Population Change in the Somerset-Wiltshire Border Area, 1701–1800: A Regional Demographic Study.

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The rapid rise of England's population from the middle years of the eighteenth century onwards, and particularly its association with early industrial developments, has long been a subject of debate. The recent exhaustive study by the Cambridge Group for the History of Population and Social Structure has shed new light on this topic and has provided answers to many of the questions concerning population change at the national level.[1] Wrigley and Schofield have shown that the dominant factor in growth was a general increase in fertility in the second half of the eighteenth century, resulting mainly from a decline in the mean age at marriage for women and an increase in nuptiality. The significant feature is the fact that in this period population expansion was sustained, there was no immediate return to a demographic equilibrium, previously maintained by social controls on fertility and periodic increases in mortality. Instead an increase in real wages, linked to the growing demand for labour and changing modes of production, initiated a new demographic regime in which higher levels of fertility could be maintained because of the expansion of the economy.

Detailed evidence to support this view has come from studies of individual communities based on the technique of family reconstitution. Levine, for example, has demonstrated how the penetration of a capitalist system of production, in the proto-industrial period, had a profound effect on patterns of family formation and altered the controls on the size and structure of communities.[2] The narrow restrictions of landholding and a dependence on local resources, were replaced by the influence of national and international markets. Increasing demand for wage labour led to the removal of disincentives to marriage and consequently to a drop in the age at marriage, a rise in the number of births and a shortening of the gap between generations. Hence those places that were most actively involved in these structural changes provided the new growth poles of population expansion.

However, such an explanation does not fit equally well to all types of local community. Large scale opportunities for employment were only available in certain locations and in many areas the immediate impact of economic development was limited. The fortunes of the industrialising communities should be set against the patterns of change in the less advanced rural areas, where restrictions on population increase remained in force and where often the most significant response, to the general quickening in the pace of economic growth, was an increase in out-migration. Also the experience of the towns, as providers of a diverse range of opportunities, but as consumers of population (having markedly high levels of mortality) presents a separate type of demographic stituation that contrasts with the circumstances in surrounding rural areas.[3] Studies which seek to illustrate the patterns of population change at the regional level cannot, therefore, avoid the significance of local variety and need to emphasize the inter-relationships between places with differing economic and environmental characteristics.

The processes involved are investigated here in relation to the experience of a group of communities in the south west of England. The variations, in terms of demographic change, between places with different economic structures are examined and compared to indicate the degree of association between communities and hopefully provide a more comprehensive regional overview of the impact of economic changes in terms of fertility, mortality and local population movement.

The area discussed is made up of fifty-two parishes centred around the border of north east Somerset and west Wiltshire, including the towns of Bradford-on-Avon, Trowbridge, Westbury, Warminster, Frome and Radstock (Fig. 1). Its size and extent represents an attempt to accommodate a fairly large population (approximately 57,000 in 1801) within the confines of an area which allowed a relatively free flow of communications, In terms of physical structure it is comprised of the valleys of the Avon, Frome and Wellow, with the Mendips to the south and the scarp slope of Salisbury Plain to the east, providing natural edges. In addition this area displayed a wide variety of economic activity in the eighteenth century. For instance, it contained places involved in the west of England woollen industry (Bradford, Trowbridge and Frome and surrounding industrial villages). The fortunes of this industry were mixed. It passed through a period of relative prosperity between 1675 and 1720 followed by forty years or so of stagnation. After 1760 the situation improved, largely as a result of the introduction of new fabrics and the extension of markets in North America and Asia. Further limited growth was

initiated in the last decade of the century through the introduction of machinery and related changes in the techniques of production.[4] In terms of industrial organization this area had already experienced its proto-industrial phase. There was a long tradition of capital involvement and production was largely regulated by the Cloth Factors of Blackwell Hall in London, who extended credit to local clothiers and recovered their investment on the sale of the goods. For this reason there was no radical transformation of the economic circumstances during the eighteenth century. Rather the influence of an abundance of domestic labour depressed local wage rates and provided a stabilizing effect on population change.[5]

Also included in this area is a section of the Somerset coalfield located around Radstock and Midsomer Norton. Although small in comparison to the principal coalfields in England it still provided considerable employment locally. Operations were expanded appreciably after the 1760s when the most productive seams were encountered and exploited in the centre of the basin around Radstock. By 1795 annual production of coal was in the region of 133,000 tons and the workforce numbered approximately 2,000 men and boys.[6] Unlike the textile districts the coalfield witnessed a rapid upturn in economic fortunes during the second half of the century and this had a profound influence on the potential for population growth in these communities.

Sandwiched between these two industrial areas were a number of relatively thinly populated agricultural parishes characterised by a varied farming economy. Pastoral farming predominated in the valleys and other low-lying areas where the principal produce was from dairies and where landholding was mainly in the form of small family farms. The upland arable areas on the slops of the Mendips and Salisbury Plain, together with the high ground between the valleys, were farmed more extensively with a tendency, during the course of the century, towards the consolidation of production into larger farming units.[7] These three broad types of economic experience provide sufficient variety in the character of communities, within a relatively small area, to allow a study of variations in population growth to be related to economic structure.

The data on which the research is based are derived principally from parish registers.[8] In their raw state these sources contain many defects in terms of the completeness of registration.[9] As far as this period is concerned, three main factors may be considered as influencing the reliability of the material: the laxity of parishioners in observing the requirements of the church and the neglect of incumbents and parish clerks to record events, the growth of

nonconformity towards the end of the eighteenth century, and the lengthening gap between birth and baptism (which increased the chances of children dying before baptism). Under-registration is not always easy to identify in the registers themselves and there is a danger that in a study like this, where attention is being paid to differences in demographic experience between communities, that the use of general correction factors to inflate baptisms and burials could mask important spatial variations in the completeness of registration. Obvious short gaps and periods of deficient registration were corrected by interpolation from the long term trend in events. Nonconformity has been partially accounted for by the inclusion of data from extant registers,[10] but the shortfall caused by pre-baptism deaths was found to be impossible to enumerate accurately for each individual community and so, initially, was left unaccounted for. Additional specific alterations were made to the registers of certain parishes where this was found to be necessary.[11] Hence the quality of the data has been improved where deficiencies could be identified. But it would be unrealistic to claim that the figures provide a totally comprehensive record of vital events. It is unlikely that the remaining elements of under-registration seriously affect the general trends identified in the analysis although the probable consequence is an under-estimate of the significance of increasing fertility in some communities. This caveat is considered later when such trends are discussed. As well as the information from parish registers, the 1801 census provided limited cross-sectional data about various social and demographic features at the end of the period of study and was useful for identifying variations in the structure of communities. Also some local parish listings have been utilised where these were available.[12]

The Regional Secular Trend

The annual totals of baptisms, and marriages (Fig. 2) indicate the principal features of population change in the area during the eighteenth century. The main elements are quite evident and mirror in large measure the now familiar pattern for many other regions of England.[13] The first forty years of the century were characterised by recurrent peaks in burials which acted to restrict population growth. However, after the mid-1740s the baptism curve began to pull away from the burial curve and during the middle years of the century burial numbers passed through a significant trough. Apart from a lesser peak in 1767 burials failed to regain ascendency over baptisms. This resulted in a steady increase in population which showed signs of

acceleration during the last two decades of the century when both baptisms and marriages achieved their highest totals.

These basic features are further emphasized in Fig. 3 which provides an indication of natural change as represented by the cumulated difference between the annual totals of baptisms and burials.[14] The fluctuating nature of population change in the first half of the century is clear, followed by a steady expansion from the mid-1740s onwards. The curve steepens in the final decades of the century, following the minor interruption of the late 1760s, and indicates the self-sustaining nature of population growth at this stage.

Aggregated figures of baptisms, burials and marriages, at best only provide a very rough indication of underlying changes in mortality and fertility and indeed may be open to alternative interpretations. When considering the course of population change it is impossible to sort out the relative importance of these two factors but nevertheless there are a number of significant features in this pattern which may provide some indication of the circumstances that surrounded growth. First the severity of the burial peaks in the first half of the century requires some explanation as they clearly represent a major component of mortality in this period. The two worst years (1729 and 1741) correspond to periods of crisis mortality elsewhere and probably reflect the occurrence of epidemic diseases (influenza, typhus, dysentry) possibly associated with deficient harvests.[15] The other prevalent killer at this time was smallpox and it is likely that this accounted for some of the minor peaks in burials. Detailed evidence on the occurrence of disease in this area, is at present lacking, although the burial registers for Bradford-on-Avon (which contain information on cause of death during the period 1711–35) suggest that smallpox was endemic in the towns, recurring on a 7–10 year cycle.[16] The apparent abatement of these diseases after the mid-1740s removed one of the constraints to growth and may have been partly responsible for the timing of expansion.[17]

The other important feature recorded on the graph is the peak in baptisms in the 1790s. This comes at the end of a thirty year period of a steadily rising trend (and may understate the actual picture given the inadequacies of parochial registration). It would appear to indicate the presence of a bulge generation caused either by a significant increase in fertility or by the fact that by the end of the eighteenth century the size of the base population had been greatly enlarged.[18] It is difficult to clarify the significance of this from the aggregated statistics. The only guide comes from the measurement of the relative proportion of baptisms to marriages which suggests a shallow decline in fertility to the mid-1760s followed by a gradual

recovery (Fig. 4). But this is an unreliable measure as it may be influenced by factors other than fertility.[19] The more detailed studies of individual parishes suggest that in some places at least, there was a marked upturn during this period, and that this factor was the driving force behind continued expansion.[20]

Disaggregation of the Regional Pattern

The breakdown of the aggregate pattern into its component parts, presented problems of classification. In his study of the Vale of Trent, Chambers used a classification based upon the predominant economic activity within each community and hence divided parishes into 'industrial' and 'agricultural', whilst Nottingham was considered separately as a quite distinctive urban area.[21] Attempts at applying a similar classification in the Somerset-Wiltshire area presented serious problems of definition, particularly for the larger rural/industrial parishes that were involved in the textile industry and which had close associations with neighbouring towns, and also for parishes on the Somerset coalfield which contained a mix of both mining and agricultural communities and where industrial organization was markedly different to the textile districts. As an alternative the argument was reversed and a classification was derived from the independent study of population characteristics. As far as possible parishes were clustered on the basis of similarities in their demographic experience, so that each parish and more in common demographically with the other parishes in its group than it did with any parish outside the group.

The procedure followed to achieve such optimum groupings involved the application of multivariate statistical techniques. First the information in the parish registers and the 1801 census was summarised by a series of variables which represented crude measures of the basic demographic characteristics of each parish.[22] This mass of data was then reduced, with the aid of common factor analysis, to five principal factors each of which represented a grouping of variables. Of these the first three factors accounted for nearly 80 per cent of the common variance and indicated the principal elements of population change in this area. Factor 1 was comprised of variables relating to the size of parishes and picked out the distinguishing features of the towns and surrounding industrial villages (a large percentage of the population involved in manufacture, a greater number of females than males and very low rates of apparent natural increase). Factor 2 revealed a clustering of variables relating to fertility. The baptism/marriage ratio and the slopes of the

trend in baptisms and burials were associated with this factor. This indicated that the parishes that were growing fastest may also have experienced markedly higher levels of fertility. Factor 3 represented variables which were related to gains and losses from migration. Indices of the numbers of baptisms and burials during the course of the century relative to population size in 1801, both tied in with this factor and were inversely related to the crude measures of birth and death rates at the end of the century. The correspondence between low crude birth and death rates and seemingly overlarge numbers of baptisms and burials suggests that those parishes with excessive numbers of events had experienced higher birth and death rates at an earlier date, and that both fertility and mortality had declined during the course of the century, or alternatively, that there had been a significant change in the size and structure of populations resulting from out-migration. Conversely, parishes with relatively high birth and death rates at the end of the century, but relatively small totals of events, may have been growing rapidly during the last two decades of the century as a result of in-migration.

The spatial variations in the above factors were investigated by calculating the factor scores (values which indicated each parish's involvement with each factor). Unfortunately these could not be mapped directly as they failed to provide mutually exclusive distributions, but an optimum grouping of parishes was eventually achieved by using cluster analysis which discovered associations between parishes from the combined information of the five factors.[23] This procedure maintained the coherence between parishes with high loadings on a particular factor while overlapping cases (parishes with a high loading on more than one factor) were assigned to the group with which they had the strongest association. The parishes which displayed least conformity with the factor pattern were linked in with the group that they had most in common with, although in some cases these links were based on relatively weak associations. This illustrates the point that the groupings derived from this analysis are not without internal variation. They do not represent spatial groupings of parishes that experienced identical demographic characteristics, but since the variation within the groups was less than the variation between them, this arrangement does at least provide a logical classification of local populations.

The spatial pattern defined by the clustering procedure is illustrated in Fig. 5. Within the groups the aggregated figures for baptisms, burials and marriages for each parish were compounded to present three distinct types of demographic profile. Type A has the attributes referred to under factor 1 and is distributed along the

border between Somerset and Wiltshire. It includes the five principal towns plus four of the parishes most heavily involved in the woollen industry. The most striking feature of the time series for this group (Fig. 6) is its similarity to the graph for the area as a whole. This emphasizes the fact that a large proportion of the total population of this area lived in urban parishes.[24] The most noticeable difference is in the relationship between baptisms and burials. Mortality appears to have remained relatively high throughout most of the century in these parishes as burials continued to exceed baptisms in several individual years up to the 1790s. This is reflected in the graph of the cumulative difference between baptisms and burials, which suggests that there was virtually no growth from natural increase and the recurrent troughs show the likely continuing influence of epidemic diseases. Even allowing for a shortfall in baptism registration, these figures tend to confirm the view that eighteenth century towns were unhealthy places and that they maintained their size through in-migration.[25]

Type B is comprised mainly of parishes at the western end of the region, on the Somerset coalfield, together with some of the manufacturing communities in Wiltshire. The principal features of this group include: the smaller scale of events in relation to type A, the relative unimportance of mortality peaks, the sharp increase in the cumulative difference between baptisms and burials after 1740, and the upward trend in the baptism/marriage ratio (Fig. 7). What seems clear from these diagrams is that this type represents a significant component of the growth singled out from the regional pattern.

Type C also displays a number of distinctive features. The map (Fig. 5) indicates that most of the communities lay between those for types A and B, and the variables included in the factor analysis suggest that this distribution is related to low population densities and employment in agriculture. Fig. 8 shows baptisms generally exceeding burials and the almost parallel trends in these events result in a steady, but moderate, rate of population growth. Both trends are also virtually horizontal, implying little change in the annual totals of baptisms and burials. A link between the number of events and population size in 1801 has already been noted and it has been suggested that this could be related to changes in population structure. Also of note is the pattern of the baptism/marriage ratio. This is surprisingly high when compared to the other two types, although the overall trend is one of decline. The probable explanation of these paradoxical features is that these communities suffered relatively high rates of out-migration, particularly in the second half of the century, which had the effect of reducing the size of these

communities, or at least preventing them from expanding. This would help to explain why an excess of baptisms over burials, causing an apparently steady rise in natural increase, could be achieved during a period of no apparent upturn in fertility and little change in patterns of mortality. The key factors are the relative deficiency of marriages (indicating possibly the loss of young unmarried adults) and related to this, the relatively small number of baptisms in the second half of the century. If the experience here had been similar to that of the area as a whole, a steeper rise in the trend of baptisms would be expected after 1750. In short, these parishes were probably characterised by low rates of mortality, relatively high rates of fertility, moderate growth through natural change and substantial out-migration.

Explaining the Regional Pattern

It remains to bring these experiences together and explain how they relate to each other within a regional context. Fig. 9 is a simple, empirically derived, model showing the links between the different groups. What is suggested is that each type is characterised by specific environmental and economic circumstances and that the differences between them were responsible for promoting a redistribution of population within the whole area. Hence, opportunities in the towns produced by a high mortality rate and prospects for employment, on the one hand and a rapid expansion of the coal mining industry on the other, resulted in the creaming-off of the excess population from the agricultural parishes.

However, the attractive force of economic opportunity should not be viewed as the only factor that was responsible for local population movement. In addition an acceleration in population growth brought about by the general lowering of mortality may well have acted as a major push factor in the rural parishes where new opportunities in farming were restricted and in some cases being reduced by enclosure and engrossment of farms.[26] Also towards the end of the century the collapse of dual-economies (families involved in both agriculture and manufacturing) resulting from technical changes in the textile industry, may have added an extra stimulus to out-migration. Population movement provides a particularly significant component of the regional pattern because of the effect that it could have upon the structure of populations. Those involved were probably predominantly young adults and the redistribution of population may have led to marked differences in the age composition of communities and thus further exaggerated variations in fertility.[27]

The differences that have been noted did not arise simply from factors acting within the individual sub-regions. The rise in fertility in the coal mining parishes, for example, was not merely the result of new jobs for their inhabitants, but also other economic changes in those parishes providing the migrating young adults. The importance and exact operation of this process is hard to establish because migratory movements are difficult to quantify in the eighteenth century, but it is conceivable that these structural changes represent a significant factor in the determination of the variation in demographic experience.[28] The geography of population change resulted not simply from the spatial variations in the impact of economic developments, but also from the movement of individuals acting as the mechanism that produced a new balance between economic opportunity and population distribution.

Some support for this explanation can be found by looking in greater detail at individual parishes in each of the groups. Adapting the techniques of family reconstitution a comparison may be drawn between a parish from type C (Steeple Ashton) with one from type B (Timsbury). Family units, as represented by a marriage, may be partially reconstituted for two time periods (1721–50 and 1761–90) to illustrate the basic changes that took place during the middle years of the century.[29] The results reveal only very slight differences in mortality patterns (with both parishes experiencing a steady decline during the course of the century) but quite sharply contrasting patterns of fertility. Tables 1–3 and Figs 10 and 11 display the relevant information. Age at first marriage for women, which has been found to be a sensitive indicator of changing patterns of fertility, shows a divergent trend in the two parishes.[30] In the earlier period women were apparently marrying earlier in the mainly agricultural parish of Steeple Ashton, than in the coal mining parish of Timsbury. But by the second half of the century these positions were reversed with Timsbury experiencing a drop in median age at marriage of three years three months and Steeple Ashton an increase of one year. Also, figures for the intervals between successive baptisms indicate the rate at which families were completed and a plot of these, taking account of age at marriage, further illustrates the difference in patterns of family formation (Fig. 10). The potential fertility occasioned by the shift in median age at marriage in Timsbury was exaggerated by the decreasing interval between baptisms, so that by the time the fifth child was born there was a difference of four years ten months between the parishes, as opposed to a difference of two years seven months at marriage. In addition the average number of baptisms per family was higher in Timsbury in the later period (Table

3), suggesting that Steeple Ashton families were not only spacing out their children, but they were also having less births in total than the families in Timsbury. These features are summarised in Fig. 11 which shows a higher rate of age-specific marital fertility in Timsbury in the later period, coupled with a pronounced shift towards the younger age groups. Taken together the results are of interest not simply because they indicate the changing demographic regime in the industrialising parish of Timsbury, but also because they show that at the same time, trends in Steeple Ashton, which had experienced no major changes in its economic base, were apparently in the reverse direction – towards later marriage and smaller families.

But such an explanation of the differences between these two communities must also take into account likely patterns of migration. Some idea of local population movement, however imprecise, can be derived in three ways: by studying the changing composition of surnames, by tracing people listed in local censuses through the parish registers to discover rates of turnover, and by looking at the place of residence of marriage partners. For Timsbury and Steeple Ashton, comparison of names in the baptism registers in 1711–20 with those in 1781–90 indicated increasing diversity of surnames in Timsbury (reflecting its rapid growth in the intervening sixty years) and a less significant change in Steeple Ashton (Table 4). However, both parishes experienced a very large turnover in surnames suggesting a high degree of local mobility (Table 5), and this may imply that there was no simple pattern of movement from agricultural parishes to industrialising parishes, but rather that the redistribution of population was the net results of continuous ebb and flow movements of individuals.[31]

If there are doubts about the validity of the impressions presented by such evidence, an analysis of local listings, giving an indication of who moved and who stayed in the different communities, should provide stronger ground and in particular highlight a difference in persistence within and between generations. In Steeple Ashton, for example, 87 per cent of household heads recorded in a census of 1770 could be traced either to a burial or to a later listing in 1800. Whereas looking in the opposite direction (tracing names listed in 1800 back through the baptism registers) only 48 per cent could be found. Also in Radstock (a parish close to Timsbury) only 28 per cent of household heads present in 1803 had appeared in the baptism register and accompanying figures for lodgers and servants suggest that an even smaller proportion (20 per cent) were born in their parish of residence. The pattern indicates high rates of persistence within generations (once an individual had become established he was

unlikely to move out) but also a high degree of movement between generations, again suggesting that the majority of migrants were young unmarried adults. This would also imply that those communities which expanded rapidly in the second half of the eighteenth century, gained a large proportion of their new inhabitants via migration.

Marriage distances give some indication of local movement patterns but do not clinch the argument. Both parishes appear to have predominantly local catchments and in the case of Timsbury there is little to suggest a direct attraction from agricultural parishes with most partners coming from neighbouring mining communities. However, this data may not be particularly representative of the general patterns of migration as it simply records place of residence at the time of marriage. For both parishes only approximately 9 per cent of marriage partners came from outside the parish. Further confirmation that Timsbury was receiving substantial numbers of migrants can be found in the aggregated figures for marriages. Between the two time periods studied in the reconstitution, the increase in the number of marriages in Steeple Ashton was of the order of 30 per cent, whereas in Timsbury the increase over the same period was 174 per cent. There can be little doubt from these figures that the population of Timsbury grew much faster than any change in the fertility and mortality of its indigenous population could alone promote.

Conclusion

The high degree of local movement provides perhaps an essential clue to the explanation of spatial differences in patterns of population change. Within the confines of the study area there existed significant variations in employment opportunity which determined the rate and direction of migration, but this resulted not simply from the variety of local influences acting upon individual settlements. By and large they played a passive role, providing the setting for change, and it may be necessary to look towards external factors in order to find the principal causes of growth and redistribution of population. The decline in mortality appears to owe much to the amelioration of epidemic diseases arising either autonomously, or from indirect factors such as improvements in diet and conditions of life,[32] whereas the increase in fertility was closely linked to economic factors, particularly the nature of demand for the products of the region. The fortunes of the west of England woollen industry were largely controlled from London and hence by the vagaries of foreign

markets. The fact that the industry was slow to adapt to new opportunities and retained its specialism in high quality products, meant that there was no appreciable expansion of employment, indeed by the second half of the eighteenth century attempts were being made to improve productivity by the introduction of new machinery and this threatened to remove one of the principal props to the family economy in the surrounding rural communities.[33] However, the situation was not so constrained in the larger textile towns where a greater variety of economic activities, plus relatively high mortality rates, ensured a rapid turnover in population maintained by a constant stream of in-migrants.

Circumstances on the Somerset coalfield were somewhat different. The rapid expansion of the town of Bath had provided a major source of demand for domestic coal and initiated a period of sustained increase in output. Twenty-three new pits were sunk in this area between 1760 and 1800 and improvements in communications during the last decade of the century secured the fortunes of the industry.[34] The demographic response was quite remarkable, the coalfield parishes all display a sharp upturn in aggregated events during the second half of the century and the detailed study of Timsbury suggests that this was accompanied by a significant increase in fertility, coupled with the reception of a large number of in-migrants.

The contrasting patterns of the textile and coal mining parishes indicate the varying nature of the relationship between economic factors and population growth. Spatial variety was occasioned not only by local circumstances but also by the operation of exogenous influences on the different types of community. In addition there existed a complex web of association between the constituent parishes which meant that the impact of economic factors on one location had repercussions for the other communities, and in this way external influences were balanced out across the region. Migration resulted in a redistribution of population in relation to economic opportunity partly to relieve pressure on those communities that had not experienced any major structural changes (such as Steeple Ashton) and partly in response to the demand for labour.

Notes

[1] E.A. Wrigley and R.S. Schofield, *The Population History of England 1541–1871: a Reconstruction* (1981).

[2] D. Levine, *Family Formation in an Age of Nascent Capitalism* (1977).

[3] For confirmation of this see Wrigley and Schofield, *Pop. Hist. of England*, pp. 415 and 472.

[4] For reference to the west of England woollen industry see, J. de Lacy Mann, *The Cloth Industry in the West of England from 1640 to 1880* (Oxford, 1971).

[5] These circumstances, where the rate of economic expansion slowed down and consequently had a negative effect on demographic behaviour, are discussed by Levine in the context of the parish of Colyton, which experienced a decline in textile production during the seventeenth and early eighteenth centuries. Levine, *Family Formation*, pp. 103–15.

[6] J. Billingsley, *General View of the Agriculture of the County of Somerset* (1798), pp. 26–30. A detailed account of the history of the Somerset coalfield is given in C.G. Down and A.J. Warrington, *The History of the Somerset Coalfield* (Newton Abbot, 1971).

[7] Information on agricultural developments has been taken from Billingsley, *Agric. of Somerset*, T. Davis, *General View of the Agriculture of the County of Wiltshire* (1794) and E. Kerridge, 'Agriculture c1500–c1793', in *Victoria County History of Wiltshire*, ed. E. Crittall, Vol.4 (1959), pp. 43–64.

[8] For the 52 parishes studied, information was collected from 37 original registers, 7 Bishops' transcripts and 8 other transcripts.

[9] The full extent of this problem is discussed in Wrigley and Schofield, *Pop. Hist. of England*, pp. 15–54.

[10] Nonconformist registers are housed in the Public Record Office for the following parishes in this area: Bradford-on-Avon (1772), Frome (1750), North Bradley (1779), Paulton (1785), Trowbridge (1757), Warminster (1762) and Westbury (1779). The date in brackets indicates the commencement of registration.

[11] These alterations included: a) the amalgamation of parishes with less than 250 habitants in 1801, with a neighbouring parish, b) the correction of baptism entries, which gave the age of the child, to the year in which the child was born, and c) the spatial correction of entries that referred to events occurring in a different parish. A fuller discussion of the quality of the source material, plus a more detailed explanation of its preparation for analysis may be found in, S. Jackson, 'Population and Change: a Study of the Spatial Variations in Population Growth in North East Somerset and West Wiltshire, 1701–1800' (unpub. Ph.D. thesis, Univ. of Liverpool 1980).

[12] The most detailed listings were available for the parish of Steeple Ashton in Wiltshire. These included: an annual list of householders for the years 1720–38 and censuses in 1770, 1771, 1800 and 1813. A list of the inhabitants of Radstock in 1803 was also used.

[13] See for example, J.D. Chambers, *The Vale of Trent, 1670–1800: a Regional Study of Economic Change*, (Economic History Review, Supplement 3, Cambridge, 1957), R.I. Hodgson, *Demographic Trends in County Durham, 1560–1801: Data Sources and Preliminary Findings with Particular Reference to North Durham* (Research Paper No.5, Univ. of Manchester School of Geography, 1978), S. Sogner, 'Aspects of the Demographic Situation in Seventeen Parishes in Shropshire, 1711–60', *Population Studies*, XVII (1963), pp. 126–46, and Wrigley and Schofield, *Pop. Hist. of England*.

[14] It is appreciated that this measure can only provide a very rough impression of underlying trends in natural increase as it is liable to be influenced by variations in net migration and in the completeness of registration – particularly in the case of baptisms.

[15] The severity, geographical extent and likely causes of these mortality crises are discussed in Wrigley and Schofield, *Pop. Hist. of England*, pp. 332–42 and 645–93. See also C. Creighton, *A History of Epidemics in Britain* (Cambridge, 1894), vol. ii, p.79, where he notes that typhus was particularly serious in the west of England in this period.

[16] A measure of the seriousness of smallpox can be seen from the fact that 15 per cent of all deaths in Bradford-on-Avon during this period resulted from the disease. In the worst years it completely dominated the burial figures. In 1721, for example, between March and July, 74.2 per cent of the burials were attributed to smallpox, and similar proportions can be found for the other major peaks in 1711, 1727 and 1734.

Although there is less direct evidence of deaths from smallpox in the other towns in this area, similarities in the periodic fluctuation of burials suggests that Bradford's experience was not unique.

[17] The abatement of disease is implied by the relative decline in burials and particularly by the reduced impact of mortality crises after 1742. A detailed discussion of the causes of mortality decline in this region is included in, Jackson, thesis, p. 156–76. The general conclusion is that the factors promoting change were mainly exogenous to other developments within the region.

[18] Analysis of the periodicity of events indicates the presence of pronounced cycles in the frequency of baptisms and suggests that there was a significant increase in the number of females in the reproductive age group during this period. Jackson, thesis, pp. 187–203.

[19] Strictly speaking the baptism/marriage ratio only provides an accurate reflection of fertility for stationary populations that are not seriously influenced by the under-registration of events or by migration.

[20] As in the example of Timsbury, an industrialising parish, discussed in a later section.

[21] Chambers, *Vale of Trent*.

[22] These variables included: crude birth and death rates at the end of the eighteenth century, the slope of the trend lines in baptisms and burials, the trend of the cumulative natural change, the trend of the baptism/marriage ratio and an index comparing the number of baptisms and burials in a parish, over the course of the century, to its population size in 1801. In addition ancillary features were included, i.e. population size, levels of bastardy, the proportion of the population in manufacturing and agriculture in 1801, average household size in 1801 and the male/female ratio. A full explanation of the statistical procedures used can be found in, Jackson, thesis, pp. 78–133.

[23] A description of this technique may be found in, B. Everitt, *Cluster Analysis* (1974).

[24] The nine parishes in this group accounted for 60.22 per cent of the total population in 1801.

[25] A regular flow of in-migrants is implied by the more-or-less constant upward trend of baptisms in these parishes.

[26] E. Kerridge, *V.C.H. Wiltshire* p. 45.

[27] The predominance of migrants in this age group has been identified by R.S. Schofield, 'Age-Specific Mobility in an Eighteenth Century Rural English Parish', *Annales de Demographie Historique* (1970), pp. 261–74, and by R. Wall, 'The Age of Leaving Home', *Journal of Family History*, III (1978), pp. 181–202.

[28] Useful summaries of the material available for the study of migration in pre-industrial England are provided by J. Patten, *Rural-Urban Migration in Pre-Industrial England* (Research Paper No.6, Univ. of Oxford School of Georgraphy, 1973) and W.T.R. Pryce, *Migration in Pre-Industrial and Indusrial Societies* (Open University Course D301, Unit 10, 1982). A full discussion of the available evidence for local population movement in the study area is included in, Jackson, thesis, pp. 290–305.

[29] The reconstitutions were based upon the marriages taking place within each time period. For each marriage the partners were traced backwards through the baptism register to establish age at marriage and forwards through the baptism, burial and marriage registers to determine the numbers of children born, the birth intervals between children, the incidence of infant mortality, the length of marriage and any subsequent re-marriages.

[30] For a discussion of the significance of the age at first marriage of women see E.A. Wrigley, 'Family Limitation in Pre-Industrial England', *Economic History Review* 2nd ser. XIX (1966), pp. 82–109, and Levine, *Family Formation*, pp. 61–6.

[31] A similar pattern has been noted by E.J. Buckatzsch, 'The Constancy of Local Populations and Migration in England and Wales before 1800', *Population Studies*, V (1951), pp. 62–9. It is appreciated that there are many problems associated with the

simple analysis of surnames, not the least of which is the assumption that each family present at the first date produces a male heir to represent it at a later date. The baptism registers have been chosen because the information they contain gives the best account of residents of a parish. All three registers are life cycle specific, but the baptism register is the most likely to provide a wide range of the family groups present during a ten year period.

[32] The case for an improvement in life expectancy arising out of changed material circumstances and better levels of nutrition, is advanced by T. McKeown in, *The Modern Rise of Population* (1976).

[33] J. de Lacy Mann, 'Textile Industries since 1550', in *Victoria County History of Wiltshire*, ed. E. Crittall, vol. 4 (1959), pp. 148–82 (p. 167). Also Davis, *Agric. of Wiltshire* pp. 158–9.

[34] Down and Warrington, *Somerset Coalfield*.

Many thanks to Paul Laxton and John Langton for their comments on an earlier draft of this paper and to Sandra Mather and Janet Sellers for their invaluable technical assistance.

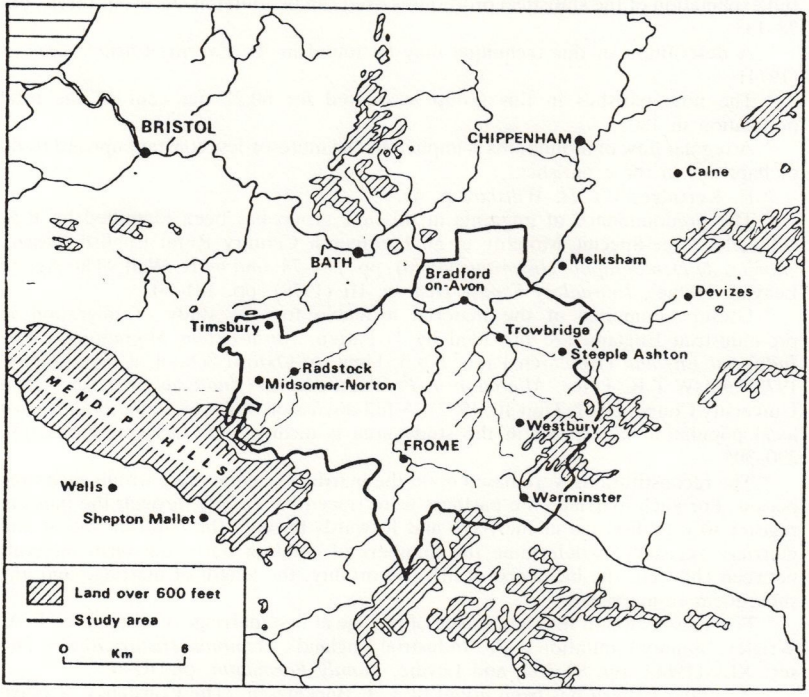

Fig. 1. *Somerset-Wiltshire border area: the regional setting.*

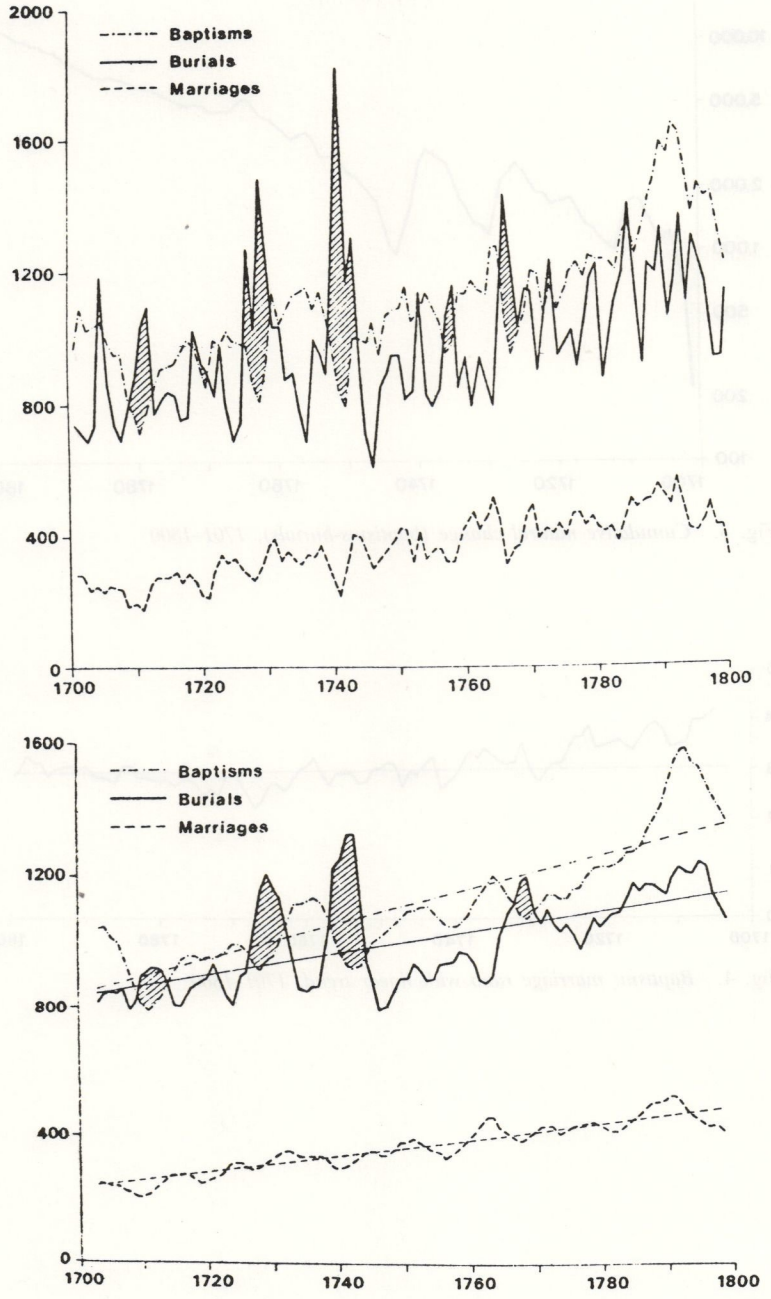

Fig. 2. *(a) Baptisms, burials and marriages, 1701–1800*
(b) 5 year moving average with linear trends, 1701–1800

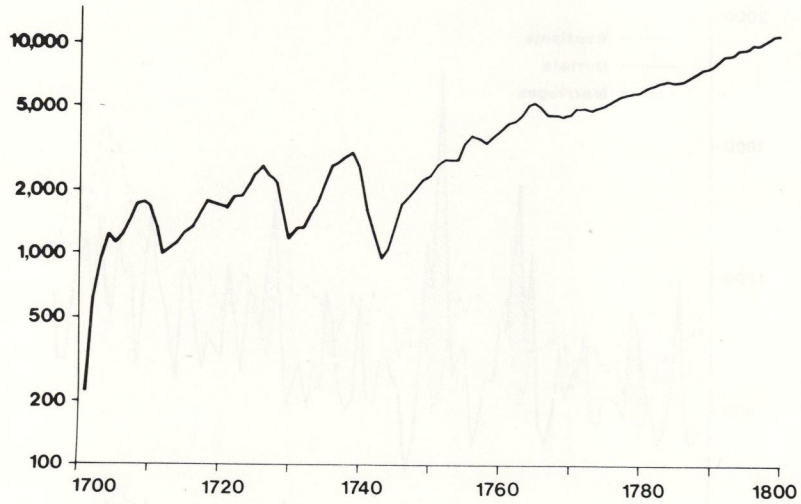

Fig. 3. *Cumulative natural change (baptisms-burials), 1701–1800*

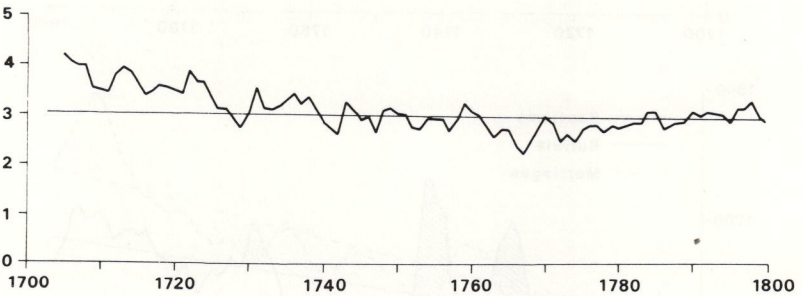

Fig. 4. *Baptism: marriage ratio with linear trend, 1701–1800*

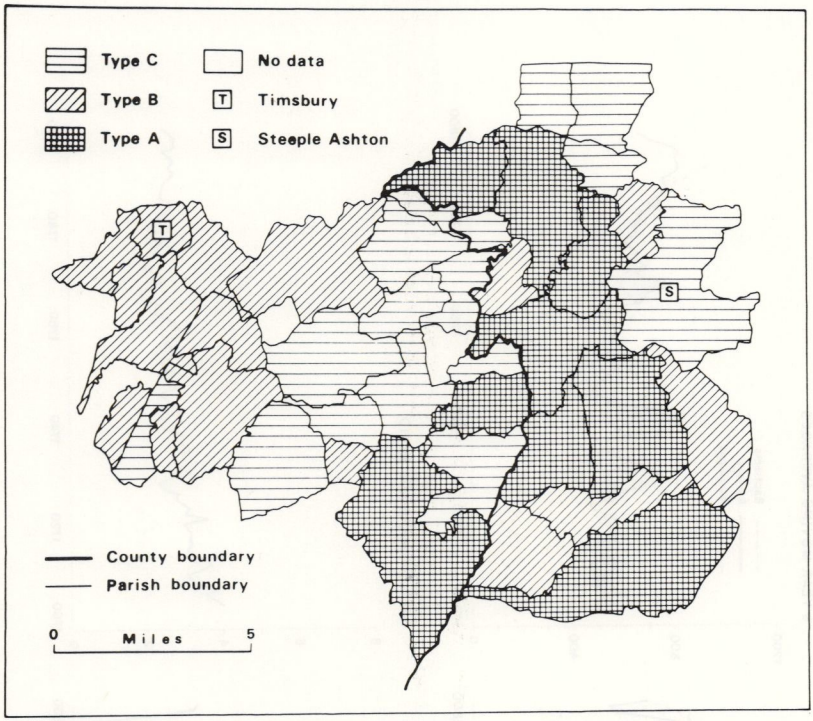

Fig. 5. *Parish groupings from multivariate analysis*

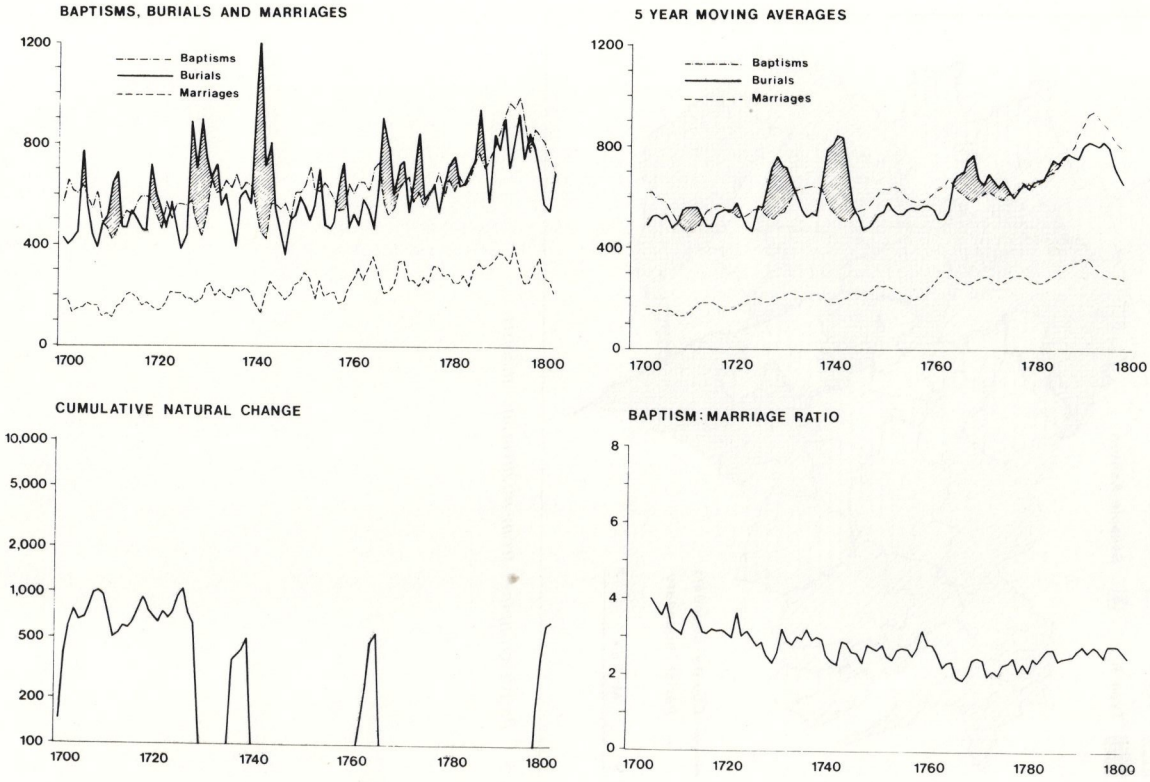

Fig. 6. *The course of population change: type A.*

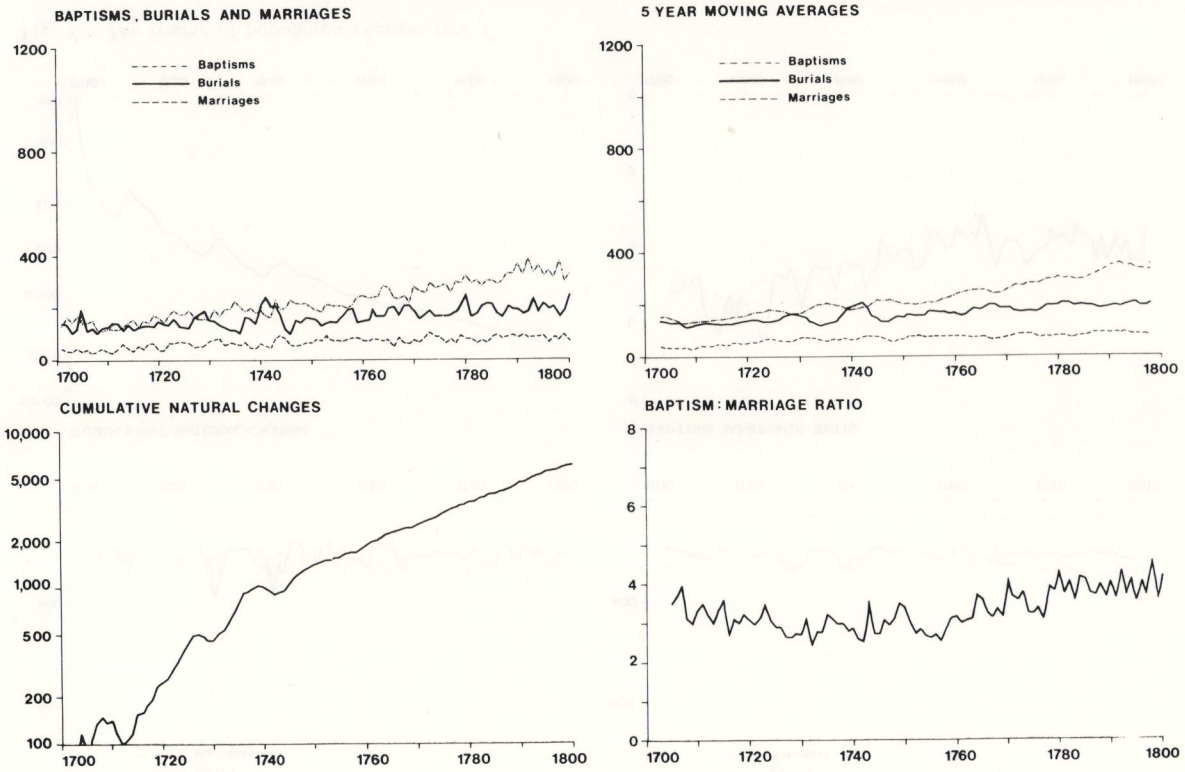

Fig. 7. *The course of population change: type B*

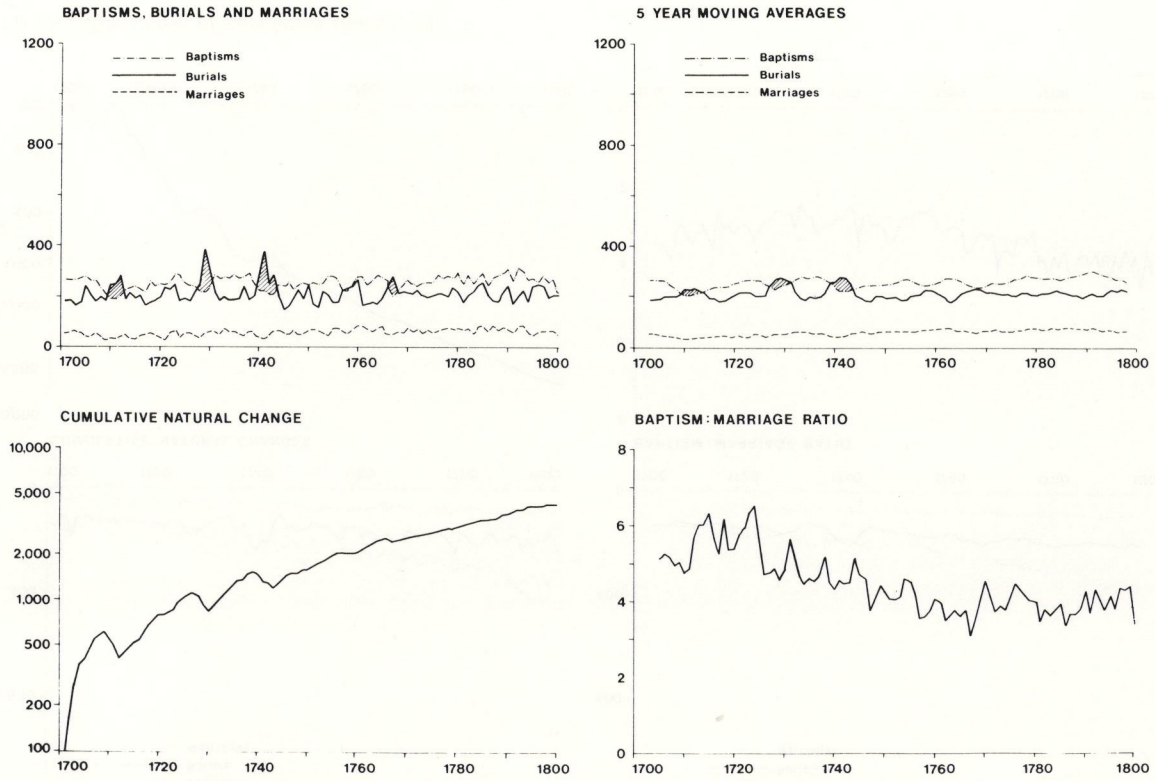

Fig. 8. *The course of population change: type C*

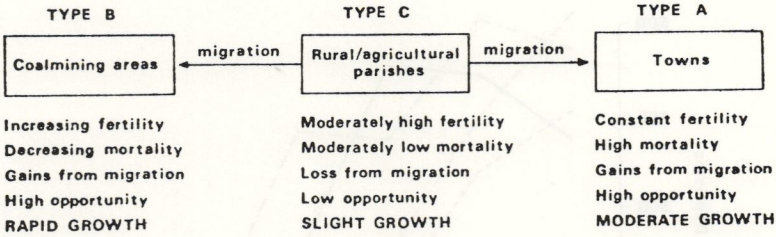

Fig. 9. *Model of the relationships between the parish groupings*

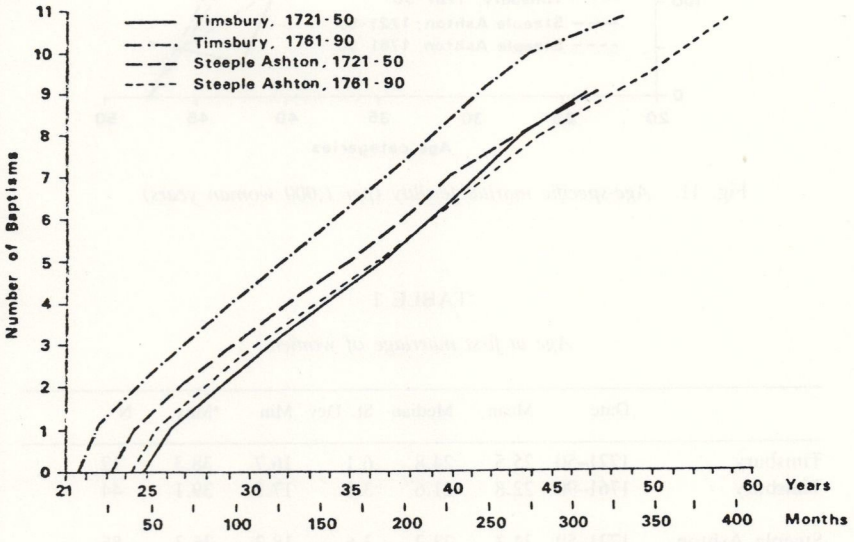

Fig. 10. *Cumulative spacing of baptisms between marriage and last child, allowing for median age at marriage.*

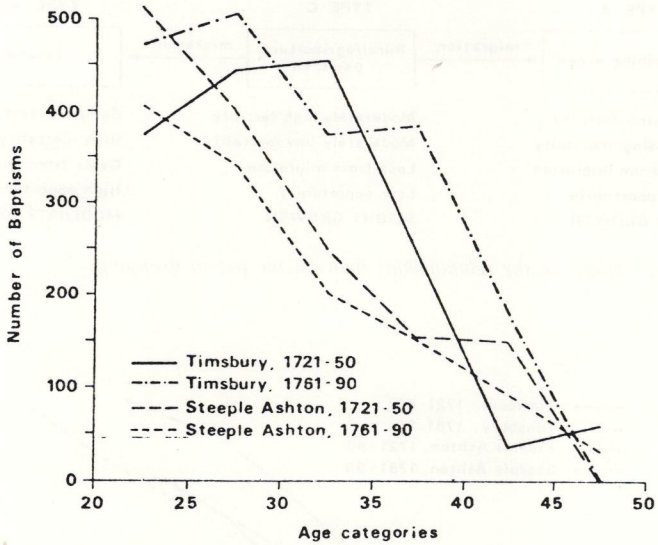

Fig. 11. *Age-specific marital fertility (per 1,000 woman years)*

TABLE 1

Age at first marriage of women

	Date	Mean	Median	St. Dev	Min	Max	N
Timsbury	1721–50	25.5	24.8	6.1	16.7	38.3	12
Timsbury	1761–90	22.8	21.6	3.8	17.2	39.1	44
Steeple Ashton	1721–50	24.3	23.2	3.6	18.3	36.3	55
Steeple Ashton	1761–90	25.3	24.2	4.4	17.6	39.1	112

TABLE 2

Mean baptism interval (in years)

	Date	Interval	St. Dev	N	Date	Interval	St. Dev	N
Timsbury	1721–50	2.42	1.55	128	1761–90	2.00	1.09	348
Steeple Ashton	1721–50	2.21	1.32	338	1761–90	2.25	1.33	460

TABLE 3

Mean number of baptisms per marriage

	Date	Mean	St. Dev	N	Date	Mean	St. Dev	N
Timsbury	1721–50	4.41	2.52	29	1761–90	4.64	2.91	78
Steeple Ashton	1721–50	3.84	2.33	91	1761–90	3.53	2.31	125

TABLE 4

Surname analysis: index of diversity

	Date	N	Date	N	Index
Timsbury	1711–20	27	1781–90	61	225.93
Steeple Ashton	1711–20	86	1781–90	92	106.98

(The index expresses the figures for 1781–90 as a proportion of the figures for 1711–20, to the base 100)

TABLE 5

Surname change (1711–20) to (1781–90)

	P.S.	%(1)	%(2)	N.S.	%(3)
Timsbury	12	44.45	19.67	49	80.33
Steeple Ashton	35	40.70	38.04	57	61.96

P.S. = Persistent Surnames (those names recorded 1711–20, still present 1781–90)
N.S. = New Surnames (names not recorded 1711–20)
%(1) = P.S. as a % of all names recorded 1711–20
%(2) = P.S. as a % of all names recorded 1781–90
%(3) = N.S. as a % of all names recorded 1781–90

TABLE 6

Persistence of household heads

	Date	H.H.	1800	Buried	%(T)
Steeple Ashton (Village)	1770	109	25	70	87.2

H.H. = Household heads
1800 = Number traced to 1800 listing
Buried = Number traced to a burial before 1800
%(T) = Columns 3 & 4 as a % of column 2

TABLE 7

Household heads baptised in parish of residence

	Date	H.H.	Bapt.	%
Steeple Ashton	1800	262	127	48.5
Radstock	1803	101	28	27.7