

The technology of medieval sheep farming: some evidence from Crawley, Hampshire, 1208–1349

by Mark Page

Abstract

Sheep farming was a profitable business for the bishops of Winchester before the Black Death. Evidence from the manor of Crawley demonstrates that investment in the management of the flock peaked in the early fourteenth century. Elsewhere on the estate, improvements in the provision of sires, housing, feeding, medicaments and the labour supply have been shown to impact favourably upon fertility and mortality rates. However, this was not the case at Crawley. Instead, this paper confirms Stone's view that productivity was determined by conscious decisions taken by demesne managers and argues that their concern in this period was to raise fleece weights.

The pessimism which for so long pervaded historical writing about the performance of medieval agriculture has now almost entirely evaporated to be replaced by a much greater appreciation of its achievements. In particular, the ability of medieval farmers to feed a population of about six million in England at the beginning of the fourteenth century, of which perhaps 15 or even 20 per cent lived in towns, has been acknowledged to be an impressive demonstration of the effectiveness of agricultural production and distribution at this time.¹ This more optimistic assessment of English agriculture in the century or so before the Black Death of 1348–9 has come about largely as a result of a sustained assault upon the influential ideas of M. M. Postan. The 'Postan Thesis', put briefly, states that as the population grew in the thirteenth century, so grain yields were undermined by an extension of cultivation onto poorer 'marginal soils', and through a reduction in animal numbers and manure supplies as permanent pasture was converted into ploughland.² Furthermore, Postan held that the possibility of technological change in this period was so limited that the likelihood of improving grain yields was still further reduced.³

In more recent years, the work of a number of historians, in particular B. M. S. Campbell, has demonstrated conclusively that, contrary to Postan's belief, grain productivity was raised substantially in various parts of the country in the decades prior to the Black Death.⁴ Moreover, this was achieved in part because of the introduction of new agricultural techniques. Our understanding of agrarian innovation and technological advance has witnessed a considerable

¹ B. M. S. Campbell, *English seigniorial agriculture, 1250–1450* (2000), pp. 20–1.

² M. M. Postan, *The medieval economy and society* (1972), pp. 20–6, 63–70; C. Thornton, 'Efficiency in medieval livestock farming: the fertility and mortality of

herds and flocks at Rimpton, Somerset, 1208–1349', in P. R. Coss and S. D. Lloyd (eds), *Thirteenth-century England IV* (1992), p. 25.

³ Postan, *Medieval economy and society*, p. 49.

⁴ Campbell, *English seigniorial agriculture*, ch. 7.

shift in emphasis over recent years. No longer is it thought necessary to equate technological change with such revolutionary advances as the widespread adoption of the mouldboard plough before the end of the tenth century or the introduction of new fodder crops such as turnips and clover in the sixteenth century. Certainly no such comparable advance occurred during the later Middle Ages. Instead, attention has been focused on 'a host of minor technological adjustments', the individual significance of which was less important than their interaction with other practices in what has been described as the overall 'technological package' or 'complex'.⁵ In the light of this new, more evolutionary model of agrarian innovation, the thirteenth and fourteenth centuries can be regarded as an era of significant progress and development.

Discussions of agricultural technology in the Middle Ages have tended to concentrate on the productivity of arable farming and the methods employed to improve it. Much less attention has been paid to developments in livestock farming and the techniques used to care for the flocks and herds which formed such a vital part of both the demesne and the peasant economy. In part this is a reflection of the dominant role played by arable farming on most of the estates for which records survive in the century or so before the Black Death. In terms of the amount of land under cultivation, the profitability to both large- and small-scale farmers of producing grain for the market, and the importance of those grain sales for the feeding of the population of England, arable husbandry clearly occupied a pre-eminent place in the national economy. By contrast, livestock farming was a sector of much less significance. Even on the estate of the bishopric of Winchester, which, as we shall see, adopted methods of farming certain to raise the profile of livestock, particularly sheep, the profits derived from grain production outstripped all other sources of manorial revenue during the period 1208–1349, rarely falling below 30 per cent of total receipts. By contrast, income from the sale of wool, the single most valuable animal product, hardly ever reached even 10 per cent of total receipts, and was at best only equal to other profits from animal farming.⁶

Another reason for the historiographical tendency to concentrate on the technology of arable farming is that the areas most receptive to innovation were also the areas of most intensive arable production, where livestock husbandry, including sheep farming, was relatively insignificant. Thus, in Norfolk before the Black Death, demesnes consistently stocked sheep at a density per sown acre well below the national average.⁷ In other parts of the country, where more extensive systems of production were practised, sheep farming assumed a role of much greater significance in the manorial economy. This was certainly the case on the estate of the bishopric of Winchester, where, in the early thirteenth century, the sales of cheese and wool were sufficient on some manors to cushion the bishop's need to maximize income in the cereal sector. Instead, the harvested grain was largely consumed by the episcopal household and manorial servants, with relatively little reaching the market.⁸ On these manors the incentive to intensify arable

⁵ *Ibid.*, p. 15; C. Dyer, 'Medieval farming and technology: conclusion', in G. Astill and J. Langdon (eds), *Medieval farming and technology: the impact of agricultural change in northwest Europe* (1997), pp. 293–4.

⁶ J. Z. Titow, 'Land and population on the estates of the bishops of Winchester, 1209–1350' (unpublished PhD thesis, University of Cambridge, 1962), pp. 54, 57.

⁷ Campbell, *English seigniorial agriculture*, pp. 136, 159,

423–4.

⁸ K. Biddick (with C. C. J. H. Bijleveld), 'Agrarian productivity on the estates of the bishopric of Winchester in the early thirteenth century: a managerial perspective', in B. M. S. Campbell and M. Overton (eds), *Land, labour and livestock: historical studies in European agricultural productivity* (1991), p. 120.

production and introduce technological change was much less strong than in areas of high commercial demand for grain or on manors which lay outside the consumption network of the estate. Nevertheless, the bishops of Winchester were able to cultivate their lands profitably, without maximizing grain yields, in a businesslike and flexible manner, and may be expected to have paid particular attention to the management of their sheep flocks, the source of their lucrative supplies of cheese and wool.

I

The technology of medieval sheep farming has received some attention in recent years, most notably in a wide-ranging essay by David Stone on the productivity of sheep farming after the Black Death.⁹ In addition, Christopher Dyer's study of sheepcotes in Gloucestershire emphasized the important role played by these buildings in the careful husbandry of sheep in the Middle Ages. Farmers invested heavily in their construction in order to keep their animals warm, healthy, and well fed.¹⁰ The building of sheepcotes also figures in Christopher Thornton's detailed analysis of livestock farming on the bishop of Winchester's manor of Rimpton in Somerset. Thornton argued that the fertility and mortality of Rimpton's herds and flocks improved markedly over the course of the period 1208–1349 as the result of 'considered investment in new sires, housing, feeding, the labour supply, the management system and administrative change'.¹¹ Rimpton's sheep flock in the thirteenth century was relatively small, comprising about 250 ewes, wethers and young stock. Furthermore, after 1266 the local flock disappeared altogether, the manor's grazings being used instead for sheep brought from other more important sheep-raising manors of the bishopric or leased to the villagers for their flocks.¹² Rimpton may thus not be typical of sheep farming on the bishopric estate, where manorial flocks in excess of 1000 sheep were regularly found on the Hampshire and Wiltshire downlands.

This paper focuses on the bishop's Hampshire manor of Crawley, one of those identified by Biddick as operating a strategy of grain production more influenced by the requirements of consumption than the demands of the market. The manor also intensified its pastoral production during the years 1209–37, at a time when Rimpton increased its arable acreage.¹³ Crawley lies a little under five miles to the north-west of Winchester, on land made up of undulating chalk hills. The medieval manor lacked a natural supply of water, making it ill-suited to the needs of cattle farming but ideal for sheep, which pastured on the grass growing on the downs.¹⁴ Crawley was chosen for study for two main reasons. First, it was one of the largest of the bishop's sheep farming manors, along with Downton and East Knoyle in Wiltshire, and East Meon and Twyford in Hampshire. Secondly, Crawley has been the subject of a classic investigation by N. S. B. and E. C. Gras, who printed some of the figures needed to study the efficiency

⁹ D. Stone, 'The productivity and management of sheep in late medieval England', *AgHR* 51 (2003), pp. 1–22.

¹⁰ C. Dyer, 'Sheepcotes: evidence for medieval sheep-farming', *Medieval Arch.* 39 (1995), pp. 136–64.

¹¹ Thornton, 'Efficiency in medieval livestock farming', p. 43.

¹² *Ibid.*, pp. 31–2.

¹³ Biddick, 'Agrarian productivity', pp. 112–13, 118–19.

¹⁴ N. S. B. and E. C. Gras, *The economic and social history of an English village (Crawley, Hampshire), AD 909–1928* (1930), pp. 4, 40–1; Campbell, *English seigniorial agriculture*, p. 162.

of medieval sheep farming on this manor. Nevertheless, it has been necessary to consult all 100 relevant surviving account rolls for the period 1208–1349 to find further information about the methods employed to manage Crawley's sheep flock.¹⁵

The Winchester pipe rolls provide sufficient data to allow an examination of five areas of policy associated with medieval sheep farming. These are the provision of sires; the construction and maintenance of sheepcotes; the supply of feed to the sheep; the supply of medicaments and veterinary expertise; and the supply of labour devoted to the care and well-being of the flock. It is relatively straightforward to identify change in these practices over time and a decision to innovate or invest in one or all of them may be considered to represent the only form of technology available to the demesne managers. It is more difficult, however, to assess the impact of any such changes on the health or productivity of the sheep. It has been argued that little productivity response has been detected in medieval wool and milk yields because few advances were made, especially before the Black Death, in breeding techniques and levels of nutrition. Instead, farmers were more likely to have an effect on the general health and reproductive capacity of the flock.¹⁶ This may be true, but improvements in the fertility of ewes or the survival rate of lambs may not always have been the priority of the administrators who introduced new methods of managing a manor's sheep. The products of medieval sheep farming were many and varied: wool, milk for making cheese and butter, manure for spreading on the arable fields, meat, and skins. An attempt to improve the yields of milk or wool would not necessarily impact favourably on rates of fertility and mortality. Milking, especially, adversely affected the ability of ewes to breed.¹⁷ The hardest question of all to answer, therefore, is what the demesne managers were hoping to achieve when they made the decision to intervene in the management of the flock.

The principal aim of this paper is to identify changes in the provision of sires, housing, feeding, medicaments and the labour supply dedicated to the care of the sheep flock at Crawley between 1208 and 1349. Any examples of innovation in these practices are related to the fluctuating rates of fertility of the manor's ewes and the mortality of lambs in their first year in an attempt to discern a connection between them. In the absence of any such connection, an alternative explanation is sought for the introduction of new techniques and methods of management. Before entering this discussion, however, it is necessary to establish the size of the sheep flock at Crawley in the 140 years prior to the Black Death and its relationship with the flock on the bishop of Winchester's estate as a whole.

II

Figure 1 reveals that the size of the sheep flock at Crawley showed a tendency to decline over the course of the period 1208–1349, from an average of 1326 sheep under Peter des Roches (1205–38) and 1465 sheep under Aymer de Valence (1250–60) to an average of 974 sheep under John Stratford (1323–33) and 805 sheep under Adam Orleton (1333–45) (Table 1). This reflects

¹⁵ Hampshire RO, 11M59/B1/1–101. The pipe roll for 1269–70 (B1/34) does not include an account for Crawley.

¹⁶ Thornton, 'Efficiency in medieval livestock farming',

pp. 26–8.

¹⁷ Stone, 'Productivity and management of sheep',

pp. 14–16.

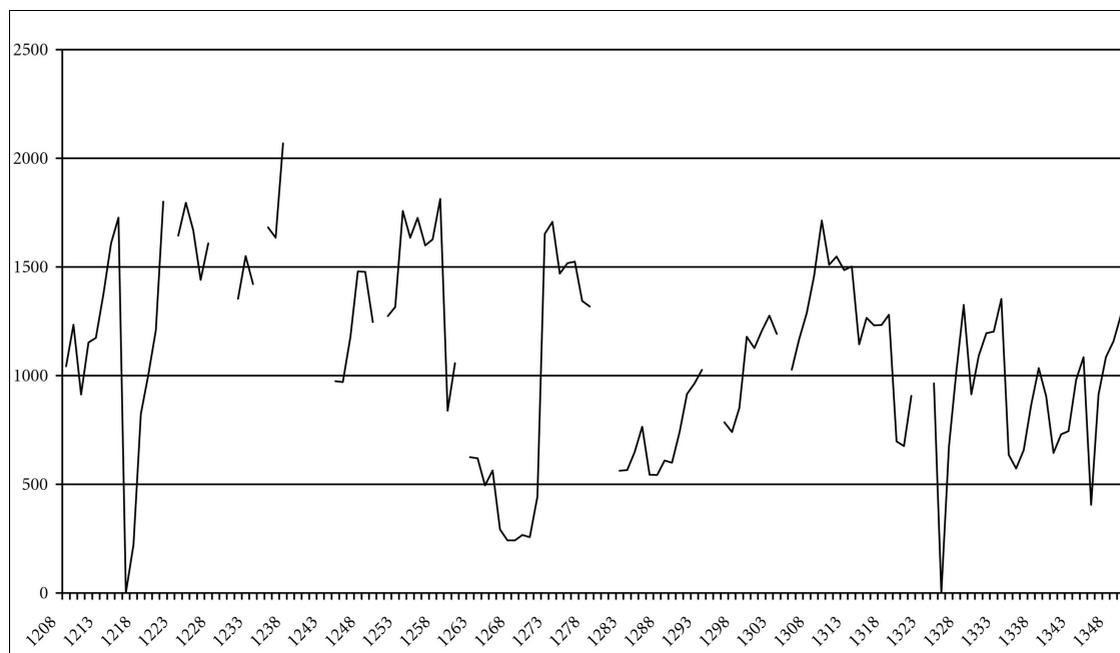


FIGURE 1. Total number of sheep at Crawley, 1208–1349.

Source: Titow, 'Land and population', Table 4.

what was happening on the Winchester estate as a whole during this time. Before 1280 the estate's flock regularly exceeded 20,000 sheep and peaked at around 30,000 sheep in 1258 and 1273. After 1280 the flock was, with the exception of a few years only, kept well below the 20,000 mark.¹⁸ This fall in numbers has not been adequately explained. It was partly the result of the onset of sheep scab from about 1275, which not only led to a great increase in the mortality of sheep but also caused a steep decline in both fleece quality and weight.¹⁹ The susceptibility of sheep to disease, which was particularly marked in the late thirteenth and early fourteenth century, may have led to an increased awareness among demesne managers that sheep were potentially a risky investment. Nevertheless, at Crawley, expenditure on sheep farming peaked in the first quarter of the fourteenth century, and there do not appear to have been any financial constraints preventing the flock being restocked at a higher level.

Certainly the suggestion by Titow, that falling income from sales of grain after 1283 led to a reluctance among demesne managers to divert money towards sheep farming and away from maintaining payments to the bishop's exchequer at a familiar level, sits uncomfortably with the amounts of money spent at Crawley on the early fourteenth-century flock (Table 5).²⁰ The contraction of arable farming on the Winchester estate from the late thirteenth century onwards may have meant that fewer animals were required to maintain an adequate supply of manure.

¹⁸ Titow, 'Land and population', p. 50; M. J. Stephenson, 'Wool yields in the medieval economy', *EcHR* 41 (1988), pp. 385–6.

¹⁹ Stephenson, 'Wool yields', p. 381; D. L. Farmer, 'Mar-

keting the produce of the countryside, 1200–1500', in E. Miller (ed.), *The agrarian history of England and Wales*, III, 1348–1500 (1991), p. 400.

²⁰ Titow, 'Land and population', p. 47, n. 1.

TABLE 1. The size of the sheep flock at Crawley, 1208–1349

<i>Episcopate</i>	<i>Number of sheep in first year of episcopate</i>	<i>Number of sheep in last year of episcopate</i>	<i>Total number of sheep in episcopate</i>	<i>Relevant accounts surviving</i>	<i>Mean number of sheep</i>
Peter des Roches (1205–1238)	1043 (1208)	2068 (1237)	33,155	25	1326
William Raleigh (1242–1250)	974 (1244)	1246 (1249)	7328	6	1221
Aymer de Valence (1250–1260)	1274 (1251)	1058 (1260)	14,645	10	1465
John Gervais (1262–1268)	625 (1262)	243 (1268)	3081	7	440
Nicholas of Ely (1268–1280)	267 (1269)	1318 (1278)	11,501	10	1150
John of Pontoise (1282–1304)	562 (1282)	1192 (1303)	16,836	20	842
Henry Woodlock (1305–1316)	1028 (1305)	1266 (1315)	15,113	11	1374
John Sandale (1316–1319)	1231 (1316)	697 (1319)	4441	4	1110
Rigaud of Assier (1319–1323)	676 (1320)	907 (1321)	1583	2	792
John Stratford (1323–1333)	964 (1324)	1353 (1333)	9736	10	974
Adam Orleton (1333–1345)	636 (1334)	1085 (1344)	8857	11	805
William Edington (1345–1366)	406 (1345)	1278 (1349)	4840	5	968
1208–1349	–	–	131,116	121	1084

Source: Titow, 'Land and population', Table 4.

Note: The figures refer to the number of sheep at the end of the year of account. The number of sheep recorded at the beginning of the year of account have been used to supply figures for those years for which no account roll survives.

Moreover, although the amount of arable land was reduced, this did not necessarily lead to an increase in the availability of pasture. Much of the former demesne land was leased to tenants, and sales of pasture to tenants also rose sharply as the fourteenth century progressed.²¹ However, there was never a straightforward relationship on the Winchester estate between stocking densities and the demesne acreage sown. After the Black Death, the size of the sheep flock increased markedly while the decline of the arable continued apace.²² Pasture need not be sold to tenants if it was required by the bishop's stock.²³ Finally, the provision of manure may not

²¹ *Ibid.*, pp. 46, 55; Stone, 'Productivity and management of sheep', pp. 10–11.

²² Stephenson, 'Wool yields', p. 386; M. Page (ed.), *The*

pipe roll of the bishopric of Winchester, 1409–10 (Hampshire Rec. Ser., 16, 1999), p. xx.

²³ Page (ed.), *Pipe roll, 1409–10*, p. 380.

always have been the primary purpose of the flock, in which case sheep numbers would not necessarily have followed fluctuations in the size of the demesne.²⁴

The effect of episcopal vacancies on numbers certainly needs to be taken into account (Table 1). Sheep, and other non-working animals, tended to be sold off at the end of an episcopate, either by the bishop's own officials or by those appointed by the king to manage the estate during the vacancy. Thus, the size of Crawley's flock fell steeply after the death of Peter des Roches in 1238, Aymer de Valence in 1260, Nicholas of Ely in 1280, John Sandale in 1319, and Adam Orleton in 1345. The translation of John Stratford to Canterbury in 1333 also led to a sharp fall in numbers. At the beginning of each episcopate, therefore, the new bishop was usually presented with a choice of whether or not to invest in a new flock. Some bishops built up their flocks relatively quickly. This was the case, at Crawley and on the estate as a whole, with William Raleigh (1242–50), Aymer de Valence (1250–60), Nicholas of Ely (1268–80), Henry Woodlock (1305–16), and William Edington (1345–66). Others were more cautious. John of Pontoise (1282–1304) became bishop at a time of falling wool prices and the size of the flock at Crawley, especially, grew only slowly. Adam Orleton (1333–45) too was not a major investor in sheep, perhaps because of the poor returns on the sale of wool which were experienced during his episcopate.²⁵

The price of wool may also explain the behaviour of the bishop who showed the most reluctance to purchase sheep, John Gervais (1262–8), whose flock at Crawley and across the estate, was much smaller than those of his immediate predecessor and successor. This may have been partly the result of the financial difficulties of the bishop, as well as a reaction to the fall in the price of sheep and wool which occurred during the 1250s.²⁶ In particular, the price of wool was low compared with that of wheat and John Gervais may have decided to invest in arable farming rather than sheep husbandry to take advantage of this trend. Certainly the acreage of the demesne showed some modest signs of increase during the first years of his episcopate.²⁷

By contrast, between 1305 and 1309 the price of wool rose quickly, encouraging the rapid expansion of the flock by the new bishop, Henry Woodlock, through the purchase of mostly younger sheep, especially lambs, from other episcopal manors and from neighbouring land-owners, such as the rector of Chilbolton.²⁸ These purchases slowed considerably and many sheep were sold when wool prices faltered after 1310, suggesting that demesne managers were sensitive to price fluctuations. At other times too sheep were purchased when wool prices rose; for example, in 1289–90 and 1298–9 when there were sudden increases in prices after several years of slump in the wool market.²⁹ As a rule of thumb, therefore, it may be concluded that the flock at Crawley was increased by purchase when wool prices were high and by breeding when they were low.

²⁴ C. Thornton, 'The determinants of land productivity on the bishop of Winchester's demesne of Rimpton, 1208 to 1403', in Campbell and Overton (eds), *Land, labour and livestock*, p. 200.

²⁵ D. L. Farmer, 'Prices and wages', in H. E. Hallam (ed.), *The agrarian history of England and Wales*, II, 1042–1350 (1988), p. 756.

²⁶ M. J. Stephenson, 'The productivity of medieval sheep on the great estates, 1100–1500' (unpublished PhD

thesis, University of Cambridge, 1986), p. 272; Farmer, 'Prices and wages', p. 754; T. H. Lloyd, *The movement of wool prices in medieval England* (*EcHR*, Supplement 6, 1973), pp. 38–9, 65.

²⁷ Titow, 'Land and population', p. 21a.

²⁸ Lloyd, 'Wool prices', pp. 17, 40; Gras, *English village*, pp. 246, 256, 411–12.

²⁹ Lloyd, 'Wool prices', pp. 16–17, 39–40; Gras, *English village*, pp. 399, 405.

TABLE 2. Fertility of the sheep flock at Crawley, 1208–1349

<i>Period</i>	<i>Relevant accounts surviving</i>	<i>Total ewes</i>	<i>Total lambs</i>	<i>Lambs per ewe</i>
1209–1224	10	5146	4873	0.947
1225–1249	12	7966	7390	0.928
1250–1274	15	7378	6894	0.934
1275–1299	17	5602	5184	0.925
1300–1324	20	10,003	8411	0.841
1325–1349	22	8080	7127	0.882
1209–1349	96	44,175	39,879	0.903

Source: HRO, 11M59/B1/1–101.

III

Thornton has argued that an analysis of livestock fertility and mortality rates may offer a useful measure of the performance of medieval demesne managers and their techniques of pastoral husbandry.³⁰ Table 2 reveals that the fertility of Crawley's ewes was generally high throughout the period 1209–1349, although there appears to have been a slight downturn after 1300. Similar lambing rates were experienced on the bishop's manor of Rimpton in the thirteenth century and also by seventeenth-century farmers.³¹ These figures are based on the assumption that each ewe bore only one lamb a year.³² The number of ewes able to breed is assumed to be that recorded at the beginning of the year of account minus those which were sold or died before lambing. Those ewes added to the flock during the year are assumed not to lamb. Indeed, the accounts seem to record any instances of lambing by gimmers, of which there were three in 1208–9.³³ The number of breeding ewes always agrees with the number of new-born lambs recorded plus those ewes said to have been sterile or which aborted. The accuracy of these final figures depended to some extent on the honesty of the reeves and the vigilance of the auditors who examined their accounts. The mortality of lambs in their first year was more variable, with the best results being achieved at the very beginning and end of the period under discussion (Table 3). These figures are somewhat poorer than those achieved at Rimpton, although still not unimpressive.³⁴ Again, it is assumed that reeves were being honest in the number of deaths they recorded.

IV

Were these fluctuating rates of sheep fertility and mortality at Crawley influenced by the provision of sires, housing, feeding, medicaments and the labour supply on the part of demesne managers? Throughout the thirteenth century Crawley had no manorial rams, suggesting that

³⁰ Thornton, 'Efficiency in medieval livestock farming', p. 28.

³¹ *Ibid.*, pp. 34, 45.

³² R. Trow-Smith, *A history of British livestock*

husbandry to 1700 (1957), p. 151.

³³ Gras, *English village*, p. 191.

³⁴ Thornton, 'Efficiency in medieval livestock farming', pp. 36, 46.

TABLE 3. Mortality of lambs in first year at Crawley, 1208–1349

<i>Period</i>	<i>Relevant accounts surviving</i>	<i>Total lambs</i>	<i>Deaths</i>	<i>Survival rate (%)</i>
1209–1224	10	5728	1198	79.1
1225–1249	12	7516	3188	57.6
1250–1274	15	7245	3235	55.4
1275–1299	17	5340	2044	61.7
1300–1324	21	9409	2576	72.6
1325–1349	22	8962	1916	78.6
1209–1349	97	44,200	14,157	68.0

Source: Gras, *English village*, pp. 410–13.

the sheep flock had to rely upon communal sires or those brought in from outside.³⁵ Apart from the occasional year in the 1240s and 1290s, the manorial livestock account did not record any rams until 1305–6, at the beginning of the episcopate of Henry Woodlock (1305–16).³⁶ Some mention, however, was made of rams in the pipe rolls. Thus, in 1218–19 five rams were sent to Crawley as a gift from the abbess of Wherwell. In 1220–1 40 rams were sent from the bishop’s manor of Fareham.³⁷ This last may provide some evidence of selection of stock for breeding. In general it is not clear from where Crawley’s rams were sourced until the introduction of a manorial flock in the early fourteenth century. Few rams were purchased from outside the manor after 1305–6, the supply of rams depending largely on the addition of young males from the stock, and it is noticeable that the fertility of Crawley’s ewes begins to fall at much the same time. Whether there is a link between these two occurrences is unclear. The opportunities of selecting stock for breeding may thus have been limited, adversely affecting the health of the flock.

It is possible that the demesne managers were aware of this problem. Certainly, in the mid-1320s, at the beginning of John Stratford’s episcopate, the whole of Crawley’s sheep flock was sent to the nearby manor of Twyford, to be replaced by sheep from Merdon, Twyford, and other bishopric manors.³⁸ This movement of animals between manors was by no means unique, although this case was exceptional in that the entire flock was involved. No explanation is given in the accounts, but the search for new breeding stock may provide a reason. The proportion of rams to ewes varied considerably (Table 4), but was generally quite high.³⁹ During the 1310s there was one ram for about every 22 ewes. This proportion fell to one ram for about every 41 ewes during the 1330s. There was little difference in the fertility of the ewes between these two periods, the 1330s showing in fact a slight improvement over the period 1310–19. Nor does the rise in the proportion of rams to ewes in the 1340s seem to have affected fertility. In short, there is little unequivocal evidence from Crawley to suggest that the provision of sires radically

³⁵ *Ibid.*, p. 37.

³⁶ Gras, *English village*, p. 416.

³⁷ *Ibid.*, pp. 41–2, where ‘Wherwell’ is mistaken for ‘Harwell’.

³⁸ *Ibid.*, pp. 400, 406, 416.

³⁹ Trow-Smith, *History of British livestock husbandry*, p. 150; Thornton, ‘Efficiency in medieval livestock farming’, p. 37.

TABLE 4. Number of rams at Crawley, 1305–1349

<i>Period</i>	<i>Total rams</i>	<i>Total ewes</i>	<i>Ratio of rams to ewes</i>	<i>Fertility of ewes</i>
1306–1309	47	2486	1:52.9	0.85
1310–1319	236	5268	1:22.3	0.84
1320–1329	79	2314	1:29.3	0.90
1330–1339	88	3643	1:41.4	0.88
1340–1349	106	2944	1:27.8	0.87
1306–1349	556	16,655	1:30.0	0.87

Source: Gras, *English village*, pp. 406–7, 416–17.

Note: The figures refer to the number of sheep at the end of the year of account. Only those years for which figures survive for both rams and ewes have been included.

affected the fertility of the ewes there during the early fourteenth century. They may instead have been introduced for some other quality, such as the nature of their fleece. For instance, this was the most likely reason for the introduction of Lincoln or Lindsey rams on some Winchester manors in the early thirteenth century.⁴⁰

V

Sheepcotes are mentioned in the accounts for Crawley from 1208–9 onwards. In this year only one sheepcote was recorded, around which a ditch was dug measuring 60 perches in length (just over 300m assuming a standard perch of 16½ feet) and a fence or hedge constructed.⁴¹ The accounts for Crawley show that in the second half of the thirteenth century separate sheepcotes were built for wethers, ewes and hogs. However, it is not clear whether this practice was already in operation at the beginning of the thirteenth century because the early pipe rolls do not identify individual sheepcotes by their function. By 1219–20, though, at least two sheepcotes were being used at Crawley, for 2s. 4d. was spent repairing their roofs. In the following year these two sheepcotes were again roofed and in addition £1 4s. 4d. was spent rebuilding a sheepcote on the orders of the estate's steward. In 1224–5 one of the sheepcotes was enlarged at a cost of 7s. 3d., reflecting the peak in the number of sheep kept at Crawley at this time. Similar work was carried out in 1247–8 at a time when the number of sheep was rising during the episcopate of William Raleigh, and in 1257–8 when the size of the flock peaked under Aymer de Valence.⁴² In 1264–5 three sheepcotes were mentioned for the first time, just when the size of the flock at Crawley was declining under John Gervais. If this was an innovation of this period, it is perhaps more likely to have been introduced at the end of Aymer de Valence's episcopate, for which the pipe rolls do not survive. The identification of the different sheepcotes according to the type of sheep they accommodated began in 1268–9 when the sills of the wether-house were repaired.

The amount of money spent on sheepcotes averaged about 5s. a year before 1300, although

⁴⁰ Stephenson, 'Productivity of medieval sheep', pp. 35–6.

⁴¹ Gras, *English village*, p. 190.

⁴² *Ibid.*, p. 225.

TABLE 5. Amount spent on sheepcotes, hay and medicaments at Crawley, 1208–1349

<i>Period</i>	<i>Average amount spent on sheepcotes (d.)</i>	<i>Average amount spent on hay (d.)</i>	<i>Average amount spent on medicaments (d.)</i>
1209–1224	73.9	52.4	2.7
1225–1249	47.8	139.5	6.2
1250–1274	55.3	212.1	0.7
1275–1299	66.4	253.1	319.5
1300–1324	165.1	837.7	1412.0
1325–1349	113.3	614.6	284.1
1209–1349	96.2	422.3	434.3

Source: HRO, 11M59/B1/1–101.

there was considerable variation within this period (Table 5). During John Gervais’s episcopate, for instance, expenditure averaged just 2s. a year, while under Nicholas of Ely it was closer to the 5s. average, reflecting the movements in the size of the flock. Under Henry Woodlock (1305–16) annual expenditure rose to an average of just short of a pound (238*d.*) again reflecting a growth in the size of the flock. The scale of the investment was so great at this time because large sums were spent on enlarging the ewe-house by eight pairs of crucks in 1307–8 and also because a ditch was constructed and a hedge planted around the three sheepcotes.⁴³ Although ditches had been dug around individual sheepcotes from the time of the earliest pipe roll in 1208–9, this new ditch appears to have been an innovation because it surrounded all three sheepcotes. The evidence for this is not entirely unambiguous, but the records of Henry Woodlock’s expenditure seem to make a distinction between the ditches and hedges surrounding each individual sheepcote and this much larger enclosure called a barton. Thus, in 1305–6 62 perches (about 312m) of ditch were dug around the hogg-house and planted with a hedge, while in 1307–8 a ditch measuring 261 perches (over 1.3km) was constructed around the wether-house, ewe-house and hogg-house which was also hedged.⁴⁴ The purpose of these enclosures is not entirely clear. However, it may be worth pointing to the coincidence of the construction of the barton and the introduction of a manorial flock of rams. Was it to facilitate mating by penning the sheep in a restricted area? The barton certainly represented a substantial investment. Its construction cost Woodlock over £2 3s. in 1307–8, which was maintained in future years both by him and his successors.

The rise in the amount of money spent on sheepcotes in the early fourteenth century may have contributed to the improvement in the mortality figures experienced at this time, although there is no clear evidence to suggest that the houses in which the sheep sheltered were any more effective in protecting the lambs on the eve of the Black Death than they were 150 years before. Were the sheepcotes maintained to a higher standard? The fourteenth-century accounts give much more detailed descriptions of the work involved in building and repairing the sheepcotes compared with the rather terse records of the thirteenth century. Thus, we learn more at this

⁴³ *Ibid.*, p. 262.

⁴⁴ *Ibid.*, pp. 243, 262.

later time than earlier about the bays, doors, groundsills, partitions, roofs and walls of the sheepcotes, and the materials used in their construction. However, there is little to suggest that any new techniques in building were introduced in the fourteenth century, or that particular improvements were made which had a direct impact on the mortality figures achieved at this time.

VI

Hay was bought to support the manor's flock over winter from 1210–11 onwards, although payments specifically for this purpose do not become regular until the 1220s.⁴⁵ The amount spent clearly depended on the price of hay at the time, the size of the flock, and the manor's own resources. The reeve made relatively few comments in the accounts about the price of hay, an exception occurring in 1273–4 when £1 13s. 6d. was spent 'and so much this year because the hay was much reduced last year'. A similar amount was spent the following year on account of the harsh weather. Likewise, in 1291–2 the great length of the winter was used to justify spending £1 8s. 3d. on hay. A change occurs in 1306–7 (once again in the episcopate of Henry Woodlock) when a quarter of vetches was given to the ewes in winter. This appears to have been an innovation and one that was continued for much of the first half of the fourteenth century. Indeed, the quantity of vetches given to the sheep rose during the early part of the century, to 2 quarters in 1308–9, 2½ quarters in 1309–10, 3 quarters 6 bushels in 1313–14, and 4 quarters 2 bushels in 1314–15. Vetches were not given to the sheep in every year, but the practice became more regular as the century progressed.⁴⁶ After 1329–30 oats and beans too might be given to the ewes at lambing-time, as well as peas and vetches.

As with the money spent on sheepcotes, there appears to have been a significant increase in the expenditure on hay during the episcopate of Henry Woodlock (1305–16). This was at least partly because the demesne managers began to purchase hay not only for the current year but also for the following year. This was certainly a change of practice and one which cost very significant sums of money. In 1310–11, for example, £1 6s. 8d. was spent on hay bought for the winter and a further £5 15s. 3d. to support the sheep the following year. These two developments, of feeding the sheep with pulses and oats and purchasing large quantities of hay for fodder, may have contributed to the improved survival rate of lambs in the fourteenth century. Certainly demesne managers appear to have become aware of the value of feeding grain and pulses, both to the ewes and their young, at lambing-time, although in general hay was more nutritious.⁴⁷ In 1334–5 an additional 10 gallons of milk were also bought to feed the lambs prior to weaning.

VII

Very little money was spent on medicaments to treat the sheep of Crawley until the beginning of John of Pontoise's episcopate in 1282 (Table 5). This was after the onset of sheep scab, which Stephenson has identified as becoming particularly virulent from about 1275.⁴⁸ At the beginning

⁴⁵ *Ibid.*, pp. 198, 326.

⁴⁶ *Ibid.*, pp. 255, 369–70.

⁴⁷ Trow-Smith, *History of British livestock husbandry*, p. 158; Thornton, 'Efficiency in medieval livestock

farmings', p. 40; Stone, 'Productivity and management of sheep', pp. 8–9.

⁴⁸ Stephenson, 'Wool yields', p. 381.

of the thirteenth century, the treatment applied to sheep as recorded in the pipe rolls is not very specific. In 1211–12, for instance, $2\frac{1}{2}d.$ was spent on the treatment of sheep and a further $12d.$ was given to the man who administered the treatment. Remedies which may have had more ancient precedents were also tried during these years. In 1220–1 a lamb was given to St Frideswide by order of the steward in order to combat the murrain then prevailing. Similarly, in 1225–6 a ewe was given to St Mary Magdalene before lambing to try to stem the number of deaths occurring among the flock. Divine intervention may also have been the intended outcome of the $8d.$ paid to a certain friar to visit the sheep in 1231–2. The following year Friar William visited the sheep, as he did again in 1235–6 and 1236–7, the last time such a practice was adopted on Crawley manor.⁴⁹

It is not until 1282–3 that the pipe rolls begin to record in detail the types of treatment used on the flock. In this year pigs' fat, ointment, copperas and mercury were purchased, almost certainly in an attempt to combat scab. In the following year fat, copperas, verdigris, mercury and butter were tried. Similar combinations of substances were bought for the remainder of the thirteenth century, with the exception of butter, and it is probable that the demesne managers had a fairly good idea of what was required without the need to test things by trial and error. If there was any innovation in the treatment of sheep it came during the episcopate of Henry Woodlock. Not only did Woodlock buy the traditional medicaments in very large quantities, but he also began to buy tar with which to coat the sheep. This became the standard treatment for scab into modern times.⁵⁰ Tar did not immediately replace the large quantities of grease, copperas and mercury which continued to be bought, but by the mid-1320s increasing quantities of tar were beginning to be purchased.

The medicaments applied to the flock at Crawley may have served to ease the symptoms of scab and other outbreaks of disease. Sheep pox (*verola*), for example, was identified on the manor in 1245–6, 1251–2 and 1314–15. However, these treatments were a palliative rather than a cure and it may be doubted whether the improved survival rate of lambs in the fourteenth century was in a direct way the result of the increase in spending on medicaments made by Henry Woodlock and his successors. Nor is it certain that the tar, grease and other unguents purchased were solely in order to combat disease. Demesne managers may have become aware that fleeces rubbed with a combination of tar and grease softened the wool and improved its quality prior to sale.⁵¹

VIII

Discussions of agricultural productivity usually place great emphasis on the amount of labour employed. The high grain yields achieved on the bishop of Winchester's demesne at Rimpton and on many manors in East Anglia were at least partly the result of the intensive use of manpower in ploughing, weeding, marling and other tasks involved in arable cultivation.⁵² Did the amount of labour devoted to sheep farming make a difference to the well-being of the flock,

⁴⁹ Gras, *English village*, pp. 203, 209.

⁵⁰ Trow-Smith, *History of British livestock husbandry*, p. 156.

⁵¹ *Ibid.*, pp. 168–9.

⁵² Thornton, 'Determinants of land productivity',

pp. 204–9; B. M. S. Campbell, 'Land, labour, livestock, and productivity trends in English seignorial agriculture, 1208–1450', in Campbell and Overton (eds), *Land, labour and livestock*, pp. 144–82.

or was this branch of husbandry relatively unaffected by the intensification of labour inputs?⁵³ At the beginning of the thirteenth century two full-time shepherds were employed at Crawley, who each received a cancellation of their rent in return for service. A keeper of lambs was also employed for at least part of the year.⁵⁴ The number of full-time shepherds was increased to three in 1215–16, rising to four in 1223–4 and remaining at that figure for the remainder of the episcopate of Peter des Roches, during which time the size of the flock reached its peak.

William Raleigh (1242–50) and Aymer de Valence (1250–60) generally employed three full-time shepherds, while between 1262–3 and 1287–8 two shepherds were employed for the whole year and a keeper of lambs for half a year. Thereafter the employment of shepherds begins to become more flexible. In 1288–9, the two shepherds who received a cancellation of their rent, and who were responsible for the ewes and wethers, were joined by a stipendiary keeper of hogs and lambs. An additional keeper of ewes followed in 1290–1, who was given an allowance of grain. These were both full-time positions, but were discontinued in the mid-1290s. Under Henry Woodlock, the two service *famuli* remained in post, but there was much more variation in the number of stipendiaries employed and the length of their service during the year. The keeper of hogs and lambs was usually paid for a whole year, but was joined by an assortment of assistants at lambing-time or for a certain number of weeks. For example, in 1310–11, the shepherd of ewes received one assistant at lambing-time, while another assistant helped to grease the ewes and hogs for eight weeks during the winter. The following year this period was reduced to six weeks, although an additional keeper of sick wethers (kebbs) was employed for eight weeks. The number of assistants and the length of time they served tended to change according to need, so that under Woodlock and his immediate successor there could be anything between three and nine people working with the sheep.

This change in policy perhaps indicates the willingness of the administration to take advantage of the abundant labour and depressed wages prevalent at this time in order to improve output.⁵⁵ There may well have been an assumption among demesne managers that there were gains to be had by employing assistants at various points during the year for relatively short periods, for which the only payment was a few bushels of grain. This practice had been tried before Woodlock became bishop but was used much more regularly by him and his successors. The effectiveness of this additional labour is difficult to measure, but was presumably regarded as valuable because these assistants continued to be employed even as the size of the manor's flock declined in the decades immediately prior to the Black Death. Most of the assistants either helped out at lambing-time or looked after the sick animals separated from the rest of the flock. The improved survival rate of lambs in the fourteenth century may, therefore, have owed something to the increased supply of labour devoted to the flock.

IX

A clear pattern of increased expenditure and innovation has emerged from this discussion of the management of Crawley's sheep flock between 1208 and 1349. In terms of the provision of sires,

⁵³ Campbell, *English seigniorial agriculture*, p. 156.

⁵⁴ Gras, *English village*, pp. 188, 191.

⁵⁵ Thornton, 'Efficiency in medieval livestock farming', p. 41.

sheepcotes, feed, medicaments and labour, the episcopate of Henry Woodlock (1305–16) appears to mark a turning-point. Not only does the size of the flock at Crawley reach its early fourteenth-century peak under Woodlock but expenditure on sheep farming also rises considerably. The manor begins to keep a permanent flock of rams for the first time, a new barton appears to be constructed around the sheepcotes, vetches and other pulses are added to the feed, tar is used for the first time to treat scab, and the shepherds receive additional help at lambing-time. All this suggests that Woodlock had some intelligent demesne managers looking after the flock at Crawley and perhaps too on the other manors of the estate. But what were they hoping to achieve by introducing these changes?

If the goal was an improvement in the fertility of the manor's ewes, then the administration must be considered to have failed. The figures suggest a decline in fertility in the first quarter of the fourteenth century. By contrast, the survival rate of lambs improved during the same period, although not to the extent of matching the figures achieved under Peter des Roches at the beginning of the thirteenth century. It is possible, however, that under Woodlock the managers at Crawley were not unduly concerned with the health or reproductive capacity of the manor's flock. They may have been much more interested in the end products of sheep farming, particularly wool. The price of wool peaked in the early fourteenth century,⁵⁶ and it might be expected that the bishop of Winchester, with a flock of around 20,000 sheep, would seek to take advantage of this trend by improving the size and quality of the fleeces produced on his estate. But how might such an improvement be effected?

All of the changes discussed in this paper, in terms of sires, housing, feeding, medicaments and labour, were potentially as likely to enhance the yield of wool as to improve the general health of the flock.⁵⁷ Certainly medieval sheepfarmers were aware that the quality of the fleece was affected by breeding and that 'a ram with good wool should run with the ewes'.⁵⁸ Similarly, well-maintained housing and an abundance of food was likely not only to impact on rates of fertility and mortality but also on the wool produced by the sheep.⁵⁹ It has been suggested already that the application of ointments to the fleece improved its texture, and in the fourteenth century assistants to the shepherds were specifically employed to grease the sheep during the winter months. This was not only intended to protect the flock from lice and scab but was also believed to insulate the sheep from the cold weather.⁶⁰ In addition, men were employed to look after those animals separated from the rest of the flock, in an attempt both to prevent the spread of disease and to draft out the old and weak whose wool was not of the standard required. In this way the demesne managers helped to ensure that average fleece weights rose on the Winchester estate in the early fourteenth century.⁶¹

Fleece weights at Crawley rose from an average of 1.47 lb in the period 1275–99 to 1.60 lb during the years 1300–24.⁶² Stephenson argued that exogenous factors, in particular disease and climate, were primarily responsible for the wool yields achieved by sheepfarmers in the Middle

⁵⁶ Farmer, 'Prices and wages', pp. 754, 756–7; Campbell, *English seigniorial agriculture*, p. 158.

⁵⁷ *Ibid.*, p. 156.

⁵⁸ Trow-Smith, *History of British livestock husbandry*, p. 160.

⁵⁹ *Ibid.*, p. 161; Stone, 'Productivity and management

of sheep', pp. 7–12.

⁶⁰ Trow-Smith, *History of British livestock husbandry*, p. 169; Stephenson, 'Productivity of medieval sheep', p. 45.

⁶¹ Stephenson, 'Wool yields', p. 377.

⁶² Gras, *English village*, pp. 421–2.

TABLE 6. Amount spent on hay and average fleece weights at Crawley, 1304–15

<i>Year</i>	<i>Average amount spent on hay per sheep (d.)</i>	<i>Annual average fleece weight (in lb)</i>
1304–5	0.526	0.859
1305–6	1.324	1.180
1306–7	0.626	1.231
1307–8	0.835	1.382
1308–9	0.446	1.689
1309–10	0.814	1.808
1310–11	1.422	1.649
1311–12	0.885	1.736
1312–13	1.163	1.648
1313–14	1.910	1.559
1314–15	1.515	1.556

Source: HRO, 11M59/B1/60–70.

Ages. Thornton too expressed scepticism that late medieval farmers had the technical ability to improve yields of wool.⁶³ In his reevaluation of post-Black Death sheep farming, however, Stone has emphasized the importance of decisions taken by demesne officials for the productivity of the flock. In particular, he stressed the vital role played by fodder.⁶⁴ Can the increased expenditure at Crawley on fodder be shown to have affected yields of wool? An analysis of fleece weights at the beginning of the fourteenth century suggests that the greater provision of hay during Henry Woodlock's episcopate may well have been one of the factors contributing to the improvement in wool yields experienced at this time, although part of the hay bought in one year was often reserved for use in the next (Table 6). Moreover, the quality of the fleeces was probably the main concern of the estate's steward, who had recently resumed his former responsibility for collecting and arranging the sale of the estate's wool centrally at Wolvesey Palace.⁶⁵

Many of the policies implemented at Crawley may have reflected the priorities of the central administration and were undoubtedly sanctioned at the highest level. Thus, in 1309–10 the steward and bailiff intervened on the manor to ensure that assistants were employed to look after the ewes during a particularly high incidence of sickness. Similarly, a payment of 3*d.* to the shepherd of ewes in 1341–2 was made by order of the steward. Reeves and shepherds may have had responsibility for the day-to-day management of the flock, and may have become skilled and knowledgeable workers, but it is likely that they were subject to quite close supervision by the central administration.⁶⁶ This was not, in itself, a change of policy introduced in the fourteenth century. The steward can be found issuing orders as early as 1220–1, to rebuild

⁶³ Stephenson, 'Wool yields', pp. 378, 381; Thornton, 'Efficiency in medieval livestock farming', pp. 26–8.

⁶⁴ Stone, 'Productivity and management of sheep', pp. 7–12.

⁶⁵ Gras, *English village*, pp. 421–2; Farmer, 'Marketing the produce', p. 397.

⁶⁶ Thornton, 'Efficiency in medieval livestock farming', pp. 41–2.

a sheepcote, to employ an extra shepherd and to offer a lamb to St Frideswide. The bailiff too almost certainly kept a close check on the shepherds' activities, one of whom was punished for his poor custodianship in 1268–9.

Unlike at Rimpton, there was no general improvement in the fertility and mortality rates of the sheep flock at Crawley. Instead, the best results were achieved in the first quarter of the thirteenth century, during the episcopate of Peter des Roches. It is particularly difficult to account for the overall decline in fertility. For example, it does not appear to reflect the more intensive milking of the ewes in the fourteenth century, a practice which was understood by contemporaries to affect adversely the breeding potential of the flock.⁶⁷ Indeed, the ewes were milked for slightly longer in 1208–9 (5 April to 27 September) than they were in 1307–8 (11 April to 29 September).⁶⁸ Milk production was of the utmost importance to the bishop of Winchester in the early thirteenth century. Indeed, Biddick has calculated that, under des Roches, several of the bishop's demesnes produced more cheese per cultivated acre than wool, and that dairy income per ewe varied between 66 and 100 per cent of the wool income per ewe and wether of the sheep flock.⁶⁹ At this time most of the Winchester cheese was made from the milk of sheep, not cows. In the early fourteenth century, by contrast, the prevalence of scab and other diseases ensured that cows' milk became a much more important component of cheese production on the episcopal estate, although apparently not to any noticeable degree at Crawley.⁷⁰

As a result of this development in cheese-making, the emphasis of sheep farming on the Winchester estate as a whole may have shifted more towards wool production, the needs of which demanded more wethers rather than ewes. Even at Crawley, where dairy production remained important, the proportion of wethers increased in the second half of the period under discussion, from an average of 1.63 ewes per wether during the years 1209–74 to 1.27 ewes per wether between 1275 and 1349. Wethers carried heavier fleeces than other sheep and were thus more suitable for manors geared to the wool market than those concerned with dairy production.⁷¹ More attention also seems to have been paid to the culling and separation of weak and sick sheep from the rest of the flock. For example, in 1312–13 a shepherd was employed for 16 weeks to look after those wethers and ewes described as kebbs. While it is unclear whether this policy aimed to reduce the spread of disease or to improve the breeding stock, it may well have resulted in the selection of sheep according to the quality of their wool. One of the signs of sheep regarded as weak (*debilis*), such as the wethers and hoggs separated from their betters in 1346–7, is likely to have been a relatively poor fleece.⁷²

X

This paper began by suggesting that innovation and technological change in farming practices, albeit on a small scale, can be detected in England during the thirteenth and fourteenth

⁶⁷ Stone, 'Productivity and management of sheep', pp. 14–16.

⁶⁸ Gras, *English village*, pp. 191, 195, 267.

⁶⁹ Biddick, 'Agrarian productivity', p. 116; Campbell, *English seigniorial agriculture*, p. 154.

⁷⁰ Farmer, 'Marketing the produce', pp. 401–2;

Farmer, 'Prices and wages', p. 758.

⁷¹ J. P. Bischoff, "'I cannot do't without counters': fleece weights and sheep breeds in late thirteenth and early fourteenth century England', *Agricultural Hist.* 57 (1983), pp. 148–9.

⁷² Stephenson, 'Productivity of medieval sheep', p. 47.

centuries, a period which has previously been characterized as one of inertia.⁷³ Evidence has been presented, from the bishop of Winchester's Hampshire manor of Crawley, which reveals that a number of policy changes were instituted, especially in the early fourteenth century, in the management of the manorial sheep flock. In particular, new practices were adopted relating to the provision of sires, housing, feeding, medicaments and the labour supply. Elsewhere on the episcopal estate, similar developments have been used to explain an improvement in rates of fertility and mortality of the herds and flocks of demesne livestock.⁷⁴ At Crawley, by contrast, no such clear connection can be discerned between the principal examples of innovation and the fluctuating rates of fertility of the manor's ewes and the mortality of lambs in their first year.

However, all of the changes introduced at Crawley in the early fourteenth century can be explained in terms of their likely beneficial impact on fleece weights, and it was at this time that yields of wool peaked on the Winchester estate. Previous studies have suggested that exogenous factors, in particular disease and climate, were primarily responsible for the wool yields achieved by sheepfarmers in the Middle Ages.⁷⁵ This paper supports the view that conscious decisions taken by manorial officials had an important effect upon the productivity of sheep farming.

⁷³ Postan, *Medieval economy and society*, p. 49.

⁷⁴ Thornton, 'Efficiency in medieval livestock farm-

ing', p. 43.

⁷⁵ Stephenson, 'Wool yields', pp. 378, 381.