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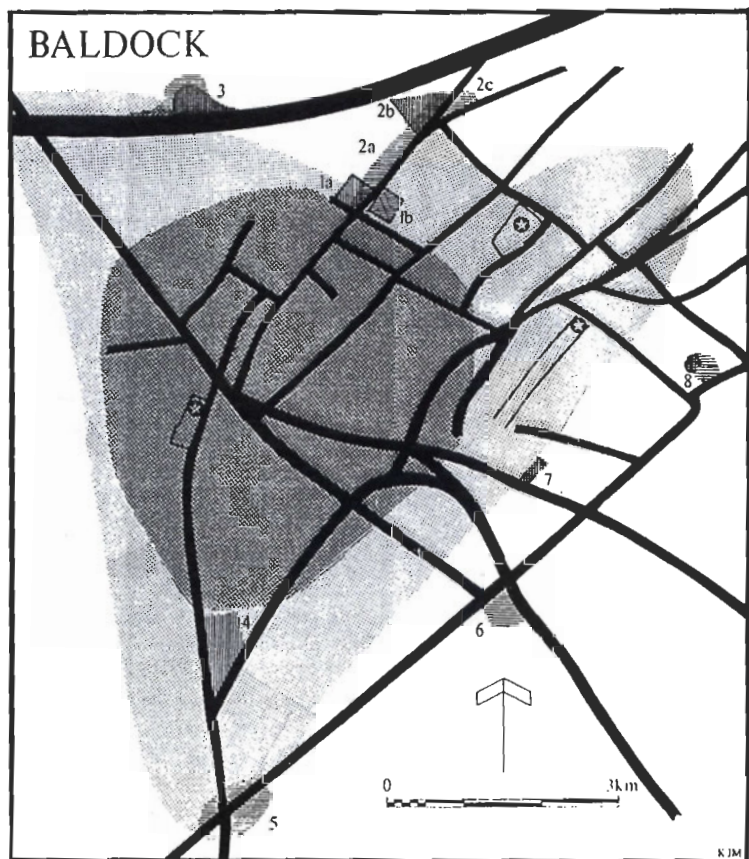
Death into life: population statistics from cemetery data








Keith J. Matthews

If archaeology ought to be about digging up people, as Wheeler (1956, 13) believed, the profession has largely failed to do so. It has concentrated on the material culture of humanity, and even when dealing with cemeteries, it has generally been the grave goods and the pathology of the human remains which have attracted more attention than the dead as people. This paper presents a technique for ordering data from cemeteries in a way that allows reconstructions of ancient demographic trends to be made. Use is also made of life-table modelling to examine age structures and suggest major differences in the demography of individual cemeteries. It uses data from as yet unpublished excavations at the Romano-British "small town" of Baldock, Hertfordshire.

BACKGROUND

The complete and near-complete excavation of five late pre-Roman Iron-Age and Romano-British cemeteries in Baldock during the 1980s provides an opportunity to examine burial practices in a rural community in



- | | | | |
|-------------------------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------|
|  | densely-occupied core of the town |  | cemeteries, late 2nd to 7th century AD |
|  | sparse occupation |  | roads |
|  | cemeteries, 1st century BC to early 2nd century AD |  | enclosures |
| | |  | religious sites |

Numbers refer to cemeteries in text

Figure 1. Baldock (Herts.): the late Iron-Age to sub-Roman town.

south-eastern England from the first century BC to the sixth century AD. This was a period of major political, social, economic, and religious changes. This paper deals largely with the results from two of those cemeteries, those at Wallington Road, on the eastern periphery of the Romano-British settlement, and at Royston Road, on its northern edge (fig. 1, numbers 8 and 2). Despite the salvage nature of the excavation of the former site, a great deal of information regarding most of the burials was recorded. Together with the almost complete and scientific examination of the Royston Road cemetery, a larger assemblage of burials than from any comparable site in the region has been examined. It must be stressed that these results are provisional, and a detailed assessment will be undertaken in the fourth volume of a projected series of publications of the recent fieldwork at Baldock.

The ancient and modern settlements at Baldock occupy a hollow in the northern scarp of the chalk ridge of northern Hertfordshire, a north-eastern extension of the Chilterns formerly known as the Champion Hills. They lie at the point of intersection of a number of important prehistoric routes and the source of the River Ivel, a tributary of the Bedfordshire Ouse. Occupation in the hollow has been almost continuous since the third millennium BC, and the first nucleated settlement grew up on the site during the first century BC. It continued to exist for six or seven centuries, and was finally abandoned before the area was incorporated into the Mercian kingdom during the seventh century. The same factors determined the location of the medieval new town of *Baldoce* in the twelfth century.

In 1982 the area which forms the subject of this paper (area 11, Wallington Road) was discovered by contractors. The work undertaken was necessarily of a salvage nature, but most of the cemetery was made available for reasonable, if hurried, excavation by North Herts Museums Field Archaeology Section under the direction of Gil Burleigh.

In 1986 a major excavation began on a cemetery beside the Royston Road (area 15) and continued intermittently until 1989. This was initially staffed by members of the community programme team and again directed by Gil Burleigh. After the programme ended in 1988 the developer, Barratt (Luton) Ltd, funded the remainder of the excavation. Three major cemeteries were discovered: one a somewhat scattered cremation cemetery, another a mixed rite cemetery of late pre-Roman Iron-Age to sub-Roman date, and the third an Iron-Age inhumation cemetery. The final phase of fieldwork took place during 1994.

The post-excavation work, partially funded by English Heritage, began

in earnest in 1988. It is intended to publish the results of the work since 1978 in five volumes, beginning with that which deals with the site at Wallington Road (Burleigh and Matthews forthcoming).

CEMETERIES AT BALDOCK

Formal burial grounds at Baldock originated in the first century BC. Two distinct forms occur: those within an enclosure up to about 33m square and unenclosed cemeteries. Four enclosures have been identified, all north of the settlement focus at Walls Field. They have a "rich" central burial surrounded by satellite burials of less complexity, and the central burials appear to have been covered by an earthen mound. A rich burial from The Tene, south of the settlement, does not appear to have been enclosed (Stead and Rigby 1986, 51). Unenclosed cemeteries were founded at Wallington Road and Royston Road around the mid-first century BC. At the latter, three distinct burial zones have been defined. One consists of a linear spread of cremations along the northern side of a major road; the second consists of a mixed-rite zone, roughly coincident with the later Romano-British enclosed cemetery, also north of the main road and east of the cremation cemetery; the third is a uniquely inhumation cemetery, located in the V of a road junction.

Enclosure of cemeteries was the norm during the Roman period. At both Wallington Road and Royston Road boundary ditches date from the late first century AD; the Walls Field cemetery was probably enclosed, although there is no indication of the date of the boundary ditch (Applebaum 1932). The late inhumation cemetery at California was in a rectangular enclosure, which perhaps pre-dates the use of the site as a burial ground. On the other hand, there does not seem to have been an enclosure at the late inhumation cemetery at The Tene, although the limited nature of investigations in this area could have missed any boundary features, particularly if they were not indicated by a ditch. The evidence from Wallington Road certainly indicates that boundaries continued to be respected even after the filling of the ditch, suggesting that fences, banks or hedges were maintained through the subsequent use of the burial ground.

THE BURIAL RITES

The rites practised in Baldock run the full gamut of Romano-British forms, from simple inhumations to elaborate cremations. At some sites

there seems to be a high proportion of "exotic" rites, such as decapitation, a theme which will be discussed in greater depth below. The commonly accepted model of a shift from cremation at the start of the Roman period to inhumation by the end of it does not work at Baldock. While there are early cremations, notably at Royston Road, Icknield Way East, California, and Walls Field, there are also pre-Roman and early Roman inhumations at Royston Road and Wallington Road, including decapitations and pronations, phenomena usually considered to be late. And cremation continued to be practised into the fifth century at Icknield Way East.

The chronology of cemeteries and their populations

Dating burials is rarely easy. Cemeteries often lack vertical stratigraphy and there are few relationships between burials. A start must therefore be made with pottery dating. This is easiest to apply to cremation groups, but some groups contain pottery manufactured at very different dates. Examples at Wallington Road have extremes of up to 140 years, so that the date of the vessels cannot always be taken as an accurate reflection of the date of deposition. The problem is particularly acute with groups containing Samian vessels. It is clear that Samian vessels were often so old at the time of deposition that they must be regarded as antiques or heirlooms.

Even where the date of individual vessels within a group are so close as to suggest that the date of deposition may be close to that of manufacture, there are problems about how to express the date. At best the coarse wares are dated by thirds of a century (i.e. early, middle, or late) and Samian is conventionally dated by imperial reign or dynasty except where closer dates can be inferred. Dating by imperial reign is a pernicious habit utterly without relevance to Romano-British Baldock, while dating to thirds of a century can be too broad, especially where assemblages from intercutting features are regarded as ceramically "contemporary". There are even greater problems with dating inhumations, since few graves contain complete pottery vessels and it is not always possible to be certain whether sherds in a grave back-fill are "residual" (whatever that may mean in a cemetery context) or a "ritual" deposition (whatever that may mean in any context). Where there are relationships between inhumations and other features this may be useful; some graves contain redeposited disturbed cremation groups at Royston Road and Walls Field. But at Wallington Road cremations always post-date inhumations.

In order to avoid giving pseudo-historical dates for the deposition of burials, a system of notional "generations" has been devised. Whilst the

question of generation length for ancient populations is not settled it appears that four generations per century in a pre-industrial agrarian society rather than the oft-quoted three generations is close to the truth. An average period of fertility for women in such a society of 17 to 35 has been proposed; the mean age of the mother at childbirth would therefore be around 26, which gives a figure of almost exactly four generations per century. The system starts in 100 BC, allowing a numbered sequence of generations to continue through to the sub-Roman period. This covers the period of occupation of the settlement, which was established some time before 50 BC, and continued into the sixth century. Each burial date can be expressed in terms of the numbers of the generations in which the pottery dating suggests its deposition occurred. Few burials can be assigned to any single generation, so in the analyses the date of deposition has been treated as a set of statistical probabilities.

By calculating the number of generations during which a burial could have been deposited, a score of the reciprocal of this number can be assigned to each of those generations. It was initially assumed that any burial had an equal chance of its true date of deposition falling into any one of the generations allowed by the pottery date. This may not be an accurate assumption, but in this way a general spread of burial dates can be established. The results are shown in table 1.

The figures show a peak in burials in the latter half of the second century with a dramatic slump in the third. The extreme nature of this decline in numbers, from the late second to early third century, raises suspicions that it is a function of the reliance upon Samian to date many pottery assemblages. No Samian manufactured later than c. AD 190 reached Baldock, so that an unknown number of third-century burials, datable only by reference to Samian, have been placed a generation or so too early. In an attempt to overcome this problem, a smoothing function was devised, based on the assumption that some pottery was a "generation" old at the time of deposition. The number of burials in each generation was compared with its immediate predecessor and the mean of the two was taken as the value for the later. This function has been used to produce the results on which the following discussion depends. Similar functions, based on either arithmetic or geometric progressions relating to the possibility of coarse pottery forms surviving for more than a generation after the date of manufacture, can be proposed and probably approximate even more closely to the real-life situation. Indeed, Chris Going's (1992) demonstration of variations in the supply of pottery during the Roman period suggests that all pottery dates need

"calibration" in this light (e.g. Marsh 1981, 215). Combined with problems of curation and the lack of specialised burial vessel forms, an extremely cautious approach to dating must be adopted.

Palaeo-demography

Little palaeo-demographic work has been undertaken with reference to the detection of population changes. In compiling demographic statistics it has generally been assumed that populations using cemeteries remained stable (e.g. Boddington 1987). However, the evidence above demonstrates that the number of burials made in each "generation" varied considerably. It is assumed that the number of burials is related to the number of deaths occurring within a living population and that by using burial data we can infer the size and rate of change of that living population.

Having computed a date range for the deposition of each burial, we can assume that this relates closely to the range of possible dates for the death of the individual concerned. In those instances where the remains have been assigned a particular age at death, it is possible to calculate a range of possible birth dates which can then be treated statistically in the same way as the dates of deposition. These are shown in table 2.

However, as only 61% of the burials at Wallington Road could be aged, it is not possible to compare the statistics for births and deaths directly. A comparison can nevertheless be made between the births per generation as a percentage of all births with the deaths for the same period; the proportions of burials which can be aged does not vary significantly with the date of deposition. If it is assumed that the population of the cemetery does represent the dead of a living group, its size can be calculated. The cumulative totals of the percentage differences between births and deaths will give the percentage of the total population alive during any given generation. It is a simple matter to convert these percentages back into absolute figures (table 3, Population 1).

Stead and Rigby (1986, 393) report that of 22 infant burials found during the excavations, 12 (ie 54.5%) were found in the vicinity of buildings or other contexts outside burial grounds. As 7% of the aged burials at Wallington Road were of infants, this may mean that the total population has been underestimated by about 11 infants buried elsewhere. If the total number of dead is increased to 200 in accordance with this assumption, a second set of population figures is obtained (table 3, Population 2).

The results of these calculations are given in table 3, where it should be noted that the stated population refers to the hypothetical population at

the end of each notional generation. In order to calculate the population for the middle of each notional generation, a geometric progression has been assumed, as is usual in statistical methods (Moroney 1953). The second, adjusted, population figures have been used in these calculations in order to include the otherwise under-represented infant mortalities. From this the birth and death rates can be calculated for each generation; they are usually quoted as a per thousand (‰) figure. These are shown in table 4.

It will be seen that the population follows much the same pattern as that of the number of burials per generation, as would be expected, but the birth and death rates are worth exploring in greater detail. There is a remarkable drop in the death rate during Generation 8 from an average of 13‰ during Generations 3 to 7 to 7.6‰ for Generations 8 and 9 which almost certainly reflects a higher standard of living following the Roman conquest and perhaps also a more peaceful existence under Roman rule. At the same time there is a leap in the annual rate of population growth from an average of 2.5‰ in the preceding century to 15.6‰ in Generations 8 and 9, which is also surely connected.

The enormous increase in the death rate (up to 67.1‰) during the second century is perhaps explicable in terms of the historically attested plague of AD 166 (Salway 1981, 552). With the lack of precise dates a large number of deaths in the late 160s may have been smoothed out over a period of two or three generations. The death rate drops again during the early third century, only to rise rapidly again from the middle of the century, following more known plagues between 251 and 271. It may be suggested, then, that such plagues were major public health crises, not just in the large towns and cities but also in essentially rural areas such as Baldock.

It is also possible that this increase in the death rate is again due to the reliance on Samian to date burials. This does not seem likely, however, in view of the smoothing function which has already been applied to the data in an attempt to minimise the distortion. To account for the increase in death rate in terms of the under-representation of third century and over-representation of second century burials would require the abandonment of dates for second-century coarse wares, which are themselves securely dated without reference to Samian. The peak of deaths in the late second century therefore appears to have a demographic reality and cannot be explained as an artefact of the uncertainty of ceramic dating.

The work of dating the burials from cemeteries other than Wallington Road has not yet been completed. However, preliminary results from

Icknield Way East and The Tene, together with the published results from Walls Field (Westell 1931; Fabrizi 1984) and Ian Stead's work (Stead and Rigby 1986) add to the picture. Although both Wallington Road and Walls Field have peak numbers of burials during the second century, the overall population seems to show less of a fluctuation. There is almost no material which can be assigned a second century date from Icknield Way East; the inhumation cemeteries at The Tene and California were not established until the third century; and the limited material from the barely explored Clothall Road cemetery is all first century in date. All this evidence reduces the scale of the peaks evident in Walls Field and Wallington Road.

Public health crises have already been suggested as an explanation for the reduction at Wallington Road. However, alternative explanations are possible. The means of disposal of the dead may have changed after AD 200; human remains could have been disposed of away from the cemeteries concerned; cremated remains may have been curated or deposited in above-ground structures rather than grave pits; a proportion of the population may have started to bury its dead elsewhere. All are possible explanations, but reasons for preferring the hypothesis of large numbers of plague deaths will be given below.

The overall birth rate (ignoring the figures for generation 17) can be calculated as 26.1 ± 9.3 ‰; the overall death rate is 28.9 ± 20.4 ‰, the greater standard deviation being a result of a greater variability with time of the death rate. The birth rate figures are comparable with certain Third World nations in the late twentieth century. India and Chile, for instance had rates of 33.2 ‰ and 23.4 ‰ in 1979 and 1981 respectively, according to United Nations statistics.

General population trends

The pattern of population derived from the cemeteries of Baldock follows what has been suggested for the population of Britain as a whole. It has been thought that the peak Romano-British population was reached around the middle of the second century, estimated by Fowler (1983) at three million or above, and that this declined substantially during the third and fourth centuries. This has recently been challenged (Higham 1992, 79), and the evidence from Baldock may suggest that although there certainly was variation, there was an underlying trend of growth from the first century BC to the fifth century AD. However, the high-status and "exotic" burials evident at Baldock from all periods should alert us to potential anomalies in patterns of life and death in the town.

Life-table modelling

Palaeo-pathological analysis of human remains allows estimation of the age of some of the material. Much of the work at Baldock has been undertaken by Jacqueline McKinley, with some work by Charlotte Roberts on the inhumations. In order to compare the ranges for cremated material and inhumations, the more accurate ages for the inhumations have been converted to the terms used for cremated remains. It must be remembered that specialist palaeo-pathologists discuss dead populations; we are looking at living populations, and the human remains are only incidental sources of data.

The life table is used as a means of summarising mortality in a more effective way than simple totals of age at death (Boddington 1987). A number of caveats must be stressed about its use. Most importantly, it involves the concept of stable population, which requires that there should be no migration, and that fertility and mortality remain constant. We have already seen that this does not apply at Wallington Road. More serious are problems of age estimation. The age of mature adult skeletal material is often underestimated, largely as a result of the lack of positive ageing features. Once the skeleton has been formed, only degenerative processes can be used for ageing, and these are often poorly understood. Equally serious is the distortion caused by biases in reference populations (Bocquet-Appel and Masset 1986), so that the age distribution of archaeological samples mirrors the age distribution of the reference sample.

Life expectancy and survival

The first site examined at Baldock using the life-table model was Wallington Road, with a sample of 189 burials. The age structure here seemed to be what one might expect of an essentially rural Romano-British population. There were large numbers of infants, and the largest single age class consisted of young adults (i.e. those aged 17 to 30). This pattern is easily explained in terms of high infant mortality and life-endangering health crises among young adults, with the hazards attending childbirth a major contributory factor to female deaths. Expectation of life at birth can be calculated as 26 years. This is a surprisingly low figure, much lower than that of any modern nation, where a low of 38 was recorded for Sierra Leone and Guinea in 1984.

The second site examined in this way was Royston Road, although the analysis was restricted to the cremations, giving a sample of 478 aged burials. The pattern is completely different for that recorded at Walling-

ton Road. From being the largest age class at Wallington Road, young adults at Royston Road are the smallest, accounting for only 3.5% of all burials. The largest class consisted of older adults (i.e. individuals over 45), accounting for 41.8% of the population. Life expectancy at birth can be calculated as 41.3

Social patterning from human remains

The two patterns of life and death from Royston Road and Wallington Road are so different, indeed almost mutually incompatible, that an explanation must be sought. Wallington Road's population looks convincingly rural, although the life expectancy at birth is curiously low. On the other hand, Royston Road looks special. Infant mortality is not high, and women seem to have sailed through their years of fertility with almost no life-threatening health problems, almost as if they were not bearing children. This sort of age structure is closely comparable with Anglo-Saxon nunneries (Audrey Meaney, pers. comm.). Is it legitimate to suggest that the Royston Road cemetery was the burial ground of a largely celibate religious community? The longevity of nuns (and monks) in Anglo-Saxon nunneries is a function of their place in society. Like all élite groups, they were essentially looked after by other members of their society; they were consumers, not producers. It might be tempting to regard the population of the Royston Road cemetery as élite consumers and controllers of the means of production (to use Marxist terminology). Late inhumation graves with evidence for timber superstructures are certainly consistent with such a model. It is also possible that at Royston Road the population consisted largely of those individuals who were most active in society and whose careful burial (and associated funerary rituals) were seen to be important in sustaining the community.

However, there is a further factor to be taken into consideration. The inhumations from the mixed-rite cemetery show an unusually high proportion of "exotic" burial practices. There are not only shrine graves but also decapitated and prone burials and several with heads encased in flints. There is even a case of possible trepanation (McKinley 1992).

Hints of "exotic" rites can also be seen in cremations with an example of *in situ* burning, arrangements of flints in grave pits and several cases of partial cremation. In one instance this was so incomplete that the body was deposited in four articulated pieces, each held together by connective tissue; the corpse must have resembled a cooked and jointed food animal rather than a human cremation, although there is absolutely no suggestion of cannibalism. Are these peculiar burial practices

evidence of the differential treatment of social "deviants" (Shay 1985) or of extreme forms of religious belief?

A religious model accords well with the character of Baldock. As a settlement it had no real public buildings other than temples, few Romanised dwellings and very few of high status. This contrasts with the series of "rich" burials. It is dangerous to argue that status in life is necessarily reflected in the burial rite, either its complexity or the perceived "richness" of any grave goods; however, to indulge in expensive means of disposal of the dead presupposes the availability of sufficient wealth to be able to expend a proportion of it in an economically unsound manner. Families in periods of social stress might well expend more resources on funerary rites than they can afford, but such stretching of resources will only take them up to a level readily available to the next stratum in society. Conversely, a lack of perceived "richness" or "complexity" cannot be taken to indicate poverty in life.

An explanation of the age structure of the population of the Royston Road cemetery as a product of a relatively cosseted lifestyle is quite possible. Set beside this group the population of Wallington Road looks very unfortunate indeed. With a poor expectation of life, they also had to cope with the effects of malnutrition acute enough to cause pathological changes to the bone. On the other hand, the bone also has degenerative and traumatic changes which indicate a lifetime of heavy manual labour; in the context of Baldock, this can only indicate agricultural work.

The group buried at Wallington Road was therefore engaged in agricultural production but did not have unrestricted access to the fruits of its labours. They were thus not poor free peasants; they were the lowest stratum of Romano-British society. Too early to be the oppressed *coloni* of the later empire (the last burial was deposited before AD 310), these unfortunates may well have been slaves, a class often thought to be virtually invisible, if not actually non-existent, in Roman Britain. It is exactly such a population, under-nourished and over-worked, which would have been most vulnerable to plagues and other public health crises.

CONCLUSIONS

A sequence of burials has been identified at Baldock running from before 50 BC to perhaps the middle of the sixth century AD. The remarkable continuity of rites used in the disposal of the dead over this period demonstrates the essential unity of the population of the settlement and the lack of external influence. It also enables a more balanced view to be

taken of apparently bizarre rites, such as decapitation, than has hitherto been the case.

More importantly, the large number of well-dated burials of all periods demonstrates patterns of death which may be connected with population trends among the living. Because of the quantity and quality of the information from Baldock a formula for converting data derived purely from the remains of the settlement's dead into information about the living has been devised. For the first time we can use data from burials to research trends in birth and death rates and other public health issues.

The most exciting and perhaps surprising result of this analysis is the discovery that apparently distinct and specialised social groups can be recognised in the human remains. The large numbers of cemeteries known at Baldock can perhaps be interpreted as an indication of restricted access to individual burial grounds. It may be possible to explain these differences in terms of subcultural differences rather than economic or religious ones. Archaeologists have tended to use data from their sites to draw inferences about all of society, following the normative models of the New Archaeology and its more recent descendants. It is perhaps now the time to examine what makes each site individual and to examine differences between social groups using different sites or parts of sites.

The interpretations suggested here, particularly for Wallington Road, are startling and may well require modification. However, something we do not yet understand fully was clearly going on in Baldock during the first half of the first millennium AD, and it is the rôle of the archaeologist to seek to explain it. This paper attempts to begin that process.

TABLES

Table 1: Deaths per notional generation

Generation	Burials	Smoothed	Percentage
3	6.6	3.3	1.8%
4	6.6	6.6	3.5%
5	3.6	5.1	2.7%
6	8.1	5.8	3.1%
7	5.7	6.9	3.7%
8	1.7	3.7	2.0%
9	10.5	6.1	3.3%
10	34.1	22.3	12.0%
11	43.5	38.8	20.9%
12	32.3	37.9	20.4%
13	8.4	20.4	11.0%
14	9.2	8.8	4.7%
15	7.1	8.2	4.4%
16	5.8	6.5	3.5%
17	2.4	5.4	2.9%

Table 2: Births per generation

Generation	Births	Smoothed	Percentage
0	1.3	0.7	0.6%
1	3.0	2.2	1.9%
2	4.7	3.8	3.2%
3	4.9	4.8	4.1%
4	4.4	4.7	4.0%
5	4.0	4.2	3.6%
6	4.4	4.2	3.6%
7	4.4	4.4	3.7%
8	8.5	6.4	5.4%
9	14.0	11.3	9.6%
10	18.9	16.5	14.0%
11	18.0	18.5	15.7%
12	13.1	15.5	13.1%
13	3.9	8.4	7.1%
14	5.4	4.7	4.0%
15	1.9	3.7	3.1%
16	2.0	2.0	1.7%
17	0.7	1.7	1.4%

Table 3: Population estimates

	Births%	Deaths%	Difference	Living	Pop 1	Pop 2
0	0.6%	0.0%	+0.6%	0.6%	1.3	1.3
1	1.9%	0.0%	+1.9%	2.5%	4.8	5.1
2	3.2%	0.0%	+3.3%	5.8%	10.9	11.5
3	4.1%	1.8%	+2.3%	8.0%	15.2	16.1
4	4.0%	3.5%	+0.4%	8.5%	16.0	17.0
5	3.6%	2.7%	+0.8%	9.3%	17.6	18.6
6	3.6%	3.1%	+0.4%	9.7%	18.4	19.5
7	3.7%	3.7%	+0.0%	9.8%	18.4	19.5
8	5.4%	2.0%	+3.4%	13.2%	24.9	26.4
9	9.6%	3.3%	+6.3%	19.5%	36.8	39.0
10	14.0%	12.0%	+2.0%	21.5%	40.6	43.0
11	15.7%	20.9%	-5.2%	16.3%	30.8	32.6
12	13.1%	20.4%	-7.2%	9.1%	17.2	18.1
13	7.1%	11.0%	-3.8%	5.2%	9.8	10.4
14	4.0%	4.7%	-0.7%	4.5%	8.4	8.9
15	3.1%	4.4%	-1.3%	3.2%	6.0	6.4
16	1.7%	3.5%	-1.8%	1.4%	2.6	2.8
17	1.4%	2.9%	-1.5%	0.0%	0.0	0.0

Table 4: Annual birth and death rates

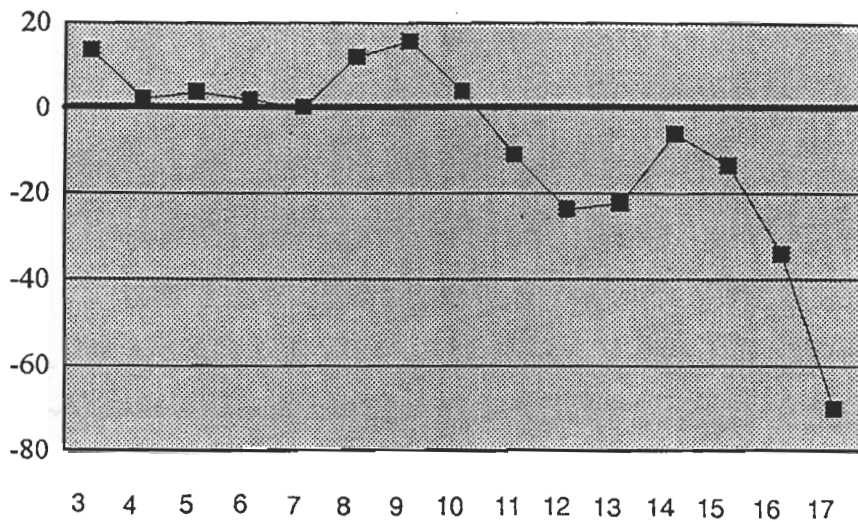
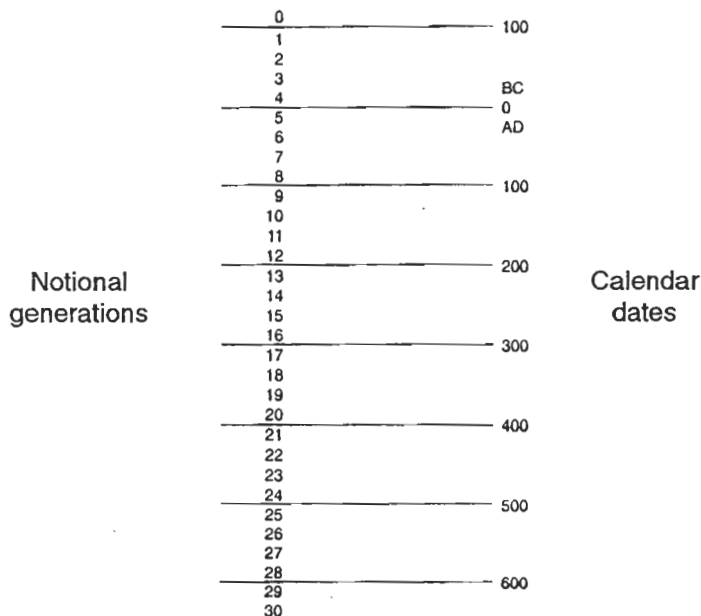
	Pop 2	Births	B rate	Deaths	D rate	Pop change
3	13.6	0.3	23.9	0.1	10.4	+13.5
4	16.5	0.3	19.3	0.3	17.2	+2.1
5	17.8	0.3	16.0	0.2	12.4	+3.7
6	19.0	0.3	15.0	0.3	13.1	+1.9
7	19.5	0.3	15.3	0.3	15.2	+0.1
8	22.7	0.4	19.1	0.2	7.0	+12.1
9	32.1	0.8	23.9	0.3	8.2	+15.7
10	40.9	1.1	27.3	1.0	23.4	+3.9
11	37.4	1.3	33.5	1.7	44.5	-11.1
12	24.3	1.1	43.2	1.6	67.1	-23.8
13	13.7	0.6	41.4	0.9	63.8	-22.4
14	9.6	0.3	33.0	0.4	39.2	-6.2
15	7.5	0.3	33.3	0.4	46.7	-13.5
16	4.2	0.1	32.2	0.3	66.4	-34.2
17	1/7	0.1	69.1	0.2	139.3	-70.2

Table 5: Wallington Road life table

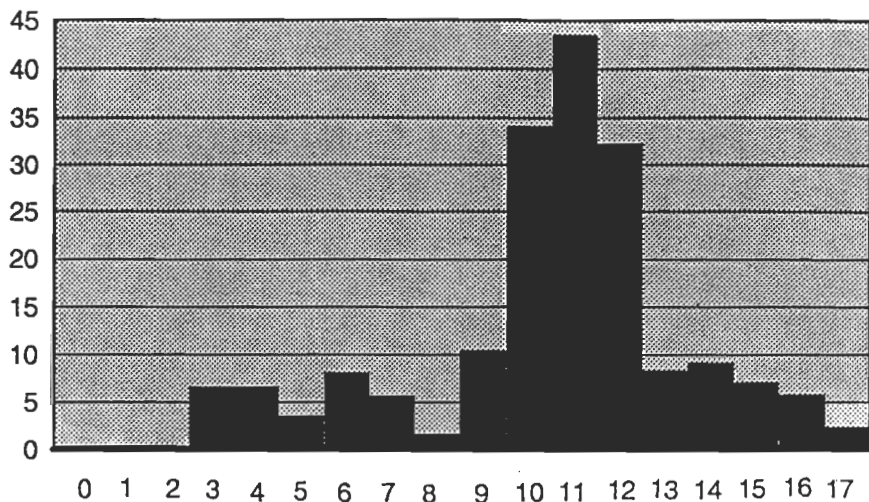
Age	D(x)	d(x)	l(x)	q(X)	qq(X)	e(x)	E(x)
0-4	14.3	12.4%	100.0%	0.12	0.025	26.0	26.0
5-11	4.2	3.6%	87.6%	0.04	0.006	24.0	29.0
12-16	14.0	12.1%	84.0%	0.14	0.023	21.6	33.6
17-29	34.3	29.7%	71.9%	0.41	0.032	18.6	36.6
30-44	25.8	22.3%	42.2%	0.53	0.033	14.1	44.1
45-70	22.9	19.8	19.8%	1.00	0.038	15.5	57.5

Table 6: Royston Road life table

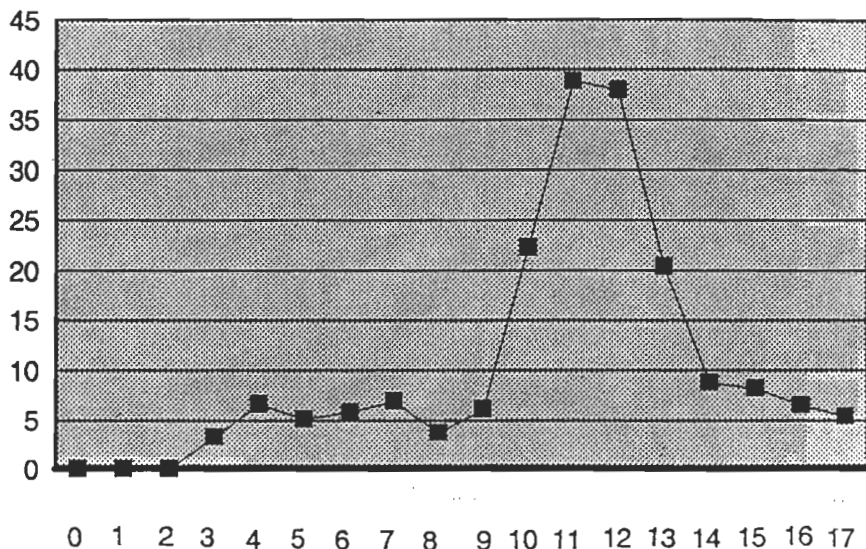
Age	D(x)	d(x)	l(x)	q(X)	qq(X)	e(x)	E(x)
0-4	26	5.4%	100.0%	0.05	0.01	41.3	41.3
5-11	23	4.8%	94.6%	0.05	0.01	37.6	42.6
12-16	51	10.7%	89.7%	0.12	0.02	31.6	43.6
17-29	17	3.6%	79.1%	0.04	0.00	29.4	46.4
30-44	161	33.7%	75.5%	0.45	0.03	22.0	52.0
45-70	200	41.8%	41.8%	1.00	0.04	13.0	58.0



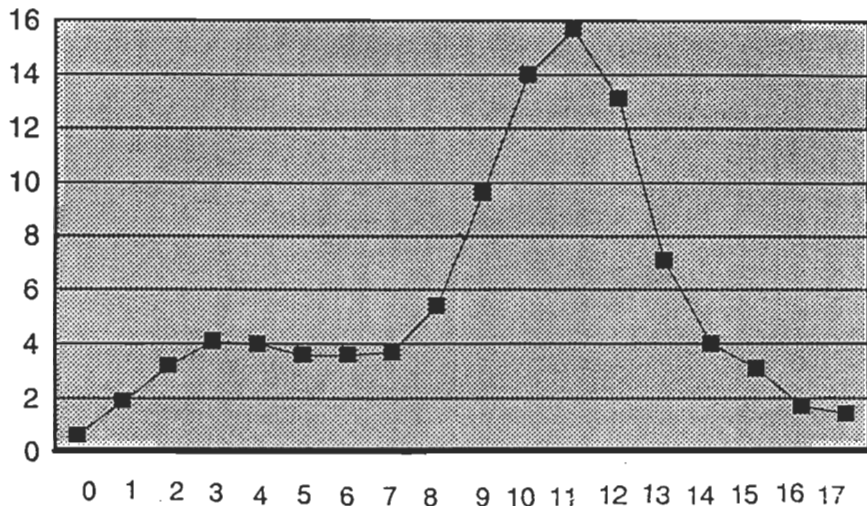
Wallington Road, Baldock: Annual rate of population change per thousand.



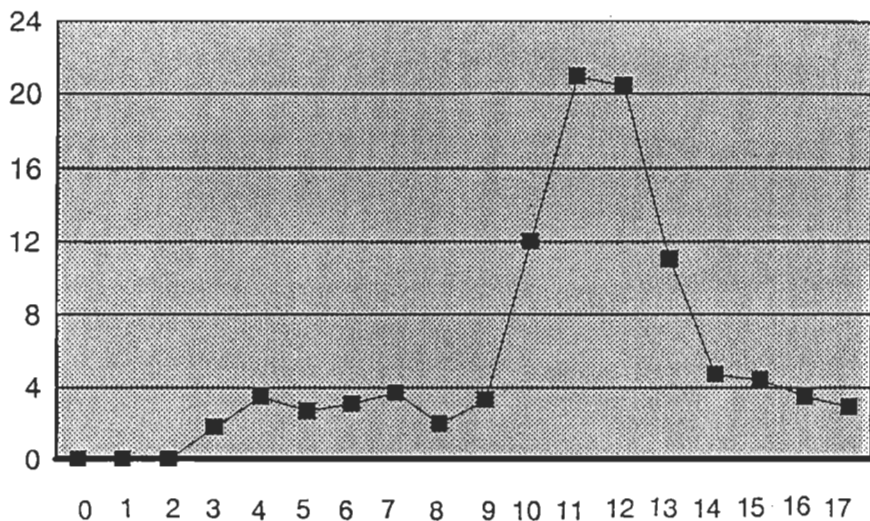
Wallington Road, Baldock: numbers of burials per generation (absolute).



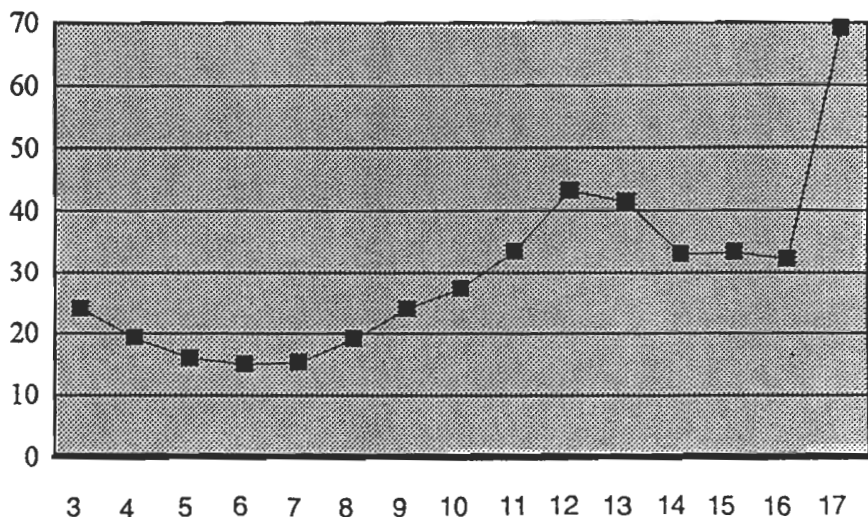
Wallington Road, Baldock: numbers of burials per generation (smoothed).



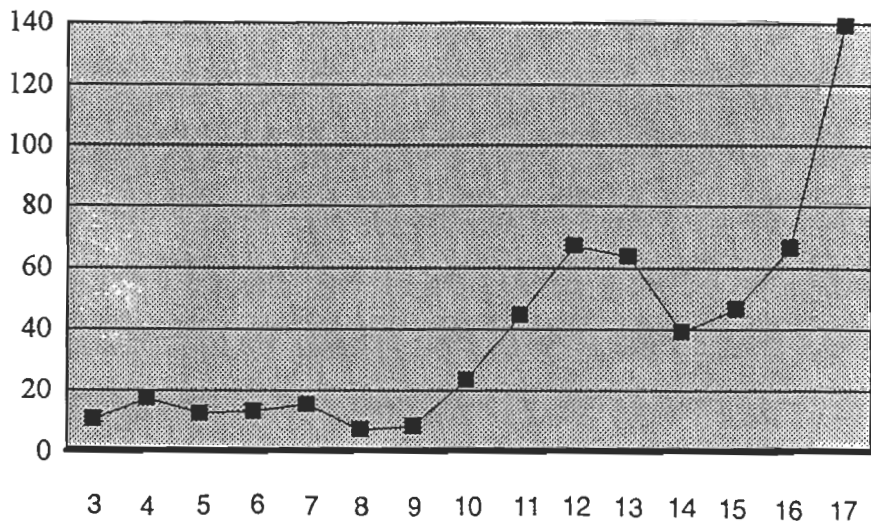
Wallington Road, Baldock: numbers of births per generation (percentages).



Wallington Road, Baldock: numbers of deaths per generation (percentages).



Wallington Road, Baldock: annual birth rate per thousand.



Wallington Road, Baldock: annual death rate per thousand.

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