1

Bricks without straw, bones without flesh

Demographers are more akin to hedgehogs than foxes. They possess a particular unifying principle and relate everything to a single central vision. The foxes, on the other hand, think in a diffuse fashion: they move on many levels collecting objects and experiences without seeking to fit them into any form of all-embracing scheme.[1] Demographers are like hedgehogs in another sense: they tend to rely on one highly effective strategy for survival against which the cunning of foxes will usually fail. The unifying principle is the notion of the demographic system and transition, while the survival strategy involves quantification within an empiricist-positivist methodology.

Although this caricature cannot do justice to the contributions of demographers, it nonetheless highlights certain important characteristics about the way questions are asked and answers attempted. Philosophical introspection is rarely indulged in and thoughts on what might be an appropriate epistemology for demography are not aired. Even among historical demographers, at least some of whom have been drawn from the ranks of history and geography where disciplinary self-doubt has been rife,[2] there is a quiet contentment with very specific lines of enquiry in which the first step invariably involves the measurement and description of a certain set of events: birth, marriage, death, migration. This is usually followed by the search for some form of demographic order, pattern recognition and modelling. Finally, explanation or interpretation is attempted although this may take many forms varying from formal hypothesis testing to 'thick description'. Whatever the finer points of the approach there is always a sense in which it is better to practise, to engage with the materials of demography, than to

[1] Berlin (1953). Of course Berlin was not thinking of demographers as such when he drew this distinction. [2] See, for example, Evans (1997).

enter the methodological and ideological debates.[3] This account of the demography of Victorian England and Wales will be no exception. It follows the lead given by *The Population of India and Pakistan*, *The Population of Japan* and *The Demography of Tropical Africa*[4] in that it will provide a detailed description via demographic measures of changes and especially variations in nuptiality, fertility and mortality. It will also offer some lines of interpretation based, as far as is possible, on the available empirical evidence. There will be a place for speculation and conjecture where, as often happens, the evidence appears unsound or there simply is none. The approach adopted is also multi-disciplinary; no single perspective dominates although in places there are contributions which statisticians, economists, sociologists, geographers and epidemiologists, as well as several branches of history, would certainly recognise as their own. It is true that our understanding of nineteenth-century demography is still in a state of flux. There are many unanswered questions especially relating to the causes of change whether economic and technological, social and cultural; the extent to which Victorians gained more control of their everyday lives must be set against the increasing role of the state, both national and local, and its power to intervene and regulate, to initiate change through public policy. Similar tensions and confusions exist in attempts to set the forces for integration and conformity against those which encouraged diversity and variation – for example, those that exacerbated inequalities among social groups and between places in terms of poverty, health and mortality.

Before returning to a discussion of that unifying principle in demography, the notion of system and transition, two further points must be made. First, it is tempting to view England and Wales in isolation and the reconstruction of its demography as an end in itself. But England and Wales was part of several far larger spheres in terms of the so-called European marriage pattern; the Western system of applied scientific knowledge, engineering and medical science included; and the international flows of capital, goods and people, to give three obvious examples. There are two other senses in which neither the place nor the period will be treated in isolation in this study. The demographic experience of other societies will be used to plug gaps in our knowledge when direct evidence is lacking. This is a device well known among historical demographers who often have resort especially to the Scandinavian model of demographic change, occasionally with unfortunate consequences. Further, there are even today populations in

[3] This tradition is now subject to healthy criticism and challenge, for example, Kertzer and Fricke (1997).
[4] Respectively, Davis (1951), Taeuber (1958) and Brass *et al*. (1968).

Africa and Asia with relatively high fertility and mortality. Studies of their characteristics may prove of value in our attempt to understand Victorian society just as the 'lessons from the past' argument has been used to draw analogies between the historical experience of the West, but mainly western Europe, and the way in which matters are likely to progress among non-European populations. Secondly, Victorian scientists, especially the medical statisticians, knew a great deal about the demography of their society both from the published tabulations and surveys, and from first-hand experience. Sir Edwin Chadwick, William Farr, Sir Arthur Newsholme, Seebohm Rowntree and Charles Booth established the British tradition of empirical social enquiry. Their findings, even their surmises, must not be overlooked otherwise they are likely merely to be discovered again.

One unifying principle with two distinct parts has tended to dominate the thinking of scholars working especially on the demography of past societies: the Malthusian demographic system and the demographic transition model. These will be considered in their turn as frameworks for our present account of the Victorian period. But first we must say a little by way of introduction about the empirical nature of these enquiries.

True facts

English historical demographers have been justly applauded for their ability to make bricks without straw whilst at the same time being criticised for failing to put sufficient flesh on their statistical skeletons.[5] Although it sometimes appears that social historians are energetic in showing us the flesh and blood of real people whilst eschewing the deeper demographic structures and generalities that give the behaviour of their subjects some wider meaning, no one could accuse the nineteenth-century statisticians and actuaries in this regard. For them the search for 'true facts' was of prime importance and without them their work would be meaningless, just theory. Those who campaigned for legislation to establish a regular population census and an accurate system for the registration of births, deaths and marriages had several motives, but the need to keep human accounts for the sake of efficient

[5] J. D. Chambers took 'Bricks without straw: the course of population change in the eighteenth century' as the title of one of his chapters in *Population, Economy, and Society in Pre-industrial England* (Chambers, 1972), while Wrigley *et al.* (1997) have used an alternative analogy to 'bones without flesh' when they talk about 'laying the foundations and erecting the main fabric of a house, but leaving its finishing and furnishing to another day' (p. 5).

administration would surely have been one of their foremost concerns. Another would have been rather more intellectual: to determine the true course of population growth in the eighteenth century.[6] With the establishment of the regular decennial census in 1801 and the introduction of civil registration in 1837 it might be supposed that the controversy that fuelled their campaign would have come to an end, but it has not been until recent decades that we have finally secured reliable estimates of the size of England's population before 1801 and of trends in the major demographic indices prior to 1837. With these materials we are now in a position to place the nineteenth century and especially the Victorian age in context.[7]

Figure 1.1 helps us to see at a glance why the Victorian period was so important as a turning point in England's longer population history.[8] It shows that life expectancy at birth in years (e_0), perhaps the best single number measure of mortality, varied between 30 and 40 in the seventeenth and eighteenth centuries. It was around 40 years early in the nineteenth century and stayed at about that level until the third quarter of the century when the secular decline of mortality began. Life expectancy at birth has doubled in the past 150 years. In figure 1.1 fertility has been measured by the total fertility rate (TFR), that is, the number of children a woman might expect to have had on passing through the reproductive ages 15–49. Until the middle of the eighteenth century,

[6] See Glass (1973).

[7] Wrigley and Schofield (1981), Wrigley *et al.* (1997) and Wrigley (1997, 1998) summarise the Cambridge Group for the History of Population and Social Structure's project to fully analyse Anglican parish registers for the period 1538–1837. The 1989 reprint of Wrigley and Schofield (1981) also contains a chapter entitled 'The debate about *The population history of England*: an introductory note' (pp. viii–xxxiv) which offers a reply to some criticisms, including the standing of the back projection estimates, and a useful list of reviews and reactions. Although these estimates are obviously not above criticism, they not only provide measures far superior in quality and detail to any previously available, but also ones that are unlikely to be bettered. See especially Wrigley *et al.* (1997), pp. 515–44, on 'Reconstitution and inverse projection', but also Levine (1998) and Razzell (1998).

[8] The measures used to construct figures 1.1 and 1.2 have been derived from Wrigley *et al.* (1997), table A9.1, pp. 614–15, up to 1840 and from the Registrar General's *Annual Reports, Decennial Supplements* and *Annual Statistical Reviews* thereafter. The 31 decades 1581–90 to 1981–90 are shown for England and Wales. Although, strictly speaking, the estimates for the decades prior to 1841 are for England, it has been assumed that they can reasonably stand for England and Wales as a whole. The reported gross reproduction rate (GRR) has been inflated by 2.05 to give the total fertility rate (TFR). For the 1840s to the 1930s TFR has been estimated; see Office of Population Censuses and Surveys, *Birth Statistics: Historical Series of Statistics from Registrations of Births in England and Wales, 1837–1983*, Series FM1 No. 13 (London: HMSO, 1987), table 1.4, and also table 4.2 below. The quality of Victorian civil registration is considered in chapter 2, and life expectancy at birth and the childhood mortality rate are reported and further discussed in table 9.3.

TFR varied from about 3.75 to 4.50; thereafter it rose substantially to peak at 5.75 in the early decades of the nineteenth century. A long decline then set in, although this appears to have been temporarily halted during the 1850s and 1860s. From the fourth quarter of the nineteenth century fertility was apparently in free fall, only ending its decline in the 1940s. Clearly the Victorian era was above all one of demographic change in which the secular declines of both mortality and fertility began, and by 1901 new, lower than previously experienced levels had been reached. Figure 1.2 captures this sense that the people of England and Wales were entering a new demographic age during Victoria's reign in an even more striking fashion. It shows the timepath for fertility–mortality again for the 31 decades used in figure 1.1. It also indicates, using Model West, the levels of TFR-e_0 that would be necessary to generate rates of natural population growth of 0 and 2 per cent per year.[9] Before the middle of the nineteenth century, population growth in England and Wales was largely the result of fluctuations in fertility; variation along the vertical axis of figure 1.2 is substantially greater than along the horizontal, but in or by the 1870s fertility and mortality set off together on a new, joint downward course into previously uncharted demographic territory.

The Model West, referred to above, comes from Coale and Demeny's *Regional Model Life Tables and Stable Populations*, first published in 1966.[10] This single work more than any other symbolises efforts to utilise to the full demographic data from the nineteenth century and to draw parallels between that largely European experience of high mortality and conditions in much of Africa, Asia and Latin America today. Coale and Demeny's models have established a framework within which the quality of historical European mortality statistics may be evaluated as well as allowing the estimation of vital rates for populations which, while regularly enumerated, lacked effective registration systems. Of the 326 life tables selected for analysis, 113 related to periods prior to 1918 and of these 86 were European in origin. From the set of 326 empirical life tables, Coale and Demeny identified four distinct age patterns of mortality which they labelled North, South, East and West thereby signifying the regions of Europe from which the constituent tables were principally drawn. For example, the life tables underlying the North model were: Sweden, 1851–90 (4 tables); Norway, 1856–80 and 1946–55

[9] Model life tables, of which West is one, will be used at various points throughout this book. They offer a convenient device for representing the various age profiles of mortality in terms of life expectancy at birth and of illustrating what population age structures will look like given certain levels of mortality and fertility.

[10] Coale and Demeny (1966).

Figure 1.1. Long-run trends in mortality and fertility in England and Wales
Note: The axis showing life expectancy at birth has been reversed to illustrate the decline of mortality.
Source: See text for explanation.

(4); and Iceland, 1941–50 (1). Model West, on the other hand, represented a residual category once the North, South and East patterns had been removed. Here the underlying tables were drawn mainly from England and Wales, France, the Netherlands, Denmark, Canada, the USA, Australia and New Zealand.[11] Model life tables were estimated for each of the four families using life expectancy at birth as the reference for defining levels of mortality, and these in turn became the basis for stable population models with various constant rates of population change.

These regional model life tables have been used extensively by English historical demographers as devices for checking the quality of data, for estimating mortality rates for which empirical data are entirely missing, and as a general reference tool, providing co-ordinates in demographic space. As such, they have proved of exceptional value. However, in recent years there has come to be an uncritical over-

[11] In passing, it is interesting to note that Coale and Demeny (1966), p. 12, excluded from further consideration life tables for periods prior to 1870 for England and Wales, France and the Netherlands because they had 'irregular patterns that appeared to arise from faulty data', although 11 for England and Wales 1871–1959 were used.

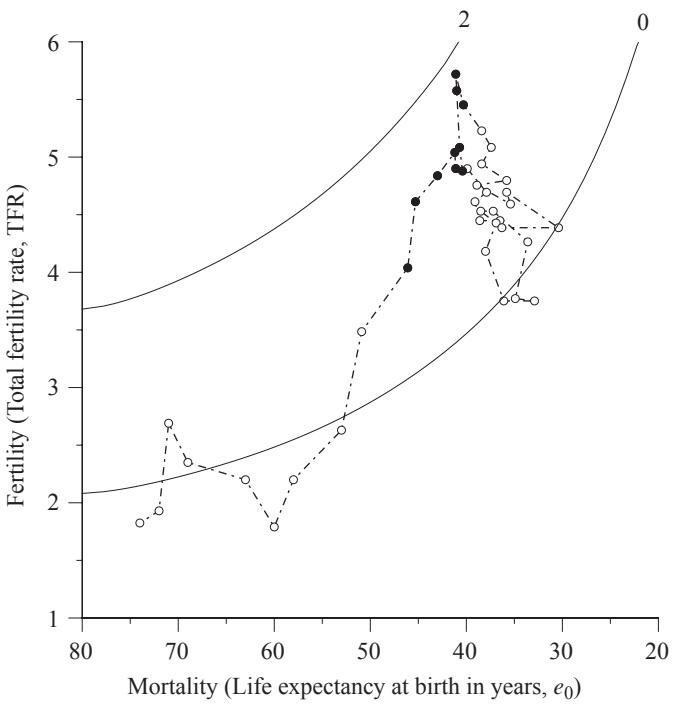

Figure 1.2. Timepath for fertility and mortality change in England and Wales, decades 1580s to 1980s
Note: The axis showing life expectancy at birth has been reversed to illustrate the decline of mortality. The curves labelled 0 and 2 indicate 0 and 2 per cent per year natural growth rates in Model West. The decades of the nineteenth century have been emphasised.

dependence on the reliability and comprehensive nature of these models which their creators could not have envisaged. Where they are perhaps at their most vulnerable is when one section of the age-specific mortality curve, usually adult mortality, is to be inferred from another, infant and child mortality.[12] There has also been the tacit assumption, for example, that because the third English Life Table for 1838–54 matches rather closely level 10 of Model North, England's historical mortality experience can, in broad terms, be represented by the North pattern.[13] However, Coale and Demeny also comment on the 'unusual

[12] See Woods (1993).
[13] Wrigley and Schofield (1981), p. 110 and appendix 14. Naturally, they are sensitive to the problems this is likely to cause for their back projection. See Wrigley *et al.* (1997), pp. 515–44.

incidence of tuberculosis' in North and that 'Model tables incorporating this experience would be suitable only for populations with a high endemicity of tuberculosis.'[14] If this assertion did indeed prove to be valid it would have important implications for epidemiological studies of the early modern period. But more detailed recent work with a larger number of family reconstitution studies has tended to cast doubt on the wisdom of making such broad generalisations linking mortality experience to one family over such a long period. Wrigley *et al.* have confirmed that as far as infancy and early childhood are concerned:

> mortality in the early modern period did not conform either to model West or to model North, though edging closer to model North pattern in the late eighteenth and early nineteenth centuries. Indeed, mortality in infancy and childhood in the English historical past does not appear to have resembled the patterns found in any of the families of tables which were extrapolated from more recent data in the Princeton tables.[15]

Presumably Model West is still appropriate for England and Wales post-1871.

The use of the Princeton model life tables epitomises the problems faced by historical demographers, even those working on the nineteenth century. Bricks may be created without straw, but they are bricks of perhaps uncertain quality which will not necessarily make the soundest foundations for a new residence.

A variation on the same theme can also be illustrated by the Princeton European Fertility Project of which Ansley J. Coale was the guiding spirit. In order to chart the progress of fertility decline among the provinces of nineteenth- and early twentieth-century Europe it was necessary to develop a set of indices that not only captured the general level of fertility, but also made it possible to differentiate the contributions of legitimate and illegitimate fertility as well as the effects of fertility within marriage compared with the influence of nuptiality itself. In normal circumstances this problem would have been solved by using the total period fertility rate and the total marital fertility rate or some modification of the gross and net reproduction rates. But many countries, including Great Britain, whilst possessing a system for civil registration lacked data on the age of mother at the birth of her children. Age-specific total or marital fertility rates could not be calculated, therefore. Coale's solution to this problem involved the development of a set of four indirectly standardised measures: *If*, the index of overall fertility; *Ig*, the index of marital fertility; *Ih*, the index of illegitimate or non-

[14] Coale and Demeny (1966), p. 12. Figure 8.2 illustrates what this means especially for mortality in the age group 15–34. [15] Wrigley *at al.* (1997), p. 263.

marital fertility; and *Im*, the index of proportion married.[16] These measures have several characteristics which make them especially important. First, they require relatively little empirical data: at minimum the numbers of legitimate and illegitimate live births, and the numbers of currently married and single women distinguished by five-year age groups 15–19 to 45–49. The births could be found from civil registration and marital condition from population censuses.[17] This usually meant that local and regional as well as national patterns could be charted. Secondly, the four measures are age-standardised and therefore avoid the problems of distortion associated with the use of the crude birth rate or even the general fertility rate. Thirdly, the indices are related one to another in a way that has certain useful properties for representing changes and variations in the joint effects of marital fertility and nuptiality on overall fertility. Since

$$If = Ig \bullet Im + Ih(1 - Im) \tag{1.1}$$

if *Ih* is zero, or at least very low, then overall fertility can be said to be the product of marital fertility and proportion married ($If = Ig \bullet Im$).[18] Fourthly, and of particular significance, in choosing a standard age-specific marital fertility schedule Coale was careful to select a population with what has come to be known as natural fertility, that is fertility that was not being limited in a parity-specific way. His choice of the especially well-documented Hutterite population and, in particular, the fertility experienced by the 1921–30 first marriage cohort meant that *Ig* not only measured marital fertility, but it also set the level of fertility against that achieved by the Hutterites for whom *Ig* was by definition 1.0.[19] Further analysis of a range of *Ig* values suggested to Coale that if the index was found to be greater than 0.6 it was likely to indicate the presence of natural fertility and thus the absence of deliberate family limitation behaviour.[20]

[16] Coale (1967).
[17] In fact Wilson and Woods (1991) offer a method for deriving these measures based on Wrigley and Schofield's (1981) back projection results for England in the parish register era before 1837.
[18] This property has been used extensively in several figures in chapters 3 and 4. For example, figure 3.6 shows the *Ig-Im* timepath for England and Wales, while figure 4.18 illustrates the changing pattern of variation among districts.
[19] Eaton and Mayer (1954), table 1, p. 84. The Hutterites were, of course, a most unusual population. The total marital fertility rate for those women married in the 1920s was 12 and only 3.4 per cent of all marriages were childless representing an exceptionally low level of natural sterility. Eaton and Mayer also speculate that whilst contraception was not used, coital frequency may have declined rapidly once a woman reached her late thirties (p. 24).
[20] The matter of identifying the presence or absence of certain forms of family limitation behaviour has proved to be far more complicated in practice, see pp. 124–40.

In reality, however, our account of demographic change and variation, even for England and Wales in the second half of the nineteenth century, cannot be made out of true facts as the Victorian actuaries might have wished. Rather, it has to employ estimates and approximations, use subjective judgement, and be selective and at times partial. This point may be illustrated just as effectively when we turn to the unifying principle of demography which has guided our understanding of population history: the concepts of demographic system and demographic transition.

Systems

The concluding chapter of *The Population History of England, 1541–1871* outlines a systems model designed to capture the dynamic relationship between population and environment in early modern England.[21] At its centre the model contains a diagrammatic representation of the ways in which the two checks to population outlined by T. R. Malthus in his *An Essay on the Principle of Population* are capable of exerting regulatory influences on the size of a population. The model is illustrated here in figure 1.3. In the outer circuit we have the positive check which works by raising mortality if and when real incomes are depressed because food prices have increased as a consequence of too rapid population growth. The preventive check occupies the inner circuit. Here the effect of falling real incomes will be to reduce nuptiality which will consequently lead to lower fertility and a reduced rate of population growth. These two routes, the first emphasised by Malthus in his 1798 *Essay* in terms of famine, disease and war, and the second in the 1803 and subsequent editions of the *Essay*, particularly as moral restraint operating via prudential and especially delayed marriage, offer alternative paths. If the preventive check is firmly in place and working effectively then there may be no need for the positive check, misery and vice may be avoided to a large extent, and there may even be positive economic benefits in terms of higher real incomes and higher living standards in general.[22] On to this essentially Malthusian, self-regulating negative feedback system, dominated by what the biologists term 'homeostasis', Wrigley and Schofield have bolted a number of additional sub-systems, endogenous and exogenous factors.[23] The first of these involves what

[21] Wrigley and Schofield (1981), pp. 454–84.
[22] Wrigley (1988) provides a more elaborate statement of some of the economic–demographic arguments.
[23] Wilson and Airey (1999) offer an interesting discussion of the application of homeostatic arguments in demography.