



Review Article

Maps, Models and Registers: the Historical Geography of the Population of England

MARY DOBSON, *Contours of Death and Disease in Early Modern England* (Cambridge: Cambridge University Press, 1997. Pp. xix + 647. £65.00 hardback)

E. A. WRIGLEY, R. S. DAVIES, J. E. OEPPEN, R. S. SCHOFIELD, *English Population History from Family Reconstitution 1580–1837* (Cambridge: Cambridge University Press, 1997. Pp. xxii + 657. £60.00 hardback)

From registers to models

In most European countries, regular censuses of population together with vital registration allow the historical geography of population changes to be studied with some confidence for the nineteenth and twentieth centuries.^[1] For earlier periods, we must rely in the main upon parish registers. Henry showed that these records of vital events could be used to build up pictures of families allowing many demographic measures to be calculated.^[2] Most English registers do not include as much information as the French registers used by Henry. They rarely give the ages of bride and groom at marriage and thus both bride and groom must be linked to their baptism records for the age at marriage to be calculated. On the other hand, whereas French registers begin in the early seventeenth century, many English registers were kept almost continuously from the mid sixteenth century. Wrigley and Laslett set up the Cambridge Group for the History of Population and Social Structure in large part to replicate in England the pioneering work in French historical demography completed by Henry. Based on a study of the parish of Colyton in Devon, Wrigley showed that English registers could be used for family reconstitution studies.^[3] As Levine remembers, Wrigley's "Colyton study revealed that a new kind of history—a people's history—could result from counting vital events".^[4] Through radio programmes Laslett appealed to local historians to make counts of the monthly totals of vital events in Anglican baptism, burial and marriage registers so that the Group could make a selection of a few dozen reliably registered parishes for reconstruction.^[5] By 1974, 530 tabulations had been received. Of these, 404 covered the core period chosen (1661–1812), were tolerably continuous over this period and were accurately tabulated.^[6]

With so much data (relating to some 3.7 million vital events) it was tempting to see if the aggregate data could be used to make some generalizations about the population history of England. There are more than 10 000 parishes in England and the four per cent sample had not been selected in a random fashion. The most serious bias appeared

to be a preponderance of large parishes among the 404. With this bias corrected by weighting parishes to produce a size distribution closer to the national picture for 1811, the sample was taken to be a tolerable guide to England outside London.^[7] Wrigley and Schofield adjusted their aggregate series until it could be taken as a reasonable guide to the unknown national series of births, marriages and deaths. By comparing short-term monthly variability with the range expected from adjacent periods, times of defective registration were identified and monthly totals were replaced with figures interpolated from earlier and later periods of good registration. In 1811, the population of the 404 parishes would have to be multiplied by 22.82 to give the national total outside London. Astonishingly, the only other large sample of parish register information—collected in 1836 for Rickman, the compiler of the first national censuses—suggests that this inflation figure works quite well for the entire period from the mid sixteenth to the early nineteenth centuries. On the basis of information in its Bills of Mortality, London was added to the inflated parish register sample. Next, non-conformist baptisms, burials and marriages were estimated and added to the national series. A number of further adjustments were made for other causes of under-registration before national series of births, deaths and marriages were derived.

Lee had shown that given a known initial age structure and population size, information about net migration and a time series of births and deaths, a modelling technique called inverse projection could use model life tables to provide good estimates of population size and age structure at any subsequent date covered by the time series.^[8] Oeppen revised this method so that it might work with information on the population size and age structure at the end rather than the beginning of the time series of births and deaths.^[9] On this basis the information contained in the national censuses of the nineteenth century could be used to back-project the demographic characteristics of earlier periods. For this reason Wrigley and Schofield produced new national estimates of population change and of nuptiality, fertility and mortality over the period 1541–1871. Their work established that England was a low-pressure demographic regime; that is, the English population was characterized by relatively low levels of both mortality and fertility. In the second place, England's population had shown very impressive growth in the eighteenth century. In other words, the modern rise of population seemed to predate the industrial revolution. Finally, the population leap of the eighteenth century owed more to a rise in fertility than to a drop in mortality and thus differed very greatly from the standard model of the demographic transition based on the quite different experience of nineteenth-century Sweden.^[10] Their book was one of the most significant works of English social and economic history published this century and it has received extensive comment.^[11]

Back to the registers

The new book returns to the work for which the volunteers originally collected the tabulations of vital events. The Group identified a number of parishes that seemed suitable for reconstitution studies and then again invited volunteers to extract the relevant data from parish registers according to rules devised by the Group. Some 34 reconstitutions were completed in this way and the forms for each vital event as well as the family reconstitution form bringing together the vital events relating to a single nuclear family were returned to the Group where they were entered into a computerized database. These data were then checked for accuracy and internal consistency and eight of the parishes were set aside before the remainder were used to generate a vast range

of demographic data about the populations of 26 parishes. With some weighting in favour of the few small parishes in the sample to allow for the fact that the reconstituted parishes are larger than average, Wrigley *et al.* found the 26 parishes to give a remarkably accurate cross section of the occupational mix of the English population as a whole. They thus used the aggregate results from the 26 parishes as national estimates.

Reconstitution studies construct estimates of the population at risk from data about vital events. If an individual is found in the parish on the occasion of one vital event and is then found again on the occasion of a subsequent event then it is assumed that they were resident between times. The reconstituted population at risk varies with the particular demographic measure being calculated. Because the English registers do not record age at marriage in the marriage register, in the reconstitution of a single parish the age at marriage can only be determined for those individuals who were both baptised and married in the parish. To work out the number of children a woman has and the ages at which she gave birth requires that the woman be born, married and remain in the parish until the end of her fertile period, taken here as age 50. Mortality studies are confined to those who were baptised and buried in the parish. Because the core document, the family reconstitution form, relates to a married couple, the studies only cover the fertility and mortality of legitimate individuals. Because the calculation of age-specific measures requires both a baptism and some subsequent vital events in the same parish, the studies only cover individuals who are native to the parish. These are significant constraints but the price is worth paying for the wealth of information the techniques yield about the reconstitutable minority. Aggregate studies yield time series but not the cross-tabulations that reconstitution studies can build up from data on individuals.

The new book is a masterful discussion of demographic techniques and provides a paradigm for future reconstitution work. In the main, the results refine rather than revise the national picture presented in the earlier work. From the late seventeenth century to the early nineteenth century, age at first marriage fell by about two-and-a-half years for both men and women.^[12] On its own this might have increased fertility by about one-fifth. The late seventeenth century saw a rise in infant mortality due to the sorts of environmental causes, such as infectious disease, which feed through into exogenous mortality. By contrast there was a significant fall in infant mortality during the second half of the eighteenth century and this was due to a dramatic reduction in the early (endogenous) mortality associated with conditions in the womb.^[13] In the first half of the eighteenth century adult mortality improved while child mortality did not. In the second half of the eighteenth century child mortality improved more dramatically than adult mortality before deteriorating again in the period 1810–1837.^[14] This divergence in the trends of adult and child mortality means that life tables based, as they are, on a constant set of ratios of age-specific mortalities are an unreliable guide when exploring mortality variations in early modern England.^[15] The fertility rise of the eighteenth century had a number of interesting components. In the first place, there was a steady rise in the fertility at older ages of women who had married early.^[16] This tendency for young marriers to carry on having children further into their late 30s and 40s would, of course, amplify the effects of the already noted fall in the age at marriage during this period.^[17] By comparing the birth interval following the death of a child in infancy with the normal birth interval the authors conclude that the difference reflects the early cessation of breastfeeding in the first case which abbreviates the period of post-partum amenorrhea.^[18] This is further explored by comparing the monthly likelihood of conceiving for these two types of birth interval. The lower fecundability (the likelihood of conceiving) of the mothers where the baby survives lasts for about 25 months.

Thereafter there is no difference in fecundability suggesting that the breastfeeding effect lasts for no more than 25 months.^[19] There is very little evidence of early weaning and it appears that most English mothers breastfed for more than 18 months producing wider birth spacing than many other European mothers.^[20]

From registers to maps

The comparison of *English Population History* with *Contours of Death* reveals some of the contrasting strengths and shortcomings of two very different studies. Dobson's study follows up Wrigley's early suggestion that we might imagine a demographic contour map which registered the ecological setting of mortality, fertility and population growth.^[21] The basic data for Dobson's study are baptism and burial registers and the occasional census-type data that exist for the seventeenth and eighteenth centuries. Dobson does not find space in her study to engage in the detailed explanation of how data were checked and manipulated. For example, of the derivation of population totals from sources such as the Compton Census and the Hearth Tax, the reader is told that there is not room "to describe in detail the sources for the population enumerations or the population levels and patterns of early modern south-east England".^[22] Instead, here and at many other points the reader is referred to Dobson's unpublished Ph.D. thesis of 1982 where we are assured that problems of data shortcomings "received considerable attention", that "a number of steps were taken to ensure that the levels [of crude death rates] presented here provide as close an approximation to reality as possible", and that the "[u]nderregistration of infant deaths is fully discussed".^[23] The rules for excluding poor registers are not specified beyond the assurance that "[e]very parish register was examined in depth and certain subjective criteria were adopted when deciding on the accuracy and coverage of the register".^[24] This lack of clarity contrasts strongly with the discussion of the same types of data in the earlier work by Wrigley and Schofield.^[25] However, Dobson goes much further than the Cambridge Group in providing maps of the local ecology of mortality. For the 1670s and 1800s, Dobson gives maps of the crude death rates in 637 of the 1185 parishes in Essex, Kent and East Sussex. For other periods in the seventeenth century and for 165 parishes, Dobson maps parishes with annual mortality peaks 1.5 standard deviations away from an 11-year decentred running mean. The maps show quite clearly that marshy and estuarine parishes, whether urban or rural, had especially high mortality. Wrigley and Schofield had produced some maps of the mortality peaks for their 404 parishes, based on the deviation of monthly totals from recent trends, and they identified a contrast between the epidemic south and the hungry north of England for the early modern period.^[26] Dobson's more finely grained geographical study tracks this epidemic south into its river valleys and its coastal and estuarine marshes.

Dobson's second innovation is to integrate the maps with detailed medical topographies assembled from a dazzling range of sources from prisons and hospitals, diaries and magazines, contemporary and modern authorities.^[27] These qualitative sources, together with data on the seasonality of mortality, complement the maps and allow Dobson to pin malaria upon the marshes and typhoid and diarrhoea upon the river valleys. Dobson implies that the main factor mitigating some of these mortality crises was the progressive drainage of these lowlands.^[28]

From geography to models

In attending to the ecology of disease, Dobson reintroduces a set of environmental factors that feature hardly at all in national studies of the economic setting of

demographic change. In turning to qualitative sources exploring the contemporary perceptions of disease and dying, Dobson introduces a cultural dimension that likewise is hard to incorporate in the study of secular trends. The potential for geographical studies to advance our understanding of the English low pressure demographic regime is now much greater with the clarification of the national picture by the Cambridge Group. Future reconstitution work will not have to pioneer techniques for estimation and evaluation since these techniques now exist. Instead it can relate family formation to local coping strategies both kin-based and institutional.^[29] It can explore issues about intrafamilial bargaining over resources through, for example, looking at the mortality hazard for father or mother of having an extra son or daughter to feed.^[30] Such new studies might even try to explore extra-economic controls on fertility behaviour such as new ideas, coming from revolutionary France and the United States, about the autonomy and status of women.^[31] Local changes in employment contexts might be explored directly by linking the reconstituted population to other sources describing such employment or working practices as the decline of farm service.^[32] In addition to furthering the debate about the representativeness of the Cambridge sample of 26, these new studies might bridge a gap that the technical panache and rigour of the Cambridge work has at times threatened to open up between demographic history on one side and social and cultural history on the other.^[33] As these new local studies accumulate, it will be necessary to set them in suggestive regional contexts so that their relations with the national picture may be understood. This, of course, is the sort of geographical work that many of the best social, cultural and economic historians already do. New and better models of the interactions between demography, economy and society will surely incorporate some such explicit geographical framework.

University of Cambridge

GERRY KEARNS

Notes

- [1] A good example being the recent study of the geography of mortality in England and Wales 1861–1900: R. Woods and N. Shelton, *An Atlas of Victorian Mortality* (Liverpool 1997).
- [2] E. Gautier and L. Henry, *La population de Crulai: paroisse normande* (Paris 1958).
- [3] E. A. Wrigley, Family limitation in pre-industrial England, *Economic History Review* second series **19** (1966) 82–109.
- [4] D. Levine, Sampling history: the English population, *Journal of Interdisciplinary History* **28** (1998) 605–32, 605. Levine was a graduate student at Cambridge who reconstituted three parishes along the lines suggested by the Cambridge Group. His three are among the 26 included in the present volume.
- [5] R. S. Schofield, Through a glass darkly, *Social Science History* **22** (1988) 117–30, 121. Schofield was appointed research assistant in the Group in 1966. The monthly series would make it clear if there were serious breaks in the continuity of registration. Volunteers were also asked to complete a checklist of the sort of information given in the registers, for example some registers give the occupations of partners at marriage.
- [6] E. A. Wrigley and R. S. Schofield, *The Population History of England 1541–1871: a Reconstruction* (London 1981) 20. Dobson has used some of the Cambridge Group's tabulations supplementing them with tabulations of her own. At least 38 of the Cambridge Group's tabulations are included in the 70 parishes forming the basis of the monthly analysis of mortality in her book: Dobson, *Contours*, 546–7; Wrigley and Schofield, *Population History of England*, 486–9.
- [7] Wrigley and Schofield, *Population History of England*, 50.
- [8] R. D. Lee, Inverse projection and demographic fluctuations, in D. S. Reher and R. S. Schofield (Eds), *Old and New Methods in Historical Demography* (Oxford 1993) 7–28.
- [9] J. Oeppen, Aggregative back projection, in Wrigley and Schofield, *Population History of England*, 715–38.

- [10] Wrigley *et al.*, *English Population History*, 545.
- [11] This debate is reviewed in: E. A. Wrigley and R. S. Schofield, The debate about *The Population History of England*, in idem, *The Population History of England 1541–1871: a Reconstruction*, Second Edition (Cambridge 1989) xiii–xxxiv.
- [12] Wrigley *et al.*, *English Population History*, 135. The fertility calculation of the Gross Reproduction Rate (GRR) in the earlier book relied upon the assumption that female age at first marriage was constant over time: Wrigley and Schofield, *Population History of England*, 233. The drop observed here would mean that the increase in GRR was somewhat overstated, as they themselves anticipated: *ibid.*, 234. The rise in fertility from the mid seventeenth century to the 1830s if the age at first marriage from the reconstitutions is entered into the formula for the GRR comes out at 48 per cent instead of 53 per cent.
- [13] Wrigley *et al.*, *English Population History*, 229. Wrigley has returned to this question and now argues that the fall in endogenous mortality shadowed a significant fall in late foetal mortality, a fall which in turn produced a significant rise in fertility as more foetuses survived to term and thus became live births: E. A. Wrigley, Explaining the rise in marital fertility in England in the ‘long’ eighteenth century, *Economic History Review* second series **51** (1998) 435–64.
- [14] Wrigley *et al.*, *English Population History*, 255. The mortality rise in this last period was not detected in the 1981 book and, indeed, a steady improvement in mortality over the period 1801–41 was assumed in choosing the mortality levels for the model life tables used to allocate deaths to the appropriate age groups, as they discuss here: *ibid.*, 523. This worsening mortality is particularly associated with urbanization and with the exposure of children to infectious disease, see: S. Szreter and G. Mooney, Urbanization, mortality and the standard of living debate: new estimates of the expectation of life at birth in nineteenth century cities, *Economic History Review* second series **51** (1998) 84–114.
- [15] The point may be extended into the nineteenth century: R. Woods, On the historical relationship between infant and adult mortality, *Population Studies* **47** (1993) 195–219. The net effect of revising the assumptions about the age structure of mortality in the aggregate analysis is reported as being slight: Wrigley *et al.*, *English Population History*, 541. The estimates of mortality are reduced but the trends remain much the same. For the quarter centuries 1701–25, 1726–50, 1751–75, and 1776–1800, the older back-projection method gave a life expectancy at birth of 35.8, 32.6, 35.7, and 36.6, and the new generalized inverse projection incorporating the new information on the age structure of mortality gave values of 37.0, 33.5, 37.7, and 37.9, respectively (estimated from Wrigley and Schofield, *Population History of England*, 528–9, and Wrigley *et al.*, *English Population History*, 614–5). The values in the reconstitution analysis itself are approximately 36.7, 36.6, 40.4, and 40.2 (*ibid.*, 308) which shows a much more impressive improvement than the aggregate studies suggest.
- [16] Wrigley *et al.*, *English Population History*, 387.
- [17] *Ibid.*, 449.
- [18] *Ibid.*, 445.
- [19] *Ibid.*, 481.
- [20] *Ibid.*, 508.
- [21] E. A. Wrigley, *Population and History* (London 1969) 99.
- [22] Dobson, *Contours*, 67.
- [23] *Ibid.*, 87, 134, 162.
- [24] *Ibid.*, 87.
- [25] Wrigley and Schofield, *Population History of England*, 15–32.
- [26] *Ibid.*, 645–93.
- [27] The full detail is withheld from the reader as the call marks and titles of the archives used “are too extensive to include here”: Dobson, *Contours*, 540.
- [28] Future work on this complex of issues will need to collect direct information on the geography and chronology of drainage schemes if Dobson’s hypothesis is to be taken further.
- [29] See, for example, S. King, Reconstructing lives: the poor, the Poor Law and welfare in Calverley, 1650–1820, *Social History* **22** (1997) 318–38.
- [30] S. Klasen, Marriage, bargaining and intrahousehold resource allocation: excess female mortality among adults during early German development, 1740–1860, *Journal of Economic History* **58** (1998) 432–67.
- [31] S. E. Klepp, Revolutionary bodies: women and the fertility transition in the mid-Atlantic region, *Journal of American History* **85** (1998) 910–45.

- [32] J. Schellekens, Nuptiality during the first industrial revolution in England, *Journal of Interdisciplinary History* **28** (1997) 637–54.
- [33] On representativeness, note that Levine, ‘Sampling history’, believes the Cambridge sample to be flawed by having too few northern parishes for the crucial period of most rapid industrialization in the early nineteenth century. Razzell, in the course of a scatter-gun evaluation, claims they discarded parishes with suspiciously large falls in infant mortality and had a bias towards accepting more conservative view of mortality improvement: P. Razzell, The conundrum of eighteenth-century English population growth, *Social History of Medicine* **11** (1998) 469–500. Ruggles believes that the sample is weighted towards higher density parishes, as was the original group of 404 parishes: S. Ruggles, The limitations of English family reconstitution: *English Population History from Family Reconstitution 1580–1837*, *Continuity and Change* **14** (1999) 105–30. Vann argues that the decision to aggregate the sample into a single estimate of the national picture hides a series of compositional issues such as the existence of a sub-population practising family limitation through stopping to have further children once a target family size has been reached: R. T. Vann, Unnatural fertility, or, whatever happened in Colyton? Some reflections on English Population History from Family Reconstitution 1580–1837, *Continuity and Change* **14** (1999) 91–104.