

From the *Transactions* of the
Bristol and Gloucestershire Archaeological Society

Malaria in Medieval Gloucestershire: an Essay in Epidemiology

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1983, Vol. 101, 111-122

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Malaria in Medieval Gloucestershire: An Essay in Epidemiology

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MALARIA IS A DISEASE we usually associate with foreign travel but which formerly affected a number of English regions. A recent article by M. Dobson has drawn attention to the existence of English malaria between the 16th and the 19th century, using parish registers and other contemporary sources.¹ In the present article I shall argue that the peasants of Thornbury manor in Gloucestershire suffered an epidemic in the second quarter of the 14th century of a disease which was very probably malaria, and that malaria was probably endemic in Thornbury and in other Severnside parishes over a long period.

The chief documentary sources for late medieval Thornbury are the long series of manorial court rolls preserved at the Staffordshire and Gloucestershire Record Offices: this article draws upon the earliest surviving rolls, which cover the period October 1328 to June 1352.² These provide a great deal of information on many aspects of the lives of local people, though one of the most useful statistical features is their record of deaths. Like much demographic evidence from the Middle Ages, these records of deaths have their shortcomings and by no means cover the entire population; those of free tenants and women were under-recorded, and no record at all was kept of children's deaths. The great majority of deaths which were recorded were those of villein men, and these form a most valuable record.

Deaths were recorded in the court rolls for two principal reasons – because there was the traditional *heriot* or death-duty payment to be collected for the lord of the manor (in Thornbury this was 'the best beast'), and because the transfer of the newly vacant holding to a new tenant had to be undertaken. This explains why there are records of so many villein tenants' deaths, but in Thornbury heriots were also due from landless villeins.³ No clear statement of local custom has been found, but male villeins appear to have become liable to heriot at the age of twelve or shortly afterwards; they seem to have begun to appear in the court rolls at about this age when, for example, they would be amerced for minor offences, and there are a number of cases in which the only reference to a male villein in the rolls was the record of his death and heriot.⁴ (For this reason I have used the phrase 'villein men' to mean male villeins from about the age of twelve upwards.)

We have records of many deaths of male villeins from about the age of twelve upwards, and these form a very good sample of the male villein population. It is unlikely that the deaths of all

1. M. Dobson, "Marsh Fever" – the geography of malaria in England', *Journal of Historical Geography*, VI (1980), 357–89.
2. Staffs. R.O., D 641/1/4C/1(i)–2.
3. To be strictly accurate these villeins 'held nothing of the lord': the full phrase is used only in the earliest court rolls and it is possible that some were sub-tenants: P.A. Franklin, 'Thornbury Manor in the Age of the Black Death: Peasant Society, Land-holding and Agriculture in Gloucestershire, 1328–1352', unpub. Univ. of Birmingham Ph.D. thesis, 1982 (hereafter referred to as 'Thesis'), 134.
4. Thesis, 149–53.

such people were recorded but there is no group which is obviously omitted: the sample includes tenants of from 2 acres to nearly 100 acres, and many landless men.

The numbers of villein men's deaths each year during the period 1328–1349 have been set out in Table 1. (For convenience the medieval practice of counting each year from Michaelmas to Michaelmas has been followed.) It will be seen that annual numbers of deaths were low and fairly steady except in two years. There were generally between four and eight deaths per year, the annual pre-plague mean (making allowance for missing rolls) being 6 $\frac{2}{3}$. Fewer than four deaths were recorded only in 1332–33, a year from which two court rolls are missing, and more than eight only in 1333–34 and 1348–49. The enormous casualties of the latter year clearly mark the impact of the Black Death sweeping up the Vale of Berkeley from Bristol, but what happened in 1333–34 to cause more than twice as many deaths as in any other pre-plague year?

Table 1 Recorded Deaths of Male Villeins on Thornbury Manor, 1328–1349

<i>Year</i>	<i>Death of Male Tenants</i>	<i>Deaths of Landless Men</i>	<i>Total Deaths of Male Villeins</i>
1328–29	5	1	6
1329–30**	3	1	4
1330–31	–	–	–
1331–32	5	2	7
1332–33**	1	1	2
1333–34*	13	4	17
1334–35	4	2	6
1335–36	4	1	5
1336–37	–	–	–
1337–38	3	5	8
1338–39	2	3	5
1339–40	–	–	–
1340–41	–	–	–
1341–42	4	0	4
1342–43	–	–	–
1343–44	6	1	7
1344–45	5	3	8
1345–46	4	2	6
1346–47	2	2	4
1347–48	3	3	6
1348–49	94	69	163
	158	100	258

* = record of 1 court session missing for that year

** = records of 2 court sessions missing for that year

– = all records missing

N.B. 3 deaths of villeins living outside the manor have been excluded.

A seminal article by M.M. Postan and J.Z. Titow has drawn attention to the agrarian crisis on the bishop of Winchester's estates during this period. The presence of famine or epidemic disease may be suspected there on many occasions before the plague.⁵ Those estates, mainly in

5. M.M. Postan and J.Z. Titow, 'Heriots and Prices on Winchester Manors', *Econ. Hist. Rev.*, 2nd ser., XI (1959), 400, graph 1 inter 410 & 411.

Hampshire, certainly experienced recurrent crises, and the *Nonarum Inquisitiones* records of 1342 show much arable land out of cultivation in a number of areas from the North Riding of Yorkshire to as far south as Sussex.⁶ Parts of the English economy were certainly in difficulties, but we would hesitate before concluding that this was the case for the whole country: the Thornbury evidence reflects a very different situation. The trend of deaths there points to an isolated disaster in a single year rather than a period of recurrent crises; the evidence, indeed, provides striking support for the great regional diversity of medieval England, for the Hampshire famines seem to have had no effect on this part of Gloucestershire.

The dramatic upsurge in deaths at Thornbury in 1333–34 must mark the effects of an isolated famine or outbreak of disease. Few people die of starvation alone⁷ so the question should really be whether crop failure weakened the population and malnutrition made them a prey to illness or whether with no such weakening they were overtaken by disease.

There is no direct evidence for yields on peasants' holdings but the yields of crops on the manorial demesne can be worked out from the account rolls of the 1330s. These reveal that the harvest of 1333 was quite average. Wheat, the most important crop, gave a return of 3.56 times the quantity sown (or 7.5 bushels per acre) – 4 per cent above the mean yield in the late 1320s and the 1330s. Oats yields were a little below average at 2.71 times the quantity sown (10.9 bushels per acre) – just 2 per cent below the mean. Barley gave returns of 5.66 times the seed sown (18.8 bushels per acre) or 6 per cent above the mean; its yields were by far the best of any demesne crop over this period. Yields for pulses, beans and peas, were 2.48 times the seed sown (7.6 bushels per acre) – 3 per cent below the mean.⁸

The harvest of 1333 was, therefore, quite ordinary, with wheat and barley yields above average and oats and pulses a little below. It seems most unlikely that the yields of peasants' crops could have been poor enough to cause a famine.

Analysis of the deaths of villein men in 1333–34 is in agreement with this. Had the unusually high number of deaths resulted from famine or from illnesses following from malnutrition we should expect the poorest part of the population to have been the most severely affected, with many landless men and smallholders among the dead but hardly any of the rich or middling peasants who would surely have had larger reserves of cash and grain. In fact the proportion of the dead male villeins who were landless was only $\frac{5}{17}$ or 29.4 per cent: far below the 42.7 per cent recorded in the year of the Black Death. The proportion of casualties who were rich peasants, that is those holding a full virgate or more, was $\frac{3}{17}$ or 17.6 per cent in 1333–34, which bears comparison with the 19.3 per cent of the plague year.

These figures surely reflect some kind of epidemic. Deaths of villein men in this began to be recorded at the court of 6 November 1333, when there were four,⁹ but though such deaths provide the best evidence for the course of the outbreak they appear to be misleading about its start; the deaths of a villein woman and a free man were recorded at the court of 9 October 1333, and that of another villein woman at the preceding court on 14 September (i.e., the last court of the year 1332–33). On the whole, deaths from this outbreak appear to have begun in September or early October rather than after this.

After the four deaths of villein men recorded in November, two or three such deaths were

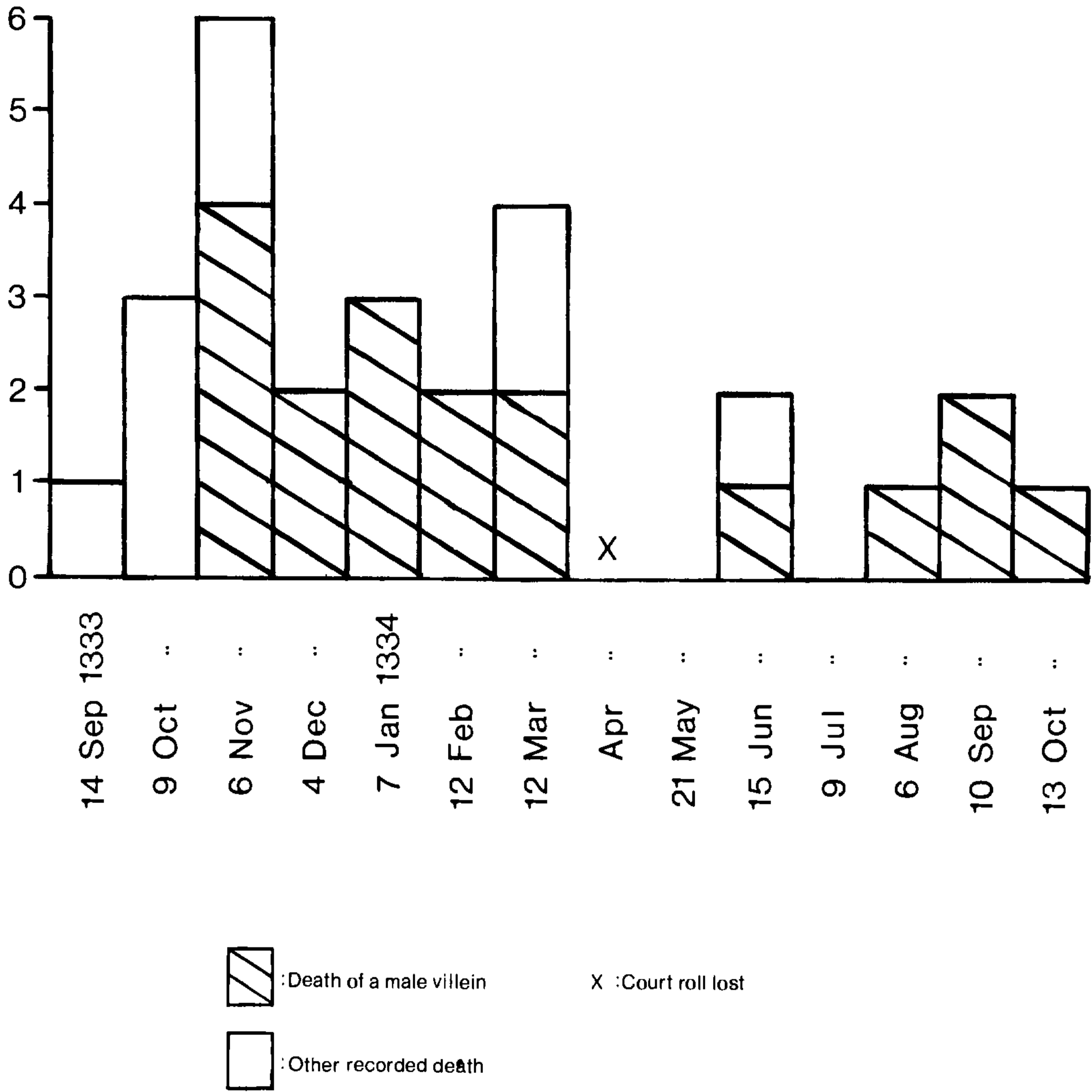
6. A.R.H. Baker, 'Evidence in the "Nonarum Inquisitiones" of Contracting Arable Lands in England during the Early Fourteenth Century', *Econ. Hist. Rev.*, 2nd ser., XIX (1966), 519, 521, 522 fig. 1.

7. Postan and Titow, 403.

8. Thesis, 249 table 7.7.

9. Court sessions were dated by regnal years and often by feast days: these have been converted to day, month and year A.D.

Deaths



N.B. Deaths were recorded promptly; there was an unusual delay in recording one villein woman's death, which is omitted.

FIG. 1 Numbers of deaths recorded at each manor court session, Summer 1333 to Autumn 1334

recorded at each of the following four courts (held monthly at this time) but after March 1334 there came a break. Subsequently one male villein death was recorded on 15 June and another on 6 August, then two at the last court of the year, held on 10 September 1334.

Although both villein women's and free tenants' deaths were considerably under-represented, the recording of three villein women's deaths in the autumn of 1333 – a mean 3.9 were recorded each year from 1328 to 1340 – and of two free tenants' deaths at the same time – only eight were recorded from 1328 to 1340 – reflects the importance of the epidemic. So do the deaths of two Thornbury burgesses recorded (most unusually) in the court rolls of this year because they held small holdings in the manor.

Several of the 17 villein men's deaths would have occurred in a normal year, though it is likely that some of the people who were already ill or aged and 'would have died anyway that year' had fallen victims to the epidemic and died of that.¹⁰ One factor which suggests which of the deceased were more probably victims of the epidemic is the very disproportionate distribution of deaths among the four tithings of the manor.

Thornbury manor was divided into four tithings named after the main villages: Oldbury, Morton, Kington and Falfield. (*Oldbury* tithing was sometimes known as the *Marsh* tithing, and *Kington* tithing as *Thornbury* tithing.) Tax records suggest that the first three were about equal in population, with Falfield considerably smaller. The 1327 subsidy assessed Oldbury as the largest settlement, with 26 taxpayers paying 38s. 3d.; the subsidy of 1334 rated Morton the highest, at £2 13s. 4d., with Oldbury second.¹¹ These figures, however, reflect the wealth of the inhabitants rather than their numbers. The 'fixed sums' given to the lord of the manor by the four tithings at the annual view of frankpledge comprised 20s. each from Oldbury, Morton and Kington, and only 6s. 8d. from Falfield, but these had been fixed at some unknown time and do not reflect population size like the payments the bishop of Winchester received from his manor of Taunton.¹² My impression is that Oldbury was the most populous tithing, with Morton and Kington each a little smaller but about the same size as each other; Falfield was certainly the smallest.

The numbers of villein men's deaths recorded for each tithing in 1333–34 were probably as follows:

Oldbury tithing	10 deaths
Morton tithing	4 deaths
Kington tithing	3 deaths
Falfield tithing	0 deaths
	—
Total	17 deaths

These are *probable* figures. Records of deaths did not usually give village or tithing of residence. These can often be established from previous court roll references to an individual, but as the victims of 1333–34 had only appeared in the rolls since October 1328 this information has sometimes had to be taken from records of other members of their families.

10. I should like to record my thanks to Dr C.C. Dyer, Univ. of Birmingham, for raising this point and for suggesting the use of bishops' registers (below).
11. Sir T. Phillipps, *The 1327 Taxation* (Middle Hill Press, n.d.); R.E. Glasscock (ed.), *The Lay Subsidy of 1334* (1975), 101.
12. J.Z. Titow, 'Some Evidence of the Thirteenth-Century Population Increase', *Econ. Hist. Rev.*, 2nd ser., XIV (1961), 218–23.

The epidemic clearly centred on Oldbury: 10 of the 17 dead lived in that tithing, including three of the four whose deaths were recorded on 6 November 1333 and both those recorded at the court of 4 December 1333. Among the Oldbury casualties were two members of the Uphill family, Sebert (also known as Sebert Hill) and Thomas I, both tenants of half virgates. John Saunders I, a smallholder who died at this time, was probably another Oldbury man and it may well be that the death of Edith Saunders recorded 14 September marks the start of the outbreak.

The first death of a villein man in Morton tithing was recorded on 6 November 1333, the others following at the courts of 7 January (two) and 12 February 1334, which suggests an outbreak on a smaller scale. The three deaths from Kington tithing were more widely separated (recorded 12 February, 15 June, and 10 September 1334) and it may be that the disease did not affect a substantial number of people in that tithing. Falfield tithing does not seem to have been affected at all, no deaths being recorded during the whole year.

The epidemic appears to have ended in the spring of 1334, but if this was so the deaths in the late summer of 1334 pose a problem, for two of the casualties were Oldbury men and relatives – Thomas I and William Isaac. Was this just some unconnected illness which affected one family, or had the disease of the previous autumn returned on a smaller scale? If it had, it seems to have caused very few casualties and to have been over quickly, for only one death was noted at the first court of the new year, 1334–35, and in that whole year there were only six.

What was the disease, and over how wide an area might the outbreak have occurred? I have found no record of any national epidemic at this time, though it is only fair to say that relatively little work has been done on the impact of disease before the Black Death. The printed calendar of the Bishop of Worcester's register records few institutions to benefices in late 1333 or early 1334, and only one of these is known to have followed from the death of the previous incumbent,¹³ and no other evidence of a regional outbreak is known. The concentration of deaths in the west of Thornbury parish suggests that this was a local rather than a regional or national epidemic.

Writers of the 17th and 18th centuries had no doubts that parts of the Vale of Berkeley were unhealthy. In his monumental description of the Hundred of Berkeley, John Smith explained how that hundred formed 'three steps or degrees, obvious to every observer: The first from the chanell of Severne halfe way towards the hills, which hath wealth without health'. Thornbury lay in its own hundred and forms no part of Smith's description, but he singled out the manor of Hill which lay beside the river and abutted on the northern boundary of Thornbury as a particularly unhealthy place, for 'through the lowe scituation and bad water it is said to bee, *Hieme mala aestate molesta, numquam bona*; evill in winter, greivous in Soñer, and never good for habitation.'¹⁴

Samuel Rudder, writing almost a century and a half later, gave a detailed description of Thornbury which is worth quoting at length:

A great part of the parish next the Severn is very subject to inundations from that river. Near two thousand acres of land are rated to the repair of the sea walls in the upper level, but a much greater tract is liable to floods, whose waters stagnate on the marshes and low lands. Hence the inhabitants of that part of the parish are very unhealthy from the putrid air they breathe; and if any go from the hill-country to reside there, such persons are usually attacked with a violent ague on their first settling, which emaciates them, and proves fatal in a little time . . . The

13. R.M. Haines, *Calendar of the Register of Adam de Orleton, Bishop of Worcester 1327–1333*, Worcs. Hist. Soc., new ser., X (1979), 218.

14. J. Smith, *The Berkeley Manuscripts III. A Description of the Hundred of Berkeley in the County of Gloucester and of its Inhabitants*, ed. Sir J. Maclean (Gloucester, 1885), 10, 235.

town of Thornbury stands in the midst of the parish, a little above the marshes, but the air there is in some degree contaminated by the stagnated waters on the low lands.¹⁵

This problem was shared by a number of localities beside the Severn where 'the inhabitants are very subject to agues', but Rudder singles out Thornbury for special comment, giving it the longest notice and adding a separate description of the unhealthiness of Oldbury tithing.¹⁶

These writers recognised the problem and put it down to 'bad water' or 'stagnated water' which gave rise to 'contaminated', 'putrid' or 'unwholesome' air. Breathing this air was believed to give residents an illness often called an 'ague', which was especially dangerous to new settlers. In Thornbury itself, most illness was to be found in the lowest part of the parish next to the Severn, but it was also present on the inland side of the marsh in Thornbury town.

The terms used by Smith and Rudder are often those found in descriptions of similar dates of the parts of Kent, Essex and other coastal regions afflicted by a disease commonly called 'ague fever'. This disease 'was so closely associated with the marshlands that it was directly attributed to the vapours and stagnant waters of the marshes',¹⁷ and there is now little doubt that it was native English malaria which gave these districts their characteristic high mortality from at least the 16th century to the 19th.

The mechanism by which malaria was transmitted was only discovered in the 1890s, by which time English malaria was largely a thing of the past. Its workings in England seem to have been quite straightforward; mosquitoes of the species *Anopheles atroparvus* bred in the mildly saline waters of coastal marshes and areas liable to tidal flooding.¹⁸ Their bites transmitted to local people a strain of the disease which is believed to have been *Plasmodium vivax* in recent centuries, which produces relatively low mortality rates, rather than the more dangerous *P. falciparum* found in the tropics.¹⁹

The disease afflicting Thornbury and other coastal parts of the Vale in the 17th and 18th centuries seems to have been malaria, and this region should be added to Dobson's list of probable English malarial zones.²⁰ But is it reasonable to say that the epidemic of 1333–34 was of the same disease, and that there was malaria in medieval Gloucestershire?

The evidence of numbers of deaths recorded suggests that epidemics, whatever the disease, were rare in 14th-century Thornbury. The year 1333–34 was a most unusual one, and we are fortunate to have evidence that what made it so was the long drought of the previous summer. If the disease was malaria, it is easy to see how local conditions and the drought of 1333 enabled it to happen.

The great marsh which lay between the villages of Oldbury and Morton has long been drained and only the extreme flatness of the landscape and the long sea walls on the coast suggest its former existence to the visitor. No medieval document reveals its extent, but by working from a combination of manorial court rolls, account rolls, extents and the evidence of landscape I have estimated the area of the marsh on the eve of the Black Death at c. 2,500 acres, or some four square miles.²¹ This would have covered much of the north-west of the parish, extending from a little south of Oldbury Rhine to the boundary with Hill parish.

15. S. Rudder, *A New History of Gloucestershire* (Cirencester, 1779), 749–50.

16. *Ibid.*, 27, 755.

17. Dobson, 371, 357.

18. G. Macdonald, *The Epidemiology and Control of Malaria* (Oxford, 1957), 72.

19. Dobson, 375.

20. *Ibid.*, 377.

21. Thesis, 41, table 1.2.

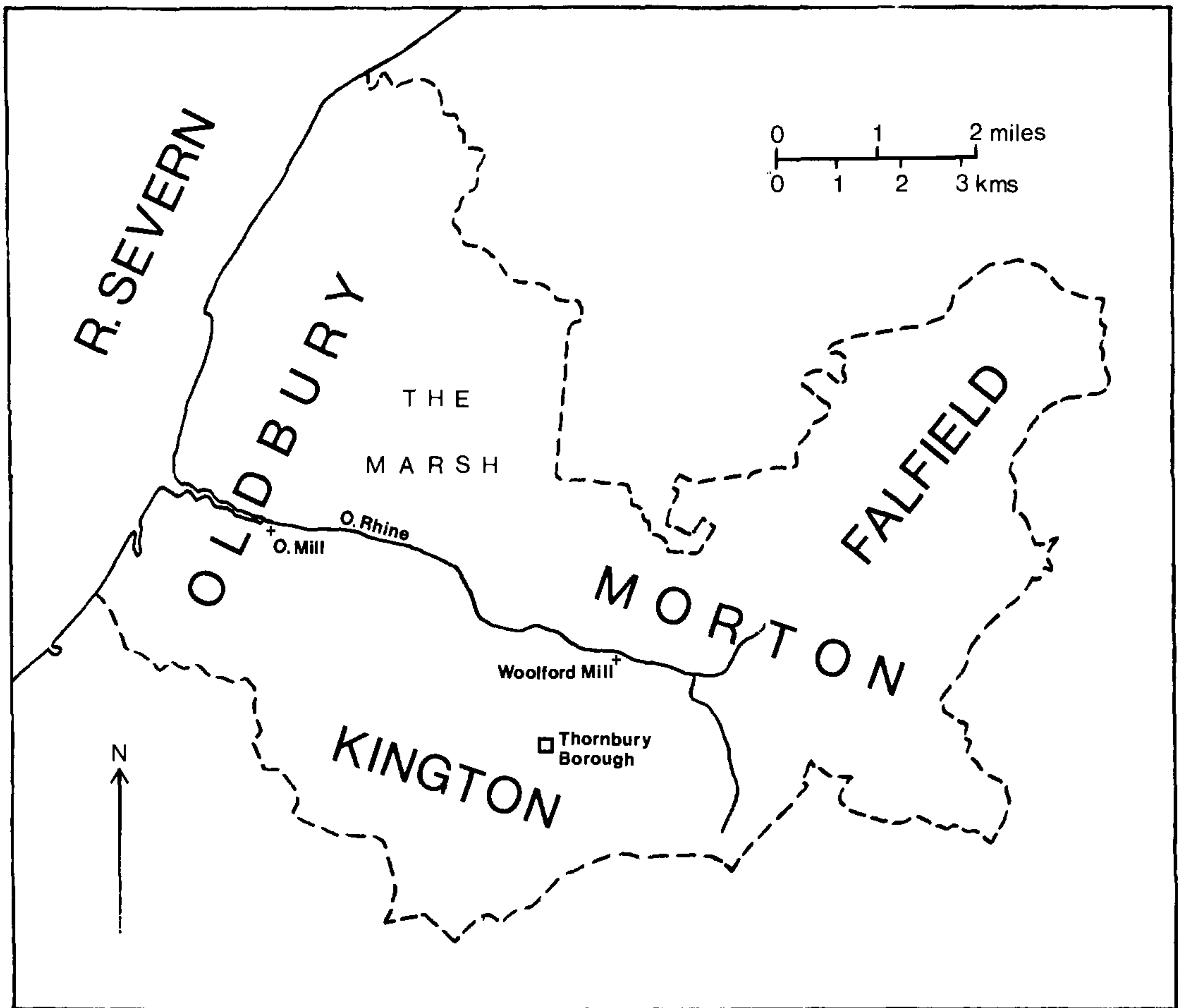


FIG. 2 Thornbury manor and its tithings in the 14th century

(Based on O.S. Map with permission of H.M.S.O., Crown copyright reserved)

Much can be deduced about the condition of this marsh at that time. Had it been well-drained it could have provided pasture for flocks and herds of considerable extent, but Thornbury agriculture had the strong bias towards grain production typical of the Severn Vale.²² Few animals were kept beyond the draught-animals needed in such an economy. Even rich peasants' sheep are only known (from trespass cases) to have been numbered in dozens, while no peasant is known to have kept more than three or four cows. Demesne agriculture followed a very similar pattern.

Although the estate covered about 17 square miles²³ and flocks and herds were small, pasture was in short supply: so much so that the pasturing of other livestock had to be controlled in order

22. *Ibid.*, 261.

23. *Ibid.*, 20.

to secure enough for the draught-animals which had first priority. The four bye-laws which survive from the second quarter of the 14th century all concern the regulation of grazing and two were aimed specifically at sheep. Sheep were not allowed to graze on the stubble under a penalty of 2s. (recorded in the 2 September 1338 court roll), or to depasture meadows or stubble before All Saints (29 September 1344). Anyone responsible for depasturing the pasture at *Leigarste* or *Denmor* (?) was to pay 40d. (2 September 1338). No one was to enter the meadows of *Hammes* or *Newebrech* (16 August 1347) until an unspecified date.

The main reason why large flocks and herds could not be kept on the marsh was that it was extremely wet because of its role as a reservoir providing power for Oldbury Mill. This 'New Mill', as it was often called in the 14th century, stood near the end of Oldbury Rhine and the gently flowing rhine could not in ordinary circumstances have provided it with much power. This was probably the 'new mill' recorded in *Domesday Book*²⁴ and said there to be worth only 8d. per year. Its low value suggests that in the 11th century it was not operating as a tidal mill, but by the late 1320s it certainly was, for it was let at farm to a tenant for £7 10s. per year. A case from the court roll of 4 November 1351 provides indirect evidence of this, for the Oldbury tithingman presented that because of the failure of three tenants to repair ditches as they ought, 'sea water floods the lord's lands and other tenants'. The reference to sea water must mean that at high tides water from the Severn was allowed to flow back up the rhine into the marsh and the drainage ditches. Ordinarily no harm would have been done to agricultural land, but some ditches had now overflowed through lack of maintenance.

The mill was worked in the same way in later centuries, hence John Leland's description of the rhine in Thornbury Park as 'an Armlet of Severne ebbynge and flowyng', but the millers sometimes let in too much water and flooded tenants' land.²⁵ In the 14th century no problem seems to have appeared until after the Black Death.

I suggest that this large wet marsh was the breeding-place for malaria-carrying mosquitoes in the 14th century and in the 17th and 18th centuries, and that 1333–34 was a most unusual year because the weather of the previous summer had led to a great increase in the numbers of mosquitoes. The impact of English malaria could be considerably increased by unusual weather conditions: in particular, drought could increase the numbers of stagnant pools in marshes and extend the mosquitoes' breeding grounds. Dobson has shown from the parish registers of Bradwell-on-Sea, Essex, how the numbers of burials recorded rose after dry summers.²⁶ In modern tropical outbreaks this phenomenon has been observed on a much more spectacular scale, notably in the great Ceylonese epidemic of 1934–35. The northern part of the island was highly malarious, but south-west Ceylon was relatively free from the disease. In 1934, however, the south-west monsoon failed: crops failed and rivers dried up, producing many pools in which a plague of mosquitoes bred. About half the total population was infected with malaria, and although case mortality was only about 3 per cent this resulted in some 80,000 deaths.²⁷

The outbreak of epidemic disease in 1333 followed the only summer in the two decades before the Black Death when there is evidence for a drought in Thornbury. The 1332–33 account roll²⁸ states that Woolford Mill was unable to grind 'from Easter to St. Luke the Evangelist', that is from early April 1333 (4 April if Easter Day itself was meant) to 18 October. This mill depended for its power on a stream which had apparently dried up. (It had done so again in the summer of

24. A. Farley (ed.), *Domesday Book* (1783), I, f. 136b.

25. L. Toulmin Smith (ed.), *Leland's Itinerary in England and Wales* (1907–10), V, 100.

26. Dobson, 378.

27. Sir M. Burnet and D.O. White, *Natural History of Infectious Disease* (4th edn., Cambridge, 1972), 235–6.

28. Staffs. R.O., D 641/1/2/121.

1976 when I first visited the site. The outline of the mill pond at O.S. Nat. Grid ST 644911 can still be clearly seen.) There is no evidence in the account roll that the working of tidal Oldbury Mill had been seriously impaired, but with little or no fresh water flowing in on its eastern side parts of the marsh may well have formed shallow pools of saline water, providing extensive breeding grounds for mosquitoes. In this way the drought precipitated an outbreak in the autumn of 1333 which was most severe in Oldbury, probably on a smaller scale in Morton, and may also have affected Thornbury borough.

Modern studies of malaria also suggest an explanation for a curious feature of the medieval evidence – the apparent small second outbreak in August-September 1334 when there is no evidence of unusual weather conditions. Cases have been observed in 20th-century Holland in which the disease had an extremely long incubation period, illness in the summer following from bites the previous winter.²⁹

Thus it seems very plausible that the inhabitants of the western part of Thornbury parish around Oldbury marsh suffered an epidemic of malaria in the autumn of 1333 and the early part of 1334, and that as a result of this there may have been further deaths the following autumn. Despite the survival of detailed records, the numbers of people who died of the disease cannot be calculated with any real accuracy. To make a rough estimate: if it can be assumed that about three-quarters of recorded villein men's deaths were from malaria and allowances are made for the under-recorded deaths of women and of free peasants, then the total number of adults who died in Thornbury manor in the epidemic was perhaps about 30. (There is too little evidence to make speculation about deaths in Thornbury borough worthwhile.) The number of adults infected could have run into hundreds, but given that the total adult population of the manor on the eve of the Black Death was only about 600³⁰ (and it was probably not very different in 1333), of whom those living in Kington and Falfield tithings and many of those in Morton tithing would not have been affected by the disease, the maximum number of adults who could have caught malaria was perhaps between one-half and two-thirds of this figure.

We cannot even guess how many children might have caught the disease or died of it during that epidemic, but the question of children's deaths from malaria is of great importance in that it leads us to consider the wider consequences of the disease being endemic in the Vale.

There may be another analogy here with the situation in some modern malarial regions. Studies in Ceylon and Africa have shown that the dangers of death from malaria can be very different for children and adults in the same population. In highly infected regions such as northern Ceylon large numbers died in infancy and childhood either from malaria alone or from its effects when combined with malnutrition or other infections. In some African regions a very high infant death-rate from the disease has also been observed. Those who survived the infection in childhood, however, acquired a considerable degree of immunity: if they remained well-fed as adults they could remain very healthy unless attacked by an unusually active strain of the disease or made vulnerable to it by failure of the food supply.³¹

I believe that a similar situation was to be found in later medieval Thornbury, but there is an unfortunate lack of the direct evidence which would allow this point to be definitely proved or disproved; children below the age of 12 did appear in the court rolls on exceptional occasions – as *essoins* for example³² – but as they were not liable to payment of the heriot due from landless

29. Burnet and White, 237.

30. Thesis, 87–8.

31. Burnet and White, 235.

32. Thesis, 153.

villeins and were too young to be tenants their deaths were never recorded. There can be no *direct* evidence of high infant and child mortality, but this could well have been one cause contributing to the low level of population in the manor in the long term. The mean figure of $6\frac{2}{3}$ villein men's deaths per year indicates that, unless there was under-recording on a considerable scale, the pre-Black Death population of the manor cannot have been very large, and we have already referred to the estimated total adult population of *c.* 600.

Landscape and land use in the 14th century prove that the estate had been relatively under-populated in the long term. Reclamation in Thornbury had virtually ceased by the late 1320s, leaving some 5,000 acres of parks, additional woodland, heath and marsh – nearly half the estate. The parks were protected against peasant encroachment, but there is very little evidence for any of the rest being assarted in the 20 years before the plague. To give two examples: John Marlwood, a large free tenant, gave 12*d.* at the court of 24 May 1329 to have a waste plot between his gardens 'in the marsh', 18 perches long by 5 perches wide, paying 1*d.* annual rent. John Honybrok gave 12*d.* at the court of 22 April 1342 for a waste plot 40 feet long by 20 feet wide across from Walter Pil's croft.³³ The few assarts known were on this scale.

There must have been little pressure of population for many years but disease was not the sole cause of this. The direct evidence for migration is poor, but it is plain that the manorial authorities had lost control over the movements of villeins and that numbers of them were leaving the manor with no attempts being made to bring them back. Few new settlers can be recognised in the 20 years before the Black Death, and it is very likely that there was net emigration from the manor at this time:³⁴ its unhealthy reputation may indeed have deterred new settlers and helped to speed emigrants on their way.

It may well be that malaria played a much more important part in the demographic history of Thornbury than the isolated epidemic would suggest. If the disease was endemic in the 14th-century Vale it could certainly have played the major role in producing the conditions we have briefly described, while its casualties among the very young would not show up among the recorded deaths.

How extensive was the malarial district in the medieval Vale? Though our direct evidence is drawn only from Thornbury it is very unlikely that the disease was restricted to one parish. No general account earlier than Rudder's deals with this theme. He states that the Severnside parishes in general were recognised as unhealthy, and specifically mentions illness in several parishes from Elmore, just below Gloucester, down as far as Thornbury.³⁵ It is, however, unlikely that his account was comprehensive. For most infected parishes he mentions disease in only a single sentence, giving longer descriptions only for Arlingham and Thornbury. Only three of those where illness was reported were among the many he lists as being subject to floods,³⁶ despite the part tidal flooding played in English malaria.

But plainly there was in Rudder's time a malarial district in the Vale which extended at least from a couple of miles south of Gloucester to the southern boundary of Thornbury parish, which is almost 20 miles as the crow flies. (If it was co-extensive with the areas in danger of flooding then it would have reached several miles further south to include Compton Greenfield and Patchway.) It was apparently a narrow strip of land, its width determined roughly by how far marshland and floods might reach: even in unhealthy Thornbury Rudder makes no mention of

33. *Ibid.*, 41 table 1.2, 266.

34. *Ibid.*, 100–1.

35. Rudder, 27, 232, 437, 439, 456, 534, 749–50, 755.

36. *Ibid.*, 26. This list is taken from Sir R. Atkyns, *The Ancient and Present State of Glostersbire* (2nd edn., 1768), 33, with one change and one addition.

disease east of the Borough which lies only three miles from the river, and the evidence of the 1333–34 epidemic agrees with this.

We would suppose that the malarial district in the 14th century was more extensive than in Rudder's day, and that it was later reduced by the draining of marshes and improvement of sea defences. The wide strip of alluvium which runs along the coast of the Vale from Portishead almost to Berkeley, with additional deposits further north, notably at Arlingham,³⁷ testifies to the great original extent of the marshes but the history of their reclamation has yet to be written and only a brief sketch can be offered here.

In the southern Vale work seems to have begun early: the marsh on the bishop of Worcester's estate at Henbury was probably drained by the late 12th century.³⁸ I have argued elsewhere that the long sea wall at Thornbury was built before the Conquest, which accounts for the substantial value of the manor's pasture (unlike later medieval times) in the Domesday survey.³⁹ If this was so, then reclamation had begun very early, but it had virtually ceased by 1328 as we have seen. Work was proceeding a few miles south-west of Thornbury: the lord of Elberton tried to improve the drainage of his estate by joining the Old Splott Rhine to Littleton Rhine in 1346, though he had no right to do this and they were disconnected after a legal dispute.⁴⁰ Also in the reign of Edward III Thomas Berkeley III made 'improvements' of 20 and 54 acres out of the waste on Slimbridge Warth, as Smith records.⁴¹

This evidence gives only a general picture of the progress of medieval marsh reclamation in the Vale of Berkeley. It evidently began before that in the Somerset Levels – the nearest region with which it is reasonable to make a comparison, and also the nearest of the possible malarial regions listed by Dobson – but neither can be dated precisely.⁴² It seems to have proceeded much more quickly and comprehensively in the south than in the central Vale around Thornbury; for the Vale north of Slimbridge there is as yet little evidence. Thus it is by no means clear how far the malarial district in the later middle ages may have stretched.

It is unlikely that there will ever be absolute proof that the disease which struck the western part of Thornbury parish in 1333–34 was malaria, or that it was endemic in the Vale of Berkeley in the Middle Ages. This could only be provided by a careful contemporary description of the symptoms of the disease. But if the evidence of later Gloucestershire writers is taken into account and the use of modern evidence from other English regions and from some parts of the tropics accepted, then this solution must be considered very likely.

From Rudder's description it is difficult to accept that the disease afflicting the riverside parishes in his day was anything but malaria, and it takes no great effort of historical imagination to believe that the same disease was active in that district 450 years before. It is not known for how long the English malarial regions of the modern period had been so affected, but there is nothing inherently implausible in the suggestion that they had been so for many centuries. Malaria was certainly known in the classical world.⁴³

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37. G.A. Kellaway and F.B.A. Welch, *British Regional Geology: Bristol and Gloucester District* (2nd edn., 1948), 1 fig. 1, 83.
38. C.C. Dyer, *Lords and Peasants in a Changing Society: the Estates of the Bishopric of Worcester 680–1540* (Cambridge, 1980), 95.
39. Thesis, 26; *Domesday Book*, I, f. 136b.
40. H.P.R. Finberg, *The Gloucestershire Landscape* (1975), 80–1.
41. J. Smith, *The Berkeley Manuscripts. The Lives of the Berkeleys I* ed. Sir J. Maclean (Gloucester, 1883), 307.
42. M. Williams, *The Draining of the Somerset Levels* (Cambridge, 1970), 17; Dobson, 377.
43. Burnet and White, 236; M. Grant, *History of Rome* (1978), 139, 371.