Statistical Service.

By Rayner's axiom, the job of the GSS was to produce only those statistics that the Government needed for its own purposes; the notion that statistics were for the public good had no place in his review. This axiom begged a philosophical question – was it not part of the Government's job to produce statistics that informed Parliament and the public of the state of the country? – but for the moment the Government put that issue on one side. The outcome was a severe cut in statistical budgets and staffing across the service; for example, the CSO lost a quarter of its staff complement. Yet few data collection projects were entirely dropped; economies were made, for the most part, by reducing the detail in the data, cutting sample sizes and streamlining the data processing. In some cases this streamlining included simplifying the checking procedures.

The damage from the cutbacks was scarcely noticeable at first to most of the people who supplied the data or used the statistics. Part of the impact was absorbed by genuine improvements in efficiency. But in some areas the quality of the statistics and the depth of analysis suffered; and one of these areas was the National Accounts. Towards the end of the 1980s the Government publicly attributed its apparently wayward handling of the economy to 'misleading statistics' and set up another review. This one, the Pickford Review, had quite a different outcome from Rayner's. The Central Statistical Office was given a greatly expanded role. It took over the Business Statistics Office and most of the statistical work in the Department of Trade and Industry's headquarters, thereby increasing its staff complement from under 200 to over 1,000. And in 1990 the Chancellor of the Exchequer formally announced a package of measures to improve the quality of economic statistics. Much of the credit for all this goes to Claus Moser's successor but one, Jack Hibbert.

A later and wider outcome from Rayner's work was 'market testing'. All suitable new projects throughout government were to be opened to the private sector by competitive tendering. By the same token inter-departmental charging for social surveys was introduced, so staff in OPCS's Social Survey Division had rapidly to become expert in the art of pitching for contracts. They succeeded, and by the end of the 1990s almost all of their work was acquired this way.

The long-term effect of market testing has been beneficial, not merely by keeping government statisticians on their toes but by giving them the confidence and know-how to contract out parts of their work that were more suitable for the private sector. In the same vein, Rayner instigated another long-term benefit. His findings stimulated government statisticians to pay closer attention to the financial aspects of their work – to make the costing of operations and the monitoring of expenditure part of their professional function. Any remaining vestige of the ivory tower was banished – today's statisticians are as aware of costs as any businessman. Like working architects and engineers, they have become their own accountants.

The type and quantity of data collected from businesses and the public have continued to grow over the past thirty years – though the changes have been nothing in comparison with the revolution in processing and dissemination, of which more shortly. The range of data collected has spread most rapidly in business statistics, where statisticians have had to be nimble to keep pace with developments in the ever-growing service industries. The European Union already had a bundle of statistical regulations in force when the UK joined in 1973 and these have continued to accumulate – they now govern around 80 per cent of economic statistics.

In two areas new statistics have played a part in shaping society. One is disability: information from questions in the population census and social surveys has led to wide recognition of the problems of disability and how they can be mitigated. The other is ethnicity. Public attitudes have changed so much that it now seems hard to understand the controversy that surrounded the new question on ethnic group in the 1991 census of population. Some influential people from ethnic minorities vehemently opposed the question, fearing that the government would use the information to discriminate against them, or even deport them. And there was a feeling widely aired in the press that the question was an unwarranted intrusion into personal matters. To include the question was to run the risk of ruining the whole census. But it all went smoothly and ethnic group quickly became accepted as part of each person's public identity – something you stated, along with your age, when registering with the local library or applying for a place on an adult education course.

Society's changing attitudes to disability and ethnicity have found expression in many ways. One of these is a rapidly growing body of law designed to ensure equal treatment for all. Another topic now subject to equality legislation is sexual orientation and, after much research and testing, the ONS has this year included a question on 'sexual identity' (one aspect of sexual orientation) in its Integrated Household Survey.

By the 1970s, computers had already transformed the production of statistics. Mainframe machines, each occupying a large hall, took in the data, checked them, and assembled them in files stored on reels of magnetic tape, from which they could be extracted for printing in paper publications. The days of clerks with quill pens were in the distant past. But a still greater transformation followed. Computers have become smaller, faster and cheaper, each by huge factors: a CD costing 10 pence today holds more data than 30 of the old magnetic tape reels, and processing that would have taken days of computer time can now be done in seconds. Household survey interviewers enter the responses to questions directly into small laptop computers that carry out data checks on the spot. Statistical reports are prepared for publication using standard software that produces the desired tables and charts, and incorporates the text.

The pace of change has not slackened. All the time, technological progress is opening up previously unimaginable possibilities: two examples from the Department for Communities and Local Government give some idea of the way things are going.

Statistical data collection from the Fire and Rescue Service is now built into command and control systems – details of each incident, including its precise geographical location, are entered directly to the database. And the Department's housing surveyors working on the Department's English Housing Survey now use 'digital pens' when writing their assessments in the field. A camera in the pen records every movement and when the surveyor docks the pen at the end of a day's work the data are whisked off to a website.

Harold Wilson may have been a little premature when he predicted the 'white hot' technological revolution but we certainly have it now. Along with the amazing advances in computing have come equally remarkable ones in telecommunications. As we have seen, the history of telecommunications in Britain spans almost exactly the 175 years of the Royal Statistical Society. Cooke and Wheatstone's mile-long telegraph on Camden Bank in 1837 has led to the Internet, which completes the modern statistical process by delivering the finished statistics cheaply and instantly direct to the user's office or living room. Traditional-style paper publications have their own advantages for regular users but the Internet has made statistics accessible to all.

Advances in computing have brought greater efficiency but hard pressed governments have kept departmental statistical budgets on a tight rein and over the past few decades there has been constant pressure to reduce costs. One result of this has been consolidation – bringing statistical operations together to share facilities and get economies of scale. The CSO took over most of the statistical functions of the Department of Employment in 1995 when that department was abolished, the remainder going to the Department for Education and Skills. The biggest merger of all came the following year. Social statistics and economic statistics, which had followed largely separate paths since the 19th century, were finally joined: the OPCS and the CSO united to form the Office for National Statistics. Data collection operations merged, too. In 1998 the census of production was brought together with no fewer than five other surveys in the new Annual Business Inquiry and in 2008 five long-standing household surveys were combined to form the Integrated Household Survey. They included the Labour Force Survey, the General Household Survey, and the Expenditure and Food Survey, which had itself been formed by merging the Family Expenditure Survey with the National Food Survey in 2001.

Together with consolidation has come a degree of independence from the politics of Government. The ONS is a government department but, as the head office of the Government Statistical Service, it reports in a professional sense to the UK Statistics Authority, set up in 2008, which reports not to the Government but to Parliament. By Rayner's axiom in the 1980s, the GSS was simply the Government's instrument. That axiom no longer holds. The GSS faces both ways: it advises Ministers on Government policy and at the same time provides the means for Parliament and the public to hold the Government to account. The Royal Statistical Society has played a big part in bringing about the change. In 1990 one of its working parties denounced the Rayner doctrine and called for a UK Statistics Act, the premise being that statistics would never be entirely trusted while they remained solely in the hands of the government of the day. The Society has held this line and the cause has prevailed. The new Statistics and Registration Service Act 2007 states clearly that official statistics are to serve the 'public good' and the Government has endorsed a detailed Code of Practice under the Act to ensure the quality, integrity and timely release of statistics.

'Knowledge is power' remains the Government's reason for collecting data. But the power now flows to the people, too. Official data collection has a long and honourable tradition in the UK. All who work in today's Government Statistical Service are building on that tradition. In a military context there would be commemorative flags and regimental silver. The legacy of Thomas Lister, William Farr, Harry Campion, Louis Moss, Claus Moser and hundreds of their colleagues has no such expression but it is present whenever an interviewer knocks at a door.

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