FAMINE AND MORTALITY CRISES IN MID-SUSSEX, 1606-1640

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Ian Nelson is to retire shortly after a career in dentistry, both in general practice and in teaching. This small piece of research has developed from recent Open University studies.

Introduction

The area selected for this study comprises thirteen adjacent mid-Sussex parishes directly to the north of Brighton, these include settlements situated on chalk downs, scarp foot, low weald and high weald. The corresponding agricultural activities ranged from marketable corn and sheep on the downs, dairy cattle largely replacing the sheep in the scarp foot, to subsistence corn in the weald areas, the low weald being engaged also in cattle rearing with some dairying and grazing, and high weald in some manufacturing industries.[1] In the period under study there were three larger centres of population, Cuckfield, Ditchling and Hurstpierpoint, each having a market, although that in the last-named was confined to corn.

Several studies of seventeenth century crisis mortality have been undertaken in recent years, some involving parishes in southeast England, others being of wider interest. Of these Brent found that diffuse Wealden parishes were less affected by epidemics than nucleated downland villages,[2] while Dobson has established that mortality increases were of two types – those widespread over most of southeast England without severe peaks, and secondly isolated intense local epidemics which did not affect adjacent parishes.[3] In Yorkshire during the same period parishes of high altitude did not necessarily suffer the highest mortality, and it has been suggested that sources of income other than from agriculture may have helped to reduce ill effects.[4]

In order to establish famine as a cause of crisis mortality, Appleby has listed a number of required criteria.[5] Although he accepted that not all of them may be open for testing, something which became evident as this investigation proceeded, they form a suitable framework for investigating the possible Malthusian relationship involved in local crises. Much abbreviated, Appleby's criteria for famine-induced crisis mortality are as follows:

1. Mortality figures should be twice the yearly average.
2. Neighbouring parishes should be involved.
3. Epidemic diseases should be considered and eliminated.
4. There should be a correlation between mortality and food prices.
5. There should be contemporary accounts of dearth.
6. A high percentage of deaths should be recorded among infants and the economically marginal.
7. There should be evidence of fewer conceptions.
8. There should be absence of negative evidence (e.g. good harvests).

Frequency of burials

Unfortunately difficulties in testing arose under several of these headings. Local evidence of disease was almost non-existent; equally, in the research time available, no records could be found giving local food prices, nor could the specific accounts of either good or bad harvests be discovered. Also only one parish had records complete enough to be reasonably certain of ages at death. Despite these problems, figures were taken from the registers of the thirteen parishes with records complete enough for useful analysis. The registers do not survive prior to 1606, and then after 1640 records became fragmentary until the Restoration. This has meant that it has not been possible to calculate an eleven year moving average for the whole period under study.

Using the evidence available from the parish registers, reproduced in the Appendix, it can be seen that no one year recorded burials totals twice the average. Obviously we need to bear in mind the varying views on the subject of a statistically significant factor. For example, Wrigley and Schofield used an increase of ten per cent on the national deathrate,[6] while Schofield, working with fifty-four parishes, discusses a choice between burial exceeding 50 and 100 per cent of the local average, and comes down in favour of the latter.[7] Equally Turner uses both of Schofield's multipliers to distinguish between 'major' and 'minor' crises.[8] In view of the lack of agreement, the burial figures were plotted to a semi-logarithmic scale, in order to identify some possible 'minor' crisis years. If the moving average is estimated for the years 1637-40, the following years show increases at least in line with those accepted by Wrigley and Schofield.

Table 1 Annual percentage increases in the frequency of burials

Year	Increase %	Year	Increase %	Year	Increase %
1611	18	1616	27	1627	26
1612	40	1617	28	1638	54
1613	22	1620	21	1639	59
1614	10	1624	40	1640	27
1615	29	1626	46		

These percentage increases in burial totals make it reasonable to give provisional consideration to the following years as being ones in which at least minor crises occurred: 1612, 1624, 1626, 1638, 1639.

In order to assess the degree of involvement of neighbouring parishes, it was decided to eliminate the five very small ones (Clayton, Newtimber, Poynings, Pyecombe and Woodmancote) from statistical analysis, as their individual annual burial figures never reached more than ten. In the remaining eight parishes, comparison of the annual totals with the corresponding moving

averages indicated major crisis years as follows: Albourne 1615 and 1630; Bolney 1612 and 1639; Twineham 1617; and Wivelsfield 1638.

The three largest parishes (Cuckfield, Hurstpierpoint and Ditchling) experienced no crisis mortality at the 100 per cent level. However, in the period under study, minor as well as major crises occurred as shown in Table 2. Yet not all parishes experienced crises in 'crisis' years: for example, Bolney had only eight deaths in 1638, Twineham with only two in 1638 and three in 1639, and Wivelsfield only six in 1624.

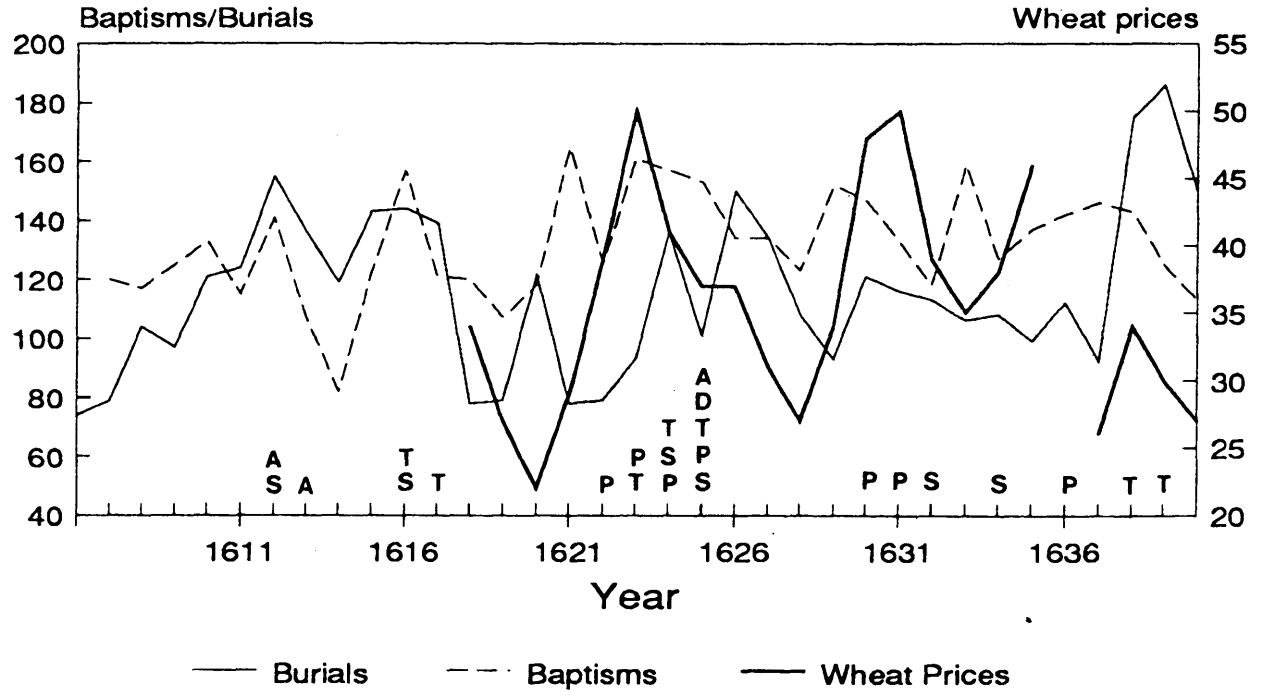
Table 2 Annual percentage increases in the frequency of burials: industrial parishes

Parish	Year	Percentage increase
Albourne	1615	140
	1617	67
	1630	120
Bolney	1612	133
	1613	55
	1614	78
	1615	67
	1624	86
	1626	57
	1628	57
	1639	160
Duckfield	1637	60
Ditchling	1617	67
	1626	77
	1631	53
Hurstpierpoint	1616	75
	1617	53
	1624	69
	1626	57
Keymer	1620	162
	1639	57
Twineham	1617	200
Wivelsfield	1635	58
	1638	100
	1640	58

No clear pattern emerges from Table 2. The most that can be said is that four parishes experienced a crisis in 1617, Twineham being in particular severely affected, and two parishes were involved in each of the crisis years 1615, 1624 and 1626. Even perusal of the crude data from the five smallest parishes only brings the largest number of parishes affected in any one year (1617) to five, hardly an indication of widespread involvement.

Investigation of epidemic disease was hampered by the lack of local data. Apart from London, references to specific dated occurrences within fifty miles of the area under study are limited to the ports of Portsmouth (plague 1625) and Rye

Figure 1 Baptisms, burials and prices: Mid-Sussex, 1606-40



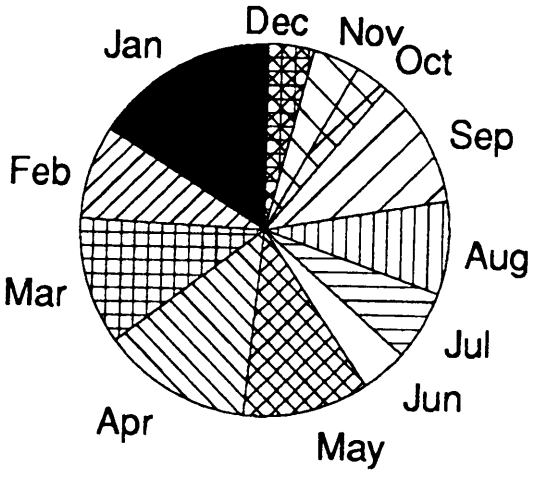
Notes: The symbols plotted on the graph for epidemic years relate as follows: **A** = Ague, **D** = Dysentery, **P** = Plague, **S** = Smallpox, **T** = Typhus.
Note that no prices are recorded for 1636.

(plague 1625; smallpox 1634-5).[9] John Evelyn records in his diary that 1625 'was the year in which the pestilence was so epidemical that there dy'd in London 5,000 a week; and I well remember the strict watches and examinations upon the ways as we passed' from Wotton in Surrey to his maternal grandparents at Lewes.[10]

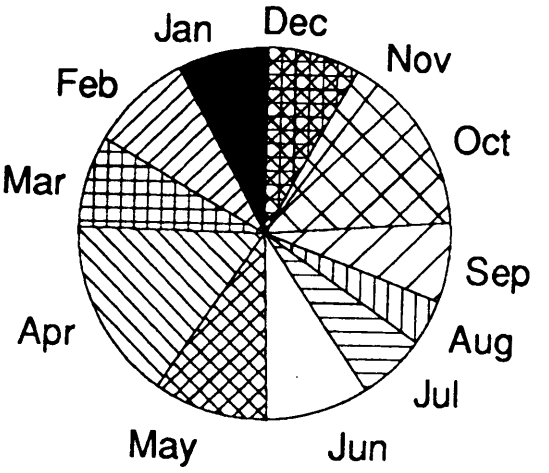
This was evidence at least of the risk if not the actual existence of disease in the area. Equally in 1636 he refers to the 'pestilence being much increased in London and divers parts of England'. In the absence of useful local data, recourse must be made to more general information, with the assumption that mid-Sussex was close enough to both London and the coastal ports to be at risk.

Creighton has recorded that the plague increased from 1622 to 1625, occurring again in 1630/1 and 1636. Typhus appeared in 1616/17, 1623/4, 1625 and 1638/9; smallpox in 1612, 1616, 1624, 1625, 1632 and 1634; dysentry in 1625; and ague (difficult to identify positively in modern terms, but either malaria in low-lying areas or influenza) in 1612/13 and 1625.[11] These years have been indicated in Figure 1, by letter, giving the nature of the infection. Bearing in mind that these findings do not relate specifically to mid-Sussex, the years 1612, 1616/17, 1624, 1630 and 1639 showed rises in mortality, but so do 1615 and 1626, when epidemics are not mentioned; while 1625, a year of widespread and various epidemics, showed a fall in burial figures in the area.

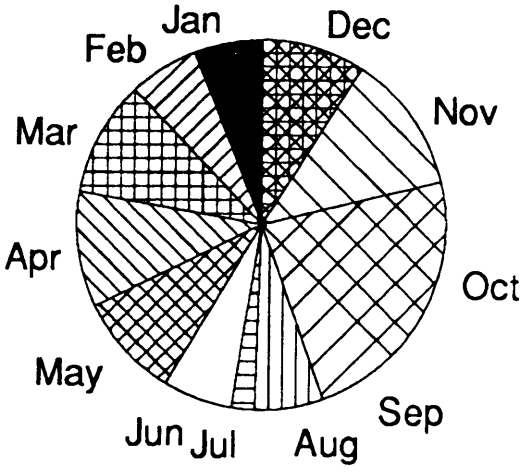
Figure 2 **Percentage monthly burials in five 'crisis' years**



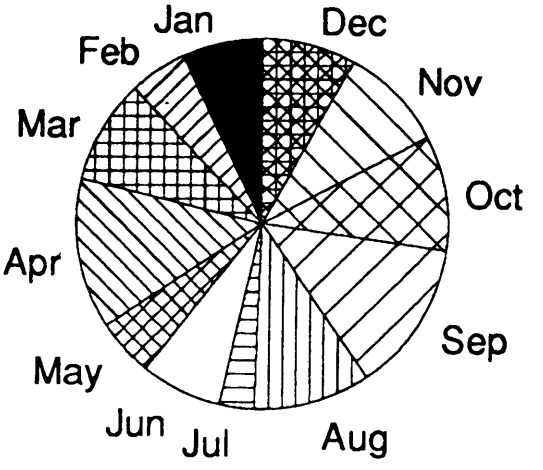
1612



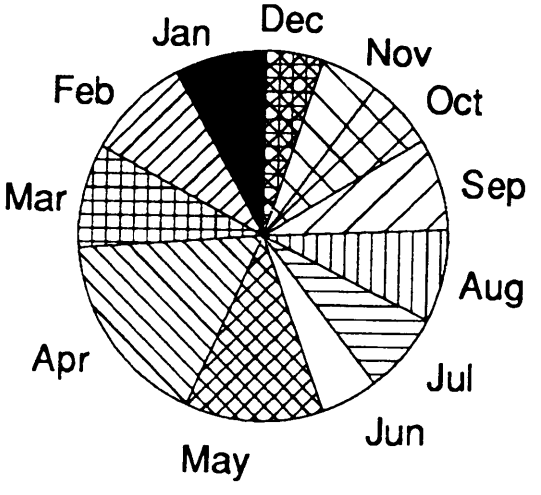
1624



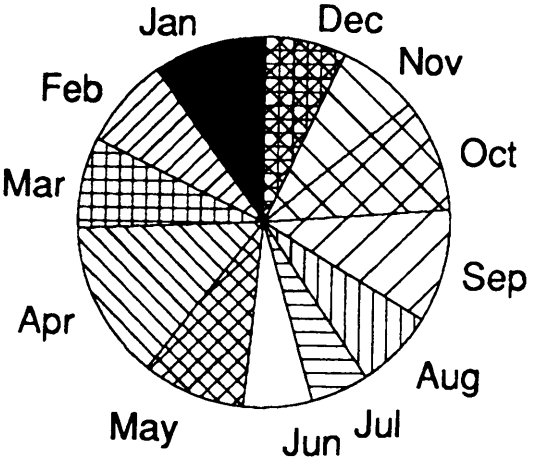
1626



1638



1639



All Crisis Years

Seasonality of burials

Another approach to the evaluation of epidemic disease as a cause of high mortality is to examine the seasonality of the burials since there is evidence that at least some of the major killer diseases showed a seasonal variation. Creighton has established that plague deaths increased from late summer into autumn; typhus as a winter/spring illness; dysentery summer/autumn; ague in either autumn or spring; and smallpox at various times through the year.[12] However, there are some additional points to be considered. Contrary to Creighton's suggestion dysentery is now considered to have a higher incidence in the winter months. Respiratory infections end in death when secondary pneumonia supervenes, usually in the winter; and epidemic smallpox may also show a winter peak. As Bradley points out, this final feature is unlikely to be present in the small parishes,[13] but could have some effect in a parish the size of Cuckfield, with an estimated population in our period of approximately 1,300. Infants were particularly susceptible to gastro-intestinal diseases in hot weather, rather than during the winter.

In order to test this disease seasonality pattern against the local mortality experience, the monthly distribution of burials for these years plus all five years combined, are displayed in Figure 2 and, in summary, suggest the following:

In 1612: there is a winter peak, possible respiratory disease, a slight peak in April, an early summer trough gradually rising to a small peak in September, though probably of insufficient size to represent any of the more virulent epidemics, returning to a calm last quarter.

In 1624: an April peak (possible influenza, but equally likely to be subsistence, to be discussed later in connection with food prices), a summer trough, a sharp rise and fall in October and November, but this may be too short a peak to indicate any epidemic, followed by early signs of a winter peak.

In 1626: there is nothing of significance until October, when the peak is again over too quickly.

In 1638: a summer trough of varying depth separates small peaks in April and September.

In 1639: one significant peak occurs in April, otherwise a calm monthly pattern.

In summary, the fragementary evidence linking epidemic disease and local mortality figures is inconclusive.

The availability of food

Turning now to the possible effects of food shortages, as indicated by market prices, it is important to remember that wheat was the main saleable crop of Sussex in the seventeenth century, and was subject to frequent and rapid fluctuations, particularly as poor communications prevented the establishment

of a stabilising national market. Local corn markets had been in existence at both Cuckfield and Ditchling since 1313, while eight miles away at Lewes cattle as well as corn were sold. No records have been found relating to any of the parishes under study, but wheat from the estates of the Roberts (Ticehurst) and Pelham (Laughton) families was sold at Cranbrook and Lewes respectively, the accounts for these two estates covering the period from 1618 to beyond 1640.[14]

The wheat prices taken from these account records have been plotted against the annual totals of burials for all the thirteen parishes (Figure 1). Unfortunately this exercise presents rather a confused picture, with no apparent correlation between prices and burials. Further confirmation of the lack of correlation is obtained when correlation coefficients are calculated, (Prices/burials: coefficient -0.152; Prices/burials lagged one year, 0.114). These figures make it abundantly clear that no correlation existed between food prices and mortality. In comparison, in his analysis of the effects of harvests on mortality in Exeter, Chambers argues that correlation coefficients somewhat greater than these indicate epidemic disease rather than food shortage to be the chief factor.[15] However, the combination of end of winter food shortages and infectious disease may account for the consistently high April mortality figures referred to earlier.

Contemporary accounts, infant deaths and decline in conception

Moving to the remaining criteria for famines sketched out by Appleby, contemporary accounts of dearth are fragmentary in the area. The harvest of 1621 was poor enough, as recorded in the Acts of the Privy Council,[16] for the government to be concerned over supplies for London by March 1622. Cornwall quotes the Roberts' accounts as evidence of the complete failure of the harvests of 1629 and 1631;[17] while Evelyn in 1631 refers to 'an extraordinary dearth, corne bearing an excessive price'.[18] Otherwise there is no evidence to be had for Sussex which would compare with the comments found in the detailed parish register of Greystoke in Cumbria. This, however, comes as no surprise since Laslett comments that 'twenty years of search has failed to add another Greystoke to our knowledge'.[19]

Efforts to identify a high percentage of deaths among infants and the economically marginal have been frustrated by there being insufficient detail in most of the thirteen registers to enable analysis of this factor to be undertaken. However, the largest parish, Cuckfield, seems to have had fairly meticulous recorders. On isolated occasions reference is made to 'wanderers', while child deaths are noted with sufficient regularity for the inference to be drawn that this matter was dealt with carefully. Selecting years of higher mortality, the percentages of child deaths are set out in Table 3. Of these, 1612, 1616, 1630, 1638 and 1639 all showed child death percentages above average (1626 looks suspiciously like a lapse in attentive recording), but this is by no means proof that subsistence crises were the sole causes.

Table 3 Child deaths in Cuckfield, Sussex: crisis years, 1612-1639.

Year	Percentage
1612	50
1616	51
1620	36
1624	23
1626	6
1630	43
1637	21
1638	50
1639	41

In order to assess evidence of fewer conceptions, the frequency of baptism entries in the parish registers of the thirteen parishes were plotted (see Figure 1). Ideally, the entries should be converted into estimated conception dates, but it was felt that broad comparisons between food prices and births could be made if the births are 'lagged' by one year. Reference to Figure 1 shows a picture just as confused as that for burials. In this case, however, the one-year lagged correlation coefficient of 0.59 does indicate a statistical significance at above the 99 per cent level (N=22, the number of years for which food prices were available). This finding reinforces other evidence that the link between fertility and prices is stronger than that between mortality and prices.[20]

Lastly, for the five years under special review there is no evidence of good harvests. In fact, in three years there is circumstantial evidence to the contrary. Gras has identified 1612 as a year of high wheat prices,[21] and equally the Roberts' accounts indicate the same for 1624 and 1626, although not the highest for the whole series. In 1638 and 1639, while prices had not returned to the low levels of twenty years earlier, the market evidence clearly does not support a suggestion of subsistence crises.

Conclusion

A few conclusions may be drawn from this investigation. First, there is no statistical correlation between food shortages, as indicated by price rises, and mortality figures. A possible connection may lie in the spring and autumn peaks, but this interpretation must be guarded in view of the interaction of disease. On the other hand there is evidence of a lower rate of conceptions, a Malthusian 'preventive check' response to food shortages. The relationship of burials to baptisms also shows a response to crisis: in the years 1613, 1626/7 and 1638-40 more burials than births were recorded, as a result of which the total population probably declined slightly during the period, but there is insufficient evidence to demonstrate conclusively the cause of this decline.

NOTES

1. J. Thirsk (ed), **The agrarian history of England and Wales**, Volume IV, Cambridge, 1967, pp.55-9.
2. C.E. Brent, 'Devastating epidemics in the countryside of eastern Sussex between the harvest years 1558 and 1640', **Local Population Studies**, 14, 1974, pp.42-8.
3. M.J. Dobson, 'A chronology of epidemic disease and mortality in southeast England, 1601-1800', **Historical Geography Research Series**, 19, 1987, pp.23, 25.
4. M. Long and M. Pickles, 'An enquiry into mortality in some mid-Wharfedale parishes in 1623', **Local Population Studies**, 37, 1986, pp.19-35.
5. A.B. Appleby, **Famine in Tudor and Stuart England**, Stanford University Press, 1978, pp.116-8.
6. E.A. Wrigley and R.S. Schofield, **The population history of England 1541-1871: a reconstruction**, Cambridge, 1981, p.332. When discussing the incidence of crises among the 404 parishes they used a flexible ratio linked to the variability of each parish's burial series.
7. R.S. Schofield, 'Crisis mortality', in M. Drake (ed), **Population studies from parish registers**, Matlock, 1982, pp.97-108.
8. D. Turner, 'Crisis mortality in nine Sussex parishes', in Drake, **Population studies**, p.109.
9. C. Creighton, **A history of epidemics in Britain**, London, 1965, p.524.
10. J. Evelyn, **Diary**, edited by W. Bray, 1827, p.7.
11. Creighton, **History of epidemics**, pp.464-5, 505-44.
12. Creighton, **History of epidemics**, p.494.
13. L. Bradley, 'An enquiry into seasonality in baptisms, marriages and burials, Part 3: burial seasonality', in M. Drake (ed), **Population studies from parish registers**, Matlock, 1982, pp.85-96.
14. J.K.C. Cornwall, 'The agrarian history of Sussex 1560-1640', an unpublished M.A. Thesis, London University, 1953, pp.435-6.
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16. **Acts of the Privy Council, 1621-3**, p.164.
17. Cornwall, 'Agrarian history'.
18. J. Evelyn, **Diary**, p.9.
19. P. Laslett, **The world we have lost - further explored**, London, 3rd edition 1983, p.135.
20. P. Galloway, 'Basic patterns in annual variations in fertility, nuptiality, mortality and prices in pre-industrial Europe', **Population Studies**, 42, 1988, pp.275-303.
21. N. Gras, **The evolution of the English corn market**, Cambridge, Massachusetts, 1915, p.336.

APPENDIX

Frequency of burials in the thirteen parishes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	Total
1606	2	5	5	23	6	12	0	2	2	0	4*	9	4	74
1607	3	5	3	25	3	11	8	3	2	0	3	9	4*	79
1608	3	3	5	36	6	15	7	3	7	2	5	9	3	104
1609	5	3	5*	37	5	17	7	3	2	3	4	3	3	97
1610	2	7	5	39	18	18	7*	4	4	3	4	7	3	124
1611	4*	1	3	47	11	19	8	3	4*	0	4	16	5	124
1612	2	21	6	58	14	10	9	1	3	4	7	10	10	155
1613	4	14	6	53	6	16	6	3	6	5	2	8	7	136
1614	6	16	6	43	8	13*	3	3	4	2	3	8	4	119
1615	12	13	6	46	14	18	9	1	3	1	6	10	4	143
1616	5	9	4	45	10	28	10	4	6	3	5	12	3	144
1617	10	9	2	35	15	23	11	0	5	2	15	10	2	139
1618	4	5	5	26	2	12	5	4	4	1	4	4	2	78
1619	5	2	7	27	5	10	4	1	1	2	5	7	3	79
1620	5*	6	2	44	10	15	21	1	3	2	4	6	3	122
1621	5	5	5	27	14	9	3	0	2	1	3	2	2	78
1622	2	3	4	28	8	16	4	0	4	3	1	5	1	79
1623	3	11	3	33	11	7	3	2	3	2	4	7	4	93
1624	1	13	5	52	11	22	8	1	2	3	7	6	5	136
1625	2	8	5	42	8	13	5	2	0	0	2	9	5	101
1626	4	11	6	52	23	22	8	1	2	3	2	11	5	150
1627	5	9	9	42	17	18	5	2	4	1	5	9	8	134
1628	3	11	1	51	15	9	2	2	1	1	1	7	4	108
1629	4	3	4	40	11	6	6	4	1	1	4	5	4	93
1630	11	2	9	30	9	21	6	3	3	5	3	6	3	121
1631	7	6	10	25	23	14	5	3	3	4	5	3	1	116
1632	7	2	7	30	15	20	5	3	3	2	2	12	5	113
1633	3	5	4	39	21	14	6	1	2	1	0	5	5	106
1634	2	2	3	34	20	17	7	0	3	2	3	12	3	108
1635	4	4	5	34	8	8	9	1	1	1	3	19	2	99
1636	2	4	6	29	20	21	7	3	1	1	3	10	5	112
1637	5	7	4	30	9	11	7	1	2	2	3	6	5	92
1638	5*	8	10	63	20	17	5	3	4	3*	6	24	7	175
1639	5	13	10	58	26	21	18	2	2	6	3	17	5	186
1640	5	8	7	53	25	6	9	3	2	6	2	19	5	150

Frequency of baptisms in the thirteen parishes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	Total
1606	4	10	6	45	5	15*	0	2	3	5	5	9	11	120
1607	5	4	11	35	12	13	6	3	4	3	5	9*	7*	117
1608	5	11	5	46	10	15	6*	3	2	5	4	9	4	125
1609	2	10	5	48	9	11	6	4	8	4	7	12	7	133
1610	3	13	5	38	15	9	6	3	4	4	2	6	7	115
1611	4*	9	5	53	10	19	9	2	4*	4	3	12	7	141
1612	2	6	5	39	10	17	5	2	3	3	2	6	7	107
1613	6	6	2	27	5	12	3	1	4	3	3	5	3	82
1614	2	7	5	50	7	13	4	3	4	2	7	6	6	122
1615	3	19	3	56	11	18	10	1	4	2	8	11	7	157
1616	4	13	5	41	11	13	9	3	4	3	4	7	4	121
1617	2	3	4	49	8	19	7	5	3	5	3	8	4	120
1618	2	7	7	38	5	12	9	2	4	5	4	4	8	107
1619	5	9	5	22	11	16	14	3	6	5	5*	10*	7	118
1620	5*	14	10	55	15	22	6	5	3*	3	9	12	6	165
1621	6	12	6	15	14	16	13	3	3	4	7	15	11	125
1622	11	9	10	39	24	27	3	3	3	5	6	13	8	161
1623	4	19	11	37	21	27	9	1	1	3	4	10	10	157
1624	7	11	8	59	17	16	4	6	4	3	2	12	4	153
1625	9	12*	3	50	11	19	6	3	4	1	2	10	6	134
1626	4	12	10	45	10	17	6	5	2	3	4	11	5	134
1627	6	8	5	42	15	24	4	4*	1	2	4	5	3	123
1628	6	8	4	45	21	23	9	4	2	2	1	1	6	152
1629	4	11	8	50	12	21	12	3	1	5	7	8	5	147
1630	3	11	6	42	20	22	9	1	0	2	3	11	7	133
1631	4	11	9	31	17	15	4	1	4	6	2	10	5	118
1632	3	15	9	54	17	19	7	4	5	3	6	11	5	159
1633	2	0	5	45	13	19	10	1	2	3	4	11	4	127
1634	6	13	7	40	16	21	10	1	2	0	4	10	7	137
1635	5	15	7	44	18	20	9	1	2	1	7	8	5	142
1636	5	7	10	49	14	19	10	4	2	5	3	11	7	146
1637	0	12	7	42	15	20	16	4	2	2	6	12	5	143
1638	4	7	9	44	21	9	7	3	0	3*	5	14	9	125
1639	4	10	5	38	8	12	5	3*	2	4	2	16	4	113
1640	4	10	7*	23	16	12	6	3	2	2	2	7	1	96

Notes: Parishes: 1 = Albourne; 2 = Bolney; 3 = Clayton; 4 = Cuckfield; 5 = Ditchling; 6 = Hurstpierpoint; 7 = Keymer; 8 = Newtimber; 9 = Poynings; 10 = Pyecombe; 11 = Twineham; 12 = Wivelsfield; 13 = Woodmancote.
* = interpolated estimate derived from 11 year moving averages.

Source: 1606-18, 1620-40 Bishops transcripts) West Sussex
1619 Parish registers) Record Office