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*

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The Rabbit and the Medieval East Anglian Economy*

By MARK BAILEY

Abstract
The rabbit was a rare beast in medieval England, and much sought after for both its meat and its fur. This investigation plots the early history of commercial rabbiting in East Anglia, and its transition from a low output concern to a growth industry in the later Middle Ages. The development of the rabbit-warren into a highly lucrative source of income is explained in terms of the changing economic and social conditions after the Black Death, and the more intensive management of warrens by landlords. The occupational spin-offs from rabbiting, and the social implications of poaching in a region where resistance to the feudal order was endemic, are also explored. Final consideration is given to the economic impact of the rabbit on areas of poor soil, and its ability to compensate for their inherent disadvantages in grain production.

AN HISTORICAL study of a creature so manifestly commonplace as the rabbit might initially appear uninteresting, for it is the unusual which most readily excites intellectual curiosity. The rabbit is still regarded as prolific, destructive, and of little value, despite its terrible suffering under the myxomatosis virus since the 1950s. Yet this modern view is not consistent with the severe attitude adopted by manorial courts towards poachers in the Middle Ages. An example from a court held at Westwood near Dunwich (Suff) in 1442 illustrates the point. In the autumn of that year, three Augustinian canons from Blythburgh Priory had been caught poaching rabbits with their own, specially reared, greyhounds, a flagrant display of the increasing worldliness of religious orders. The outraged court officials fined them the substantial sum of 46*s* 8*d*, and also recorded that the operation had the express knowledge and support of no less a person than the Prior himself.[1] If the medieval rabbit was valueless, why did such illustrious men take up poaching and why were the courts so determined to stop them?

In fact, this modern reputation belies historical experience, and for much of its history the rabbit has remained a rare and highly prized commodity. The animal is not indigenous to the British Isles, unlike the hare, but was deliberately introduced from France or its native western Mediterranean by the thirteenth century.[2] Its value lay both in its meat and fur, and as one seventeenth-century commentator noted, 'no host could be deemed a good housekeeper that hath not plenty of these at all times to furnish his table'.[3] Fur was used as clothing as well as on clothing, and although neither the most fashionable nor valuable, rabbit fur was increasingly popular from the thirteenth century.[4]

Yet initially the rabbit found the English climate inhospitable and required careful

* This study is concerned with Cambridgeshire, Norfolk and Suffolk. I am grateful to Edward Miller and Duncan Bythell for reading and commenting on an earlier draft of this paper.

1 Ipswich and East Suffolk Record Office, HA30:312/195.

2 The rabbit was apparently indigenous to Britain in a previous interglacial but subsequently became extinct, A M Tittensor, *The Rabbit Warren at West Dean near Chichester*, published privately, 1986, no page numbers. For its reintroduction by the Normans, see E M Veale, 'The Rabbit in England', *Ag Hist Rev*, V, 1957, pp 85–90. An excellent general study of the animal is J Sheail, *Rabbits and their History*, Newton Abbot, 1971. See also O Rackham, *A History of the Countryside*, 1986, p 47.

3 F Hervey (ed), *Reyce's Breviary of Suffolk*, 1902, p 35.

4 E M Veale, *The English Fur Trade in the later Middle Ages*, Oxford, 1966, chap 1.

rearing and cosseting inside specially created warrens.[5] For the next five centuries the vast majority of England's rabbit population lived protected within these confines, and not until the eighteenth century did it successfully colonize a much wider area. As Sheail writes, 'the agricultural revolution made it possible for the rabbit as a species to survive in a feral state' and provided a launch pad for its demographic explosion, an explosion which ultimately undermined its economic value.[6] Even in the seventeenth century the rabbit was still regarded as an important cash crop and, in some areas, as a form of agricultural improvement.[7] In the Middle Ages rabbit-warrens represented almost the sole source of supply for rabbits and their scarcity made them a valuable and fiercely guarded commodity. Indeed, the collapse of the grain market in the later fourteenth and fifteenth centuries encouraged some landlords to develop their warrens as an alternative source of income, to the extent that rabbiting can be classed as an unlikely but successful late medieval growth industry.

I

Throughout the Middle Ages the right to hunt and kill any beast or game was a special privilege granted by the king, so that all hunting was carefully controlled and restricted. Hunting in the extensive royal forests was the privilege of the king alone, but outside these areas the Crown was prepared to sell exclusive hunting rights by means of a charter of free-warren. In effect, the recipient of this charter was granted the *sole* right to kill the beasts of warren – which basically consisted of the pheasant, partridge, hare and rabbit – within a specified area. Hence the right to keep and kill rabbits was the exclusive privilege of the owner of free-warren and it was therefore illegal for anybody else to attempt to do so. Free-warren was consequently a valuable privilege, jealously guarded by its owner, and charters for most East Anglian villages had been granted by the 1280s.[8]

There is obviously an important distinction to be made between the warren in its legal and its practical senses. In modern usage the rabbit-warren refers to a piece of waste ground on which wild rabbits burrow, but in the Middle Ages it specifically meant an area of land preserved for the domestic or commercial rearing of game. Furthermore the sites of medieval warrens were selected according to strict topographical criteria and not at random. The modern rabbit has developed a resilience to the damp British climate, but still prefers to avoid moisture and hence burrowing in water-retentive clays and loams. Its medieval predecessor felt this aversion more keenly, for the distribution of warrens in East Anglia corresponds closely with areas of dry and sandy soil (see Map 1). Landlords also sought slopes for colonization, as a gradient facilitated both drainage and the dispersal of burrowed soil.[9] Significantly the largest concentration of warrens was in Breckland, a region of undulating heathland, low rainfall and deep, porous sands, in other words an ideal habitat for the rabbit. In 1563 a lease of Brandon warren in the heart of Breckland noted it 'is very Wyde and Large but of very Baren Soyle neverthelesse very good for brede of Conyes'.[10]

5 Rackham, *op cit*, p 47.

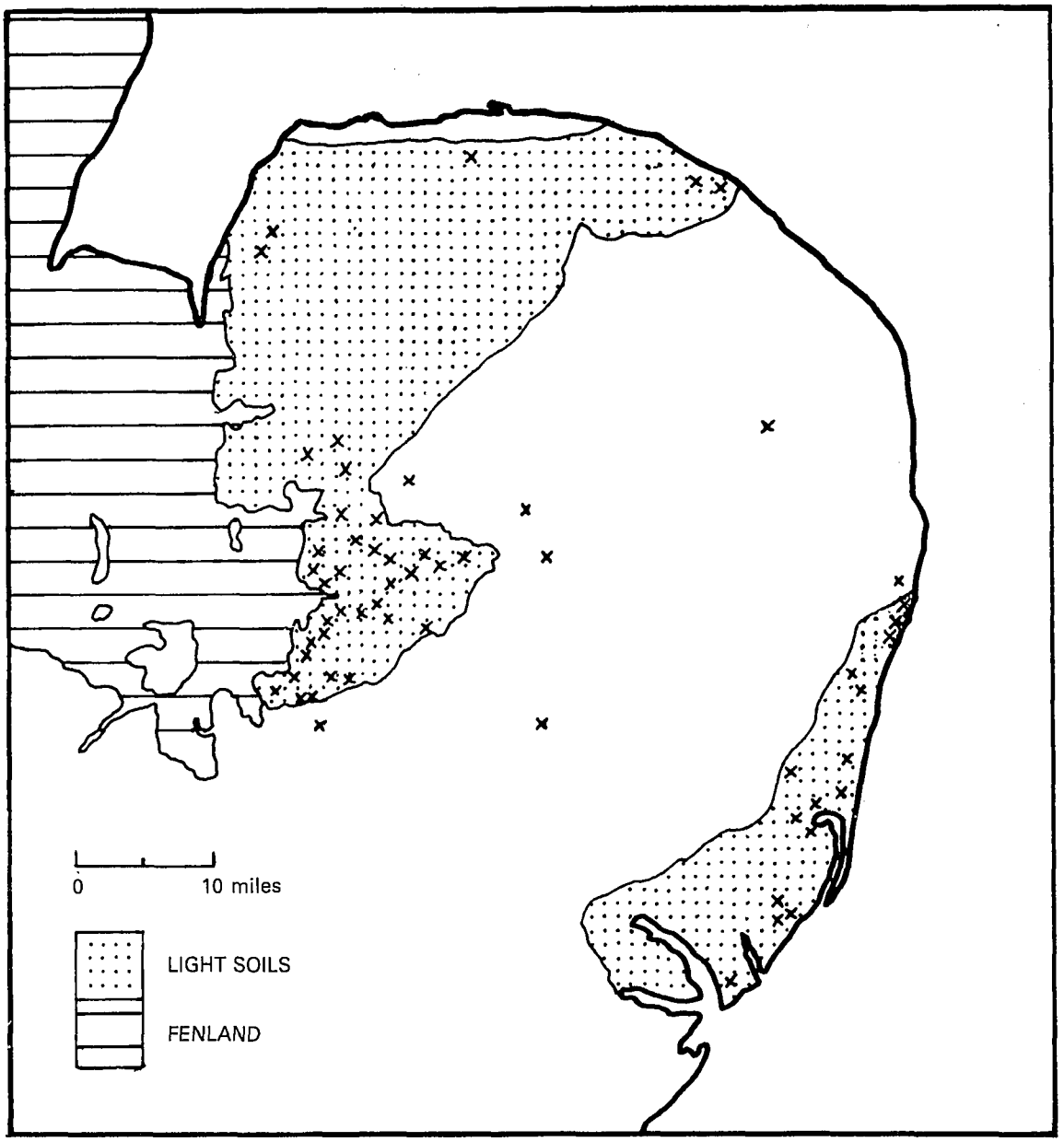
6 J Sheail, 'Rabbits and Agriculture in post-Medieval England', *Jnl Hist Geog*, IV, 1978, p 355. See also Sheail, *op cit*, 1971, pp 9–10 and 31–2.

7 Sheail, *op cit*, 1978, p 349. Sheail's article considers the revived interest in rabbit rearing in the early modern period, and attempts to correct the 'impression that rabbit-warrens were always inimical to progressive land management', p 344. Indeed, the value of some warrens suggests that commercial rabbiting could represent the optimum use of poor soils. Such arguments could be equally applicable to the medieval period, but no study of the fortunes of rabbit rearing in the Middle Ages has hitherto been attempted.

8 The Hundred Rolls nominate the owners of free-warren charters in most East Anglian villages. For the concept of free-warren see Sheail, *op cit*, 1971, p 35 and C R Young, *The Royal Forests of Medieval England*, Leicester, 1979, pp 10–11 and 46.

9 Sheail, *op cit*, 1971, p 39.

10 PRO, E 310.24/138. See below, n 109.



MAP I
Documented Rabbit-warrens and Areas of Light Soil in East Anglia, 1200–1540*

*warrens marked are those mentioned in text

The earliest warrens were founded almost exclusively on heathland and permanent pasture, although at Chippenham (Cambs) the Hospitallers bought out common rights on small pieces of arable for inclusion in their warren in the 1280s.[11] Although most nineteenth-century war-

11 M Spufford, *A Cambridgeshire Community: Chippenham from Settlement to Enclosure*, Occasional Papers, Dept of Local History, Leicester University, XX, 1965, pp 22–3.

rens were enclosed by ditches and banks topped with gorse to restrict the movement of predators, there is little evidence to indicate that this was widespread in the Middle Ages. At Lakenheath (Suff) a ditch probably divided the west end of the warren from the village arable, but such examples are rare and most remained open and without physical delimitation.[12] However, enclosed deer-parks were sometimes used for breeding rabbits, and these must have been an ideal, ready-made medium for their introduction so long as damage to pasture remained slight. The association between rabbits and deer-parks is strong at Staverton (Suff), and at Benhall (Suff) where a warren was mentioned in 1349 although not subsequently, but in 1543 the famous park was leased for £20.[13] There was also a substantial deer-park at Lopham by the end of the thirteenth century, which in 1386 produced 300 rabbits for the Countess of Norfolk's table.[14]

Most of the warrens in Map 1 had been founded by the late thirteenth century, many by ecclesiastical landlords. The Bishoprics of Ely and Rochester created warrens at Brandon and Freckenham (Suff) respectively; Bury St Edmunds Abbey did likewise at Mildenhall (Suff); and so did West Acre Priory at Wicken and Custhorpe (Norf).[15] The Prior and Convent of Ely were granted free-warren in Lakenheath in 1251 and in 1300 the specific right to a *cunicularium* was added to the charter.[16] The rabbit was a particularly favoured delicacy of the Abbot of St Edmunds who had a warren created at his country retreat in Elmswell and at Long Melford (Suff), whilst both West Acre and West Dereham Priories also established their own warrens nearby.[17] Various lay landlords were also prominent in this new experiment, notably the Warennes, earls of Surrey, at Methwold, Thetford, Tunstead and Gimingham (Norf), and the earls of Norfolk who founded seven warrens centred on east Suffolk.[18]

It is difficult to ascertain the exact area of these early warrens, although the largest swept down the western edge of Breckland from Thetford through Wangford to Eriswell.[19] By the end of the Middle Ages such warrens had probably grown to occupy the 1000 acres plus they were to reach at their zeniths. However, other warrens may never have been larger than that at Coney Weston (Suff), where in 1302 'there are two acres two roods of herbage in the rabbit warren with furze included which are valued at 8*d* per annum, but there are no profits from the rabbits'.[20] These differences in warren size and capacity are illustrated by the wide variety of warren lease valuations: Snettisham and Wighton warrens (Norf) were valued at 66*s* 8*d* and 6*s* 8*d* respectively in the fifteenth century, whilst Leiston warren (Suff) produced £20.[21]

12 Cambridge University Library, EDC.7/15/II/Box 1/9 m.22 records that three Lakenheath men grazed their animals '*in fossato de la coneger*' in 1333.

13 Staverton park is well documented as far back as the 1260s, and a warrener was employed there in 1267, Rackham, *op cit*, p 147 and PRO,SC6.1005/7; for Benhall see Inquisitions Post Mortem, IX, p 300, and W A Copinger, *The Manors of Suffolk*, 7 vols, 1896–1905, vol V, p 103.

14 Thirteenth-century accounts of Lopham mention neither rabbits nor warrener, although a park was patently in use, PRO,SC6.938/1–10. Yet in 1386 it was the largest individual source of rabbits on the Countess of Norfolk's estates, J M Ridgard (ed), *Medieval Framlingham: Select Documents 1270–1524*, Suffolk Record Society, XXVII, Woodbridge, 1985, p 115.

15 For Brandon see PRO,SC6.1304/23; E Callard, *The Manor of Freckenham*, 1924, pp 59–60; Mildenhall, Bodleian Library Oxford, Suffolk Rolls 21; F Blomefield, *An Essay towards a Topographical History of the County of Norfolk*, 5 vols, 1739–75, vol IV, p 752.

16 G Crompton, 'A History of Lakenheath Warren', *Report to the Nature Conservancy Council*, 1972, p 14.

17 For a map of Elmswell warren in the sixteenth century see N Scarfe, *The Suffolk Landscape*, 1972, p 195; PRO,SC6.Hen. VIII/2632 m.8 and m.16.

18 The Warennes were responsible for introducing rabbits on these estates, but in the fourteenth century they were taken over by the Duchy of Lancaster, Blomefield, *op cit*, IV, p 318, and PRO,DL29.288/4719 (1358–9). In 1386 the Countess of Norfolk received rabbits from warrens at Kennett, Dunningworth, Hollesley, Staverton, Walton, and Chesterford, n 14 above.

19 Crompton, *op cit*, map VI.

20 British Library, Harl.Ms.230, fo 155. The name Coney Weston is not derived from 'rabbit' but is in fact a corruption of King's Weston.

21 Snettisham and Wighton, PRO,DL29.291/4790 (1431–2); Leiston warren was leased by Robert Brown in 1539, PRO,SC6. Hen.VIII/3420 m.38.

Were all medieval warrens deliberate seigneurial creations, or did in fact some landlords just exploit an indigenous colony? There is explicit evidence that the earliest warrens were deliberate creations. For example, the Despencers gave Henry III ten live rabbits to begin a colony at Guildford (Surrey) in 1235 and the King himself donated 100 to the Bishop of Chichester, but unfortunately no comparable examples are extant from East Anglia.[22] However, indirect evidence proves that the rabbit's migratory scope was very limited in the Middle Ages, and so most warrens must have been artificial creations. The distinctive clustering of warrens displayed in Map 1 indicates that the rabbit did not colonize a wide geographical area, and even in central parts of East Anglia it remained a rare beast.[23]

This might surprise a modern reader familiar with the animal's ubiquity and fecundity, but the medieval rabbit was fragile and uncomfortable in its new, cold environment, and under constant threat from predators and harsh winter conditions. Consequently, low fertility and high mortality rates restricted natural increase, even within the relative safety of the warren. This placed severe restrictions on long-distance migrations, although undoubtedly some fledgling warrens were spawned in the vicinity of the early warrens, and these were then exploited by eager landlords. Hence two colonies near Methwold warren were leased separately in 1413–15 for a small sum.[24] Iken (Suff) lay at least two miles east of Dunningworth warren (established by 1274), but rabbits only appear in its court rolls after 1364, significantly one year after the right of free-warren was first granted in the village.[25] This almost certainly indicates the arrival of a colony in Iken and by 1390 the court jurors were recording damage caused by rabbits from Dunningworth. This Iken colony must have flourished, because in 1392 documents refer to a locality as 'le coniger'.[26] There was a similar spread from the large Breckland warrens around the same time, and at Saxham (Suff) on the region's southern edge a few rabbits were recorded in the village by 1365.[27]

It is impossible to estimate accurately the rabbit population in any warren because of the immense difficulty of counting rabbits in colonies, and documentation is consequently uninformative. The only indications as to population size are the annual cullings entered in manorial accounts, although even these disappear in fifteenth-century documents as landlords abandoned direct management of warrens and leased them for a fixed rent income instead. The figures detailed in Table 1 indicate that the rabbit population expanded in the later Middle Ages, a trend substantiated by the rising value of Hilborough warren (Norf) from £2 13*s* 6*d* in the 1250s to £30 in the late fifteenth century.[28] However, even at its peak the medieval population still remained less than one-tenth the size it was to reach in the nineteenth century. For instance, few medieval warrens ever culled more than around 3000 rabbits in one year,

22 *Calendar of Close Rolls, Hen.III* vol 3, p 217, and *Hen.III* vol 5, pp 329 and 380. Veale, *op cit*, 1957, pp 88–9 discusses the evidence for created warrens but not the rabbit's spread subsequently.

23 The rabbit was rare in the Middle Ages in the central Suffolk village of Worlingworth, J M Ridgard, 'The Local History of Worlingworth, Suffolk, to 1400 AD', unpublished PhD thesis, Dept of Local History, Leicester University, 1984, p 69. Sheail, *op cit*, 1971, p 132 comments that the rabbit was not widespread in Norfolk until the nineteenth century.

24 In 1413–14 twenty shillings were paid for the farm of the warrens at Oteringhithe, Santon and Brundale, and in the next account ten shillings were rendered for rabbits 'taken at Weeting hill', PRO,DL29.290/4765 and 4769.

25 Rabbits are first mentioned at Dunningworth in the account of 1274, PRO,SC6.995/15. Extant Iken court rolls are extensive, but I could not find any reference to rabbits until the court held in December 1364, IESRO,HD32:293/390 m.44. Free-warren is not mentioned in the village in the Hundred Rolls and according to Copinger was not granted until 1363, Copinger, *op cit*, V, p 144.

26 IESRO.HD32:293/387, courts held November 1390 and September 1392.

27 The stock account of 1364–5 includes the heading '*cuniculi*', although none were actually taken, West Suffolk Record Office, Bury St Edmunds E.3/15.14/1.7.

28 Blomefield, *op cit*, III, pp 437–8.

TABLE 1
Decennial Means of Culled Rabbits and Their Disposal, Selected Manors

Decade	*A/Cs*	*Mean culled*	*Sold*	*Lord*	*Misc*
Brandon					
1340–9	4	158	11%	89%	—
1350–9	3	160	81%	11%	—
1360–9	6	301	46%	48%	6%
1370–9	4	622	29%	62%	9%
1380–9	4	2811	85%	5%	10%
1390–9	7	2267	86%	4%	10%
Dunningworth					
1270–9	1	199	100%	—	—
1280–9	2	51	100%	—	—
1290–9	5	30	100%	—	—
1300–9	3	41	28%	72%	—
Kennett					
1270–9	4	414	75%	25%	—
1280–9	4	195	78%	22%	—
1290–9	6	750	91%	9%	—
1300–9	4	213	96%	4%	—
Lakenheath					
1300–9	1	50	—	100%	—
1320–9	3	34	—	100%	—
1330–9	3	327	14%	86%	—
1340–9	2	265	17%	83%	—
1350–9	2	788	70%	29%	1%
1360–9	3	382	73%	27%	—
1370–9	3	850	73%	27%	—
1380–9	2	3639	80%	19%	1%
1390–9	2	3056	80%	20%	—
1420–9	1	758	99%	1%	—
Methwold					
1350–9	1	320	75%	25%	—
1390–9	1	9450	100%	—	—
1420–9	3	3933	100%	—	—
1430–9	6	1972	100%	—	—
1440–9	4	2055	100%	—	—
1450–9	4	1031	100%	—	—
1460–9	3	1897	100%	—	—

Sources: Brandon, PRO,SC6.1304/23–36, Bacon 644–63; Dunningworth, PRO,SC6.995/15–25; Kennett, PRO,SC6.768/5–24; Lakenheath, CUL,EDC. 7/15/1/1–31; Methwold, various accounts in series PRO,DL29.288/4719 to DL29.310/5007.

yet at Thetford in 1860 nearly 36,000 were slaughtered.[29]

29 See Table 1. The Thetford figure is from Sheail, *op cit*, 1971, p 59.

Inconsistent output was another distinctive feature of the medieval warrens. Cullings varied enormously from year to year, reflecting wild fluctuations in the rabbit population and illustrating the early warrens' precariousness. The bailiff of Guildford was ordered to send fifty rabbits to Henry III at Windsor, but only if the colony could sustain the losses, and a warrener was employed at Staverton between 1267 and 1300 although there were only seventy-two recorded cullings during that time.[30] A low population base in Kennett warren (Cambs) meant that only 169 rabbits could be taken between 1286 and 1291, yet a rapid recovery in 1292 resulted in localized damage to pasture ground and a bumper harvest of 1698 rabbits.[31] Warreners therefore had to exercise considerable discretion over the number to be culled each year, and the primary concern was always to maintain sufficient breeding stock. This was still the case in the fifteenth century, and even in a substantial warren such as Methwold it was not always possible to cull any rabbits because numbers were dangerously low.[32] Hence lessees held Swaffham warren (Norf) under a £10 penalty to leave it 'sufficiently stocked' at the end of the lease, and in 1498 John Wareyn was obliged to leave Blythburgh warren (Suff) 'well replenysshed with two thousand coneys or more'.[33] Yet even these precautions could not always prevent reckless plundering of the stock. Gressinghall warren (Norf) was ruined by its lessees in 1391, and that at Gimingham could not be leased in 1427–8 because of the devastation wrought by Edward Custans.[34]

As the rabbit population acclimatized to its new surroundings and gradually grew in size, so its capacity for crop destruction also increased. As early as 1341, 400 acres

30 *CCR, Hen.III* vol 6, p 327; Staverton, PRO,SC6.1005/7–18.
31 PRO,SC6.768/11–16.
32 See for example, PRO,DL29.292/4796, 4808, 293/4817, and 295/4846.
33 PRO,SC6.944/12 (1434–5); IESRO,HA30:50/22/1.11 (1498).
34 PRO,DL29.310/4980 and 291/4782.

at Gazeley (Suff) lay uncultivated 'because of the poverty of the tenants and destruction by the lord's rabbits', but the main problems emerged after the later fourteenth century.[35] At Elmswell in 1378, 16 per cent of the sown demesne area was destroyed by rabbits, and in 1391 the Mildenhall demesne lost all its oats crop.[36] In 1404 the vicar of Tottington (Norf) complained that the value of his tithes had been reduced by the spread of rabbits from John FitzRauf's warren, and an inquisition at Methwold in 1522 declared that 'much of the Corne of the said londe distroyed yerely with Conyes which be so greatly encreased'.[37] Such protestations should be treated with a little scepticism, but they do illustrate the rabbit's tendency to colonize a wider area, so that by the sixteenth century the spread from the largest warrens had become quite marked. At Freckenham in 1551 rabbits were described as 'increasing and multiplying on the common land' and the warren lessee was ordered to block up rabbit holes on common land, whilst a 1589 lease of Brandon warren commented on the 'growth and renewal' of stock outside the warren.[38] Yet for all this demographic expansion, the rabbit still remained scarce in many areas, and the Poulters' company of London was sufficiently concerned about stocks to impose a spring close season on cullings for much of the sixteenth century.[39]

35 *Nonarum Inquisitiones*, p 99.
36 WSROB,E.7/8/1 and E.18/455/1.
37 M R Postgate, 'An Historical Geography of Breckland 1600–1800', unpublished MA thesis, London University 1960, p 77.
38 WSROB,613/686/1 October 1549 and October 1551; PRO,E310.24/138.
39 P E Jones, *The Worshipful Company of Poulters of the City of London*, 1939, pp 82–3. Whilst the rabbit was obviously becoming more commonplace in the immediate vicinity of warrens in the Middle Ages it was still reckoned to be a rare beast, Sheail, *op cit*, 1971, p 9. However in the sixteenth century the price for rabbit rose less steeply than the price for other goods, which indicates that it was gradually becoming more common, J E T Rogers, *A History of Agricultural Prices and Wages in England 1259–1793*, 7 vols, Oxford, 1866–1902, vol IV, p 717. Other authors have subsequently argued that the rabbit was altogether more numerous in the sixteenth and seventeenth centuries, H V Thompson and A N Worden, *The Rabbit*, 1956, p 13.

The exploitation of warrens was a highly skilled business, and careful management underpinned the warren's transition from fledgling experiment to successful commercial enterprise. Most warreners were full-time manorial officials, although on smaller warrens they tended to combine duties, so that the warrener at Bury Abbey's grange also doubled as the rent collector.[40] Landlords soon realized that this was 'a trade not learnt in five minutes and one good warrener is worth any number of poor ones' and paid them handsome wages.[41] At Dunningworth in 1302 the warrener was the highest-paid manorial official, receiving fifty-two shillings a year.[42] In the fifteenth century, Ely Abbey drew up detailed contracts with their warreners, paying them at least £5 per year, stipulating their exact duties, and reserving the right of dismissal if their work was unsatisfactory.[43] To some extent these high wages were designed to reward the warrener's loyalty: the attentions of poachers made the job occasionally dangerous, and by acting as the guardian of a seigneurial privilege the warrener might expect little sympathy in village society. Besides financial remuneration, most warreners enjoyed other perks such as extra pasture rights and free accommodation within the warren lodge. The pressures of their work were largely seasonal and peaked with cullings in the autumn when the rabbit's fur was thickest. Extra help was often required in this busy period, as at Lakenheath in 1384 when seven men were hired for twenty weeks.[44] The most common method of trapping was with ferrets and nets, the ferrets being released into specific burrows to drive the rabbits above ground and into nets tended by trappers. Most warreners reared their own ferrets,

40 WSROB,A.6/1/9.
41 T W Turner, *Memoirs of a Gamekeeper*, 1954, p 103.
42 PRO,SC6.995/24.
43 See those drawn up for Lakenheath in 1411 and Brandon in 1492, CUL,EDR.G/2/3, fo 34 and Bacon 685.
44 CUL,EDC.7/15/1/28.

although sometimes a ferreter was hired at no little expense.[45]

For much of the year the warrener worked alone, guarding his rabbits against hunger and predators and even seeking ways to encourage breeding. The early rabbits appear to have been reluctant burrowers, which prompted some warreners to construct artificial burrows or 'pillow-mounds'.[46] These were designed to provide dry, well-ventilated burrows in which the rabbit could breed, and their very existence again emphasizes both the animal's unease in the damp climate and the need to tend it carefully.[47] Archaeological evidence for medieval pillow-mounds – as opposed to those from later centuries – is rare, particularly in East Anglia, although the region's warreners were certainly very protective of the rabbit's own burrows.[48] At Walberswick (Suff) John Huntsman was amerced in the standard court format for poaching and then indicted separately for 'searching in the burrows', whilst John Baret blocked up holes 'with mud and a lotion of salted herrings'.[49] Poachers were problem enough without their clumsiness causing untold physical damage to the warren's structure.

In many places warreners took positive steps to curtail the rabbit's high mortality rates, particularly after the late fourteenth century. Shortage of winter food was a perennial problem, although on the heathlands gorse provided a cheap and convenient source.[50] Drought at Staverton in 1306 resulted in the provision of gorse for the warrener, Robert Tendenil, presumably to feed the rabbits, and in the late fourteenth century oats were regularly given to rabbits at Lakenheath.[51] In the fifteenth century, warren leases often included some meadowland for the same purpose, such as at Desning in 1506.[52] Warreners also waged a perpetual war against the rabbit's natural predators and poachers, and the growth of the warren population signifies their success. The fox, stoat, weasel, wildcat and polecat stalked with ruthless efficiency, so that Brandon and Lakenheath warrens were set with numerous traps and snares 'for nocturnal predators', and the Kennett warrener was paid extra expenses for catching foxes and polecats.[53]

The real threat of both predators and poachers resulted in the construction of a wooden watchtower in Lakenheath warren in 1365, and of a stone lodge in Methwold by 1413.[54] These lodges were a feature of medieval Breckland, and that at Thetford still stands. Most date from the late fourteenth century, and at once reflect the threat posed by poachers and the determination of landlords to protect increasingly valuable assets. These remarkable buildings also absorbed much of the capital invested in warrens, for they were expensive to build and maintain. Brandon lodge was completed in the 1380s at a cost of over £20, stood at two storeys high, and was protected by slit windows and flint walls three feet thick; and at Elmswell in the early sixteenth century, the warren lessee

45 In Kennett warren in 1291–2 three ferreters were hired at a cost of 18*s* 6*d*, with an extra 5*s* 6*d* subsistence allowance for the ferrets themselves, PRO,SC6.768/16; on other occasions the warrener hired the ferrets only, SC6.768/5.

46 Sheail, *op cit*, 1971, pp 57–8; Rackham, *op cit*, p 47; Tittensor, *op cit*.

47 C F Tebbutt, 'Rabbit Warrens on Ashdown Forest', *Sussex Notes and Queries*, XVII, 1968, pp 52–4.

48 Most of the known pillow-mounds in Wales, for instance, date from the second phase of rabbit warren creation in the seventeenth and eighteenth centuries, *An Inventory of the Ancient Monuments in Glamorgan*, vol III: 'Medieval Secular Monuments, Non-defensive' Royal Commission on Ancient and Historical Monuments in Wales, HMSO, Cardiff, 1982, p 321.

49 John Huntsman, IESRO,HA30:312/194, court held August 1443. Baret was amerced twenty shillings for obstructing holes '*iuxta Cobbeshill infra garrena domini cum luto et locion' allec' sals*', HA30/312/195 December 1446; in June that year seven men were presented for obstructing burrows. This could conceivably refer to the act of trapping, but then we would expect the offenders to be amerced for poaching in the conventional court manner. One suspects that these men were blocking holes near arable land to stop their crops being damaged by the rabbits.

50 Turner, *op cit*, p 101; Sheail, *op cit*, 1971, p 50.

51 Staverton, PRO,SC6.1005/21; CUL,EDC.7/15/1/17 and 31.

52 PRO,SC6.Hen.VII/692; see also G Crompton and J Sheail, 'The Historical Ecology of Lakenheath Warren in Suffolk; a Case Study', *Biological Conservation*, VIII, 1975, p 305.

53 Brandon, PRO,SC6.1304/32; Lakenheath, CUL,EDC.7/15/1/28–9; Kennett, PRO,SC6.768/14 and 22.

54 CUL,EDC.7/15/1/20; PRO,DL29.290/4765.

was allowed over one-sixth the value of the lease each year to spend on upkeep.[55] Rabbit rearing was otherwise a relatively inexpensive business, with the major expenditure on labour.

Whilst these new methods were successful in increasing the rabbit population in the fifteenth century, they also created new problems for warren owners. Greater numbers inevitably meant greater competition for food and greater psychological stress amongst the rabbit community, which led to a higher rate of migration from the warren itself, despite the protection it offered.[56] Not only were the warrens losing their monopoly of supply, but localized damage to crops became a more serious problem. Increased population density in the warrens also led to inbreeding and a reduction in the quality of stock. Colonies then became more susceptible to disease, although the documents are frustratingly silent about its nature or incidence.[57] Coccidiosis and liver-fluke were probably major scourges:[58] indeed, liver-fluke also afflicts sheep, and as sheep and rabbits commonly shared pasture grounds throughout East Anglia then it is possible that they infected each other. Significantly, references to disease appear more frequently in the fifteenth century, and it was an important factor in the accumulation of arrears at Brandon warren in the 1480s and 1490s. In 1483 the warrener was pardoned the year's rent because of murrain amongst his stock, and in 1491 a further £11 1*s* 5*d* was allowed due to 'a great mortality in the winter'.[59] Now that competition for food amongst the rabbits had increased, harsh winters could threaten the existence of whole communities. Breckland warrens were badly afflicted by intense cold in the successive winters of 1434 and 1435, and both Swaffham (Norf) and Methwold lost much of their stock. The rent of £6 13*s* 4*d* remained unpaid at Swaffham until at least 1441 when the warren was to be restocked 'for the lord's greater profit'.[60] At Methwold £5 was spent on restocking in 1435 and another sixty live rabbits were bought in 1439, whilst gorse had been specifically planted as winter feed for the rabbits in 1437.[61]

The increasing migration of rabbits from the warrens, either permanently or temporarily in search of food, resulted in further damage to arable in the immediate vicinity of warrens. As the later Middle Ages was a period of slack demand for land, tenants were understandably reluctant to cultivate such ground, which encouraged and allowed landlords to absorb it within the official warren area. At Brandon before the Black Death, Oxwickfield was used as occasionally-cropped 'outfield' land, but thereafter was converted to permanent warren pasture, which explains why the bailiff of Brandon was acquitted rent owed on sixty acres of free land in 1389.[62] The value of Mildenhall warren tripled in the quarter-century after 1381, corresponding with a number of rent allowances on certain peasant lands which had been absorbed within the warren.[63] In 1425 William Gaylon was awarded eighteen acres in recompense for his own arable lands which now 'lay within the warren'.[64] By the mid-fifteenth century other lands had been similarly abandoned at Lakenheath and Swaffham.[65]

55 Bacon 651 and Rackham, *op cit*, p 293. For Thetford lodge see W G Clarke, *In Breckland Wilds*, Cambridge, 1926, p 144. Redstone, *op cit*, p 334. An analysis of costs in Blythburgh warren is given in C Richmond, *John Hopton: a Fifteenth Century Suffolk Gentleman*, Cambridge, 1981, p 39.

56 Sheail, *op cit*, 1978, p 353; Crompton and Sheail, *op cit*, p 306.

57 Sheail, *op cit*, 1971, p 57; Thompson and Worden, *op cit*, pp 109–10.

58 *Ibid*, pp 115–18.

59 Bacon 677 and 683.

60 PRO,SC6.944/15.

61 PRO,DL29.292/4792, 4796, and 4798; the 1437–8 account records fines levied on various men who had destroyed 'les whynnes' planted to sustain the lord's rabbits.

62 Mark Bailey, 'At the Margin: Suffolk Breckland in the Later Middle Ages', unpublished PhD thesis, Cambridge University, 1986, pp 251 and 264.

63 *Ibid*, p 264.

64 WSROB,E.18/451/4.

65 CUL,EDC.7/15/1/34; PRO,SC6.944/12.

II

The fortunes of commercial rabbiting in the Middle Ages are easier to describe than to explain with precision. Output from most warrens remained low until the later fourteenth century. Cullings varied wildly from year to year, but seldom exceeded a couple of hundred (Table 1). The sale price of the rabbit reflects its scarcity (Table 2), and for a century after its introduction to East Anglia it cost at least 3*d* each, which was equivalent to the wage of almost two days' unskilled labour. The highest recorded price is at Kennett where one rabbit fetched 4½*d* in 1297–8.[66] Whilst produce from the earl of Norfolk's early warrens tended to be mainly distributed to unspecified markets, most ecclesiastical warrens dispatched their rabbits to the monastic kitchens before *c*1350. Produce from Elmswell warren was almost exclusively consumed by the Abbot of St Edmunds and his retinue.[67] Rabbits also proved most acceptable gifts to friends, favourites and eminents, and the Prior of Ely sent sixty to Edward III in 1345.[68]

The main changes in the destination of produce came with the rapid growth in output in the latter decades of the fourteenth century, and even the ecclesiastical warrens diverted produce from their tables to the market.[69] Such a remarkable increase brought equally spectacular rewards. Between 1300 and 1348 the Brandon demesne received a negligible income from rabbit sales, yet in the next half-century they constituted one-fifth of gross manorial revenue, and in 1386–7 produced a record £40 4*s* 0*d* or 40 per cent of gross income. At Lakenheath in 1384–5 sales reached £37, or twice the income received from wool sales, hitherto the staple demesne product. From sales at Methwold the Duchy of Lancaster received a staggering £75 in 1391.[70]

The late fourteenth century was probably the heyday of commercial rearing in medieval East Anglia, although a shortage of direct evidence from the fifteenth century makes it impossible to be certain of this. However, most landlords had abandoned direct management of warrens and had leased them as part of a general movement towards the security of rentier farming by the 1400s.[71] Underpinning this movement was a continuing rise in wages relative to prices which had begun around the mid-fourteenth century. For example, the Lakenheath warrener received a flat rate of 30*s* 4*d* in 1355 but in 1470 was paid 60*s* 8*d* and an additional sum for trapping the rabbits.[72] Prices however fell from their earlier peak as the animal became more common, but held steady at around 2*d* per rabbit for most of the fifteenth century. Whilst this meant that the rabbit was still a relatively expensive commodity, it could not offset the continuing rise in wages and transport costs, and the industry must have suffered from declining profit margins.

Table 3 reflects the decline in warren values, which might suggest that commercial rabbiting, along with many other sectors of the English economy, suffered from depression in the middle years of the fifteenth century. Larger warrens fell to

66 Kennett, PRO,SC6.768/19; the average wage rate for a day's labouring on eight Winchester manors between 1301 and 1310 was 1.49*d*, J Hatcher, *Plague, Population and the English Economy 1348–1530*, 1977, table II. At these prices the rabbit cost about as much as a goose.

67 In 1377–8 the Elmswell warren produced 446 coneys and 244 *rabetti*, all of which were consumed by the Abbot of St Edmunds. In fact the Kennett warren did produce some rabbits for the Norfolk family's indulgence before the Black Death. In 1280 169 were taken to Hanworth (Norf) in time for Christmas; see PRO,SC6.768/11 and also 768/17 and 21.

68 CUL,EDC.7/15/1/13.

69 Not that this sudden increase in market production totally eclipsed domestic consumption: in 1385–6 Norfolk's household consumed 658 rabbits at Framlingham and in 1525 it managed 263 in just twenty-six days at Kenninghall, Ridgard (ed), *op cit*, p 115 and R Howlett, 'The Household Accounts of Kenninghall Palace in the Year 1525', *Norfolk Archaeology*, XV, 1902–4, p 58.

70 Brandon, WSROB, Iveagh Suffolk Ms.148; Lakenheath, CUL,EDC.7/15/1/28; Methwold, PRO,DL29.310/4980.

71 'By the last decade of the century, landlords nearly everywhere had ceased to farm their own land,' M McKisack, *The Fourteenth Century*, Oxford, 1959, p 390.

72 CUL,EDC.7/15/1/16 and 34.

TABLE 2
Sale Prices of Rabbits on East Anglian Manors

Period	*A/Cs*	*Gross income* (d)	*Total no. of rabbits*	*Price per rabbit* (d)	*Indices*
1250–99	12	22952	6404	3.58	158
1300–49	9	3924	1145	3.43	151
1350–9	6	3957	1732	2.29	101
1360–9	9	12261	4908	2.50	110
1370–9	7	12823	4913	2.61	115
1380–9	6	43033	16742	2.57	113
1390–9	12	68522	31574	2.17	96
1420–9	4	22620	11750	1.93	85
1430–9	4	14242	7840	1.82	80
1440–9	3	15928	8220	1.94	85
1450–9	1	7783	4124	1.89	83
1460–9	2	10044	5692	1.76	78

1250–1469 = 100

TABLE 3
Warren Lease Valuations, Selected Years

Warren	*Year*	*Valuation* (£ s d)
Brandon	1398–9	20. 0.0
	1463–4	13. 6.8
	1480–1	20. 0.0
	1541–2	20.13.6
Blythburgh	1480–1	8. 0.0
	1505–6	6.13.4
Gimingham	1424–5	3.10.0
	1437–8	4. 0.0
Lakenheath	1427–8	15. 0.0
	1442–3	12. 0.0
	1481–2	10. 0.0
	1487–8	18. 0.0
	1540–1	20. 0.0
Mildenhall	1400–1	4.13.4
	1407–8	5. 0.0
	1444–5	2. 6.8
	1467–8	4. 0.0
	1539–40	5. 0.0
Tunstead	1437–8	5.0
	1443–4	3.0

Sources: Brandon, Bacon 663–4, 675 and 696; Blythburgh, Richmond, *op cit*, p 38; Gimingham and Tunstead, PRO,DL29.291/4776, 292/4796, 293/4809; Lakenheath, CUL,EDC.7/15/I/35, 39, 47, and 48, EDC.1.C.3; Mildenhall, BL,Add.Roll 53120, 53124, 53137, 53139, and L J Redstone, 'First Minister's Account of the Possessions of the Abbey of St Edmund', *Proceedings of the Suffolk Institute of Archaeology and History*, XIII, 1909, pp 347–8.

around two-thirds their earlier value, and a small warren at Cavenham (Suff) lay vacant for want of a tenant.[73] The figures then appear to suggest a recovery from the 1460s, but it is doubtful whether this was really the case. For instance, at Brandon the warren lessee, Robert George, paid the £13 6*s* 8*d* rent in full in the 1470s which encouraged the Bishopric of Ely to increase it in 1480. George promptly defaulted on payment, running up substantial arrears by the 1490s.[74] Arrears at Desning warren amounted to £44 in 1506, all of which had been accumulated by four different lessees in the previous six years.[75] Yet despite these difficulties, rabbiting remained an integral part of seigneurial revenue. Excluding arrears the Brandon warren lease comprised 33 per cent of gross manorial income between 1400 and 1550, and 20 per cent at Gooderstone in *c*1500. At Hilborough it represented the biggest single source of manorial revenue.[76] So whilst its profitability in absolute terms declined, rabbiting maintained its relative importance in demesne farming.

73 PRO,SC6.1117/12.
74 Bacon 657–690 and 695.
75 PRO,SC6.Hen.VII/692.
76 Bailey, *op cit*, p 308; Blomefield, *op cit*, III, pp 403 and 438.

Explaining these contrasting fortunes is more difficult than merely outlining them. Prior to the Black Death of 1348–9, rabbit production was a distinctly low-output concern geared primarily towards household consumption. It presented some commercial opportunities in the luxury goods market, but its mass marketing potential was restricted by its high price and the low incomes of most Englishmen. The early warrens often represented a net financial loss in many years, emphasizing that rabbits were essentially an indulgence enjoyed only by the very wealthy.[77] However, the drastic reduction in the human population after the mid-fourteenth century heralded a remarkable change in fortunes for commercial rabbiting. The exact chronology of late medieval demographic decline is hotly debated by historians, but few dispute that after the 1370s it resulted in rapid gains in living standards and purchasing power for many people.[78] Whilst the grain market collapsed and arable cultivation contracted severely, this increased purchasing power induced changes in taste and fashion, and opened up a new market for goods previously considered as non-essential.[79] Hence in the late fourteenth century there was considerable growth in output of goods with relatively high income elasticities of demand, such as woollen cloth, cutlery, leather goods, pewter and wine.

Commercial rabbit rearing benefited from the changing economic conditions in a number of ways. First, the labour costs of rabbit keeping were low compared to grain farming and this enhanced its attractiveness to landlords in a period of rising wages. Furthermore, cullings could be sharply increased without a big rise in labour inputs, so that *unit* costs in rabbit production fell appreciably in the fourteenth century (although they rose slightly in the fifteenth).[80] Secondly, the demand for meat rose, and although there are no grounds for supposing that the rabbit suddenly became the meat of the masses, it certainly descended the social scale. Lastly, demand for better clothing increased and chroniclers commented on the rising standard of dress amongst the masses:[81] being a low-value fur, rabbit was most likely to benefit from any expansion in the mass clothing market. The common grey rabbit was most numerous in East Anglian warrens and was used for warmth rather than for display.[82] On the other hand, Methwold, Wretham (Norf) and some coastal warrens specialized in the rarer silver-grey and black rabbits.[83] These were much more fashionable as an adornment on clothing, and apparently Henry VII possessed night attire tailored with black rabbit fur.[84] Its fur also bore a close resemblance to the more expensive ermine, and was much in demand as an imitation.[85] The ability of warrens to meet these new market opportunities depended partly on careful management but also on favourable climatic conditions. The remarkable growth in output from the 1370s to 1390s coincided with a period of warm weather in which the rabbit population flourished.[86]

At first glance, the price evidence for rabbits does not seem to indicate their rising popularity in the fourteenth century. In the second half of the century, falling

77 This was inevitable in the thirteenth century when warren populations were low and variable and yet warreners' wages were high.

78 E H Phelps Brown and S V Hopkins, 'Seven Centuries of the Price of Consumables, Compared with Building Wage-rates', *Economica*, XXIII, 1956, pp 296–313.

79 For a general survey of these trends see Hatcher, *op cit*, pp 31–47.

80 A crude analysis of running costs (excluding major capital investment programmes) at Lakenheath warren in the fourteenth century indicates a fall from 2.12*d* per rabbit in 1300–49 to 0.45*d* in 1390–9, Bailey, *op cit*, p 267.

81 Hatcher, *op cit*, p 34.

82 Veale, *op cit*, 1966, p 176.

83 Sheail, *op cit*, 1971, p 25; Tittensor, *op cit*.

84 Veale, *op cit*, 1966, pp 15 and 141.

85 I am grateful to Margaret Windham Heffernan for this information.

86 The supposition that climate improved is based on knowledge that harvests were bountiful and grain prices low in this period, Hatcher, *op cit*, p 51.

demand for bread grains was reflected in a drop in price of about 22 per cent between 1351–60 and 1391–1400, and so conversely we might expect a rise in rabbit prices: in fact the data in Table 2 suggest a fall of 5 per cent over the same period.[87] Whilst this patently conceals a rise in *real* terms relative to grain whose price fell more rapidly, it compares unfavourably with beef prices which rose by around 11 per cent.[88] Yet this does not necessarily mean that demand for rabbit was less buoyant than for other meats, rather that its rapidly expanding population led to a rise in supply which exceeded the rise in demand, thus deflating prices.

The most cursory glance at the documents reveals that East Anglian rabbits were in demand from all quarters in the late fourteenth century. Even a lowly thief captured in Brandon possessed 'one gown furred with rabbit', and rabbit meat was also in demand on local markets, although retailers could not always meet that demand. Why else were butchers from Sudbourne and Orford (Suff) repeatedly poaching in Iken warren in the 1380s?[89] Distant markets proved even more lucrative, so that much of Brandon's output was bought in bulk by William Staunton, the renowned London merchant.[90] This heralded the beginning of a long tradition of trade between East Anglian warrens and London poulters and skinners, and in the early seventeenth century Reyce noted that Suffolk 'conies . . . are carried to London with noe little reckoning'.[91] Accessibility to major markets was crucial because high transport costs undermined profits and long delays could ruin stock, as happened in 1388 when 3000 skins from remote Pembrokeshire warrens had rotted by the time they reached Bristol.[92] The great advantage of East Anglian warrens was their proximity to the lucrative London market, which was reached either directly from the coast or overland.[93] In London many skins were treated or made into felt and then exported, the most common destinations being Calais and the Low Countries. In 1365 John Calwer shipped 12,000 skins to Flanders, and eighteen years later Collard Chierpetit exported 10,000 to Holland.[94]

A marked fall in the price for rabbits between 1390 and 1420 coincided with a drop in production on some warrens, indicating a check in the boom by the early fifteenth century, a feature also common to other late medieval 'growth' industries.[95] If the fourteenth-century successes had been based upon an ability to meet rising per capita demand for meat and fur, then the early fifteenth-century downturn was based on a tendency to over-supply. Despite a century when its price fell gradually, the rabbit was still a relatively scarce and expensive commodity in 1400 and demand was unlikely to expand indefinitely. The rabbit had a higher income elasticity of demand than, for example, bread grains, but it was not totally elastic. Furthermore, continued demographic decline in the early fifteenth century was likely to have sapped aggregate demand. Yet new warrens were still appearing, as at Wighton (Norf), whilst older warrens all over southern England continued to raise capacity, and eventually must have saturated the market.[96] Indeed, the tend-

87 *Ibid*, p 51.
88 L Genicot, 'Crisis: from the Middle Ages to Modern Time', in M M Postan (ed), *The Cambridge Economic History of Europe*, vol II, 'The Agrarian Life of the Middle Ages', second edition, Cambridge, 1966, p 686.
89 Bacon 293/5; IESRO, HD32:293/387 May 1391.
90 Bacon 653, 655–7.
91 Hervey (ed), *op cit*, p 35.
92 H Owen (ed), *A Calendar of the Public Records Relating to Pembrokeshire*, 1911, vol I, p 80.
93 Even the 'inland' warrens of Breckland enjoyed good river communications to Lynn via the Great Ouse.
94 *Calendar of Patent Rolls*, 1364–7, p 93; *CCR*, Ric.II vol 6, p 330; *CCR*, *Hen.IV* vol 1, pp 455–6, 523. Compare this export trend with the early thirteenth century when merchants of France and Spain imported rabbit skins to London, *CCR*, *Hen. III* vol 3, p 479.
95 Hatcher, *op cit*, pp 35–6.
96 In 1413–14 the Wighton account refers to '*nova warrena*', PRO,DL29.290/4765.

ency to excess-supply even in the boom years has been noted, and the sudden levelling of demand exacerbated that tendency.

The sharp drop in rabbit prices between 1390 and 1420 was followed by a century of stability when they held steady at just under 2*d* each, a remarkable performance considering the continuing price decline of other goods and the general deflationary trend of the period. Yet this evidence apparently contradicts that of warren values and rent payments, which suggest continuing decline and deepening depression in the industry during this century. A possible explanation for this paradox is that the warren as a means of rabbit production fell in value, whilst market demand for the rabbit *per se* was more buoyant. Warren values were primarily undermined by the rabbit population's slow but inexorable rise, which might have depressed the quality of warren stock, but certainly broke the warrens' monopoly of supply by increasing the rate of escape from the warren area. Otherwise the drop in warren rents may be explicable in terms of the general contraction in rents – particularly for land – around this time. As the tenant position grew stronger relative to the landlord in the fifteenth century, and as rental opportunities increased and diversified, so there occurred a general slippage of rents, which would have afflicted warren values.

The supposition that it was the value of warrens rather than the market for the rabbit which declined in the fifteenth century requires further verification. In part this comes from seigneurial efforts to regulate the exploitation of extraneous colonies within their jurisdiction. Legally these 'wild' rabbits remained under the protection of the free-warren charter, but in *practical* terms it was much harder for the lord to enforce his rights outside the protection of the rabbit-warren, and so peasant access to the animal became easier. Seigneurial response to this new situation varied considerably. The demands that the Freckenham warrener destroy burrows on the common land noted earlier appear to be a response to the damage inflicted on pasture, but in reality they could have been a cunning ruse to restore the warren's monopoly.[97]

Other landlords accepted the new conditions more stoically, and the Duchy of Lancaster merely charged 10*s* for the right to take rabbits at a wild colony in Weeting (Norf) from 1414, although by 1420 it had abandoned the idea.[98] Elsewhere a compromise between lord and tenant was reached. At Gimingham (Norf) in the sixteenth century the villagers 'shoold have all the conyes breedynge and dwelling uppon every of ther severall groundes to increase or distroy at their liberties and pleasures, except such as shoold brede uppon the demeanes of the said manor which shoold have bene free chase and rechase to feede uppon any of the tenants grounds without lett or disturbance of any of the said tenants', and the tenants should render 53*s* 4*d* each year for this right.[99] The agreement must have presented insuperable practical difficulties, for it is hard enough to distinguish one rabbit from another, let alone identify their burrow of origin. The lord had obviously imposed the rent in self-recompense for all the extraneous cullings which he could no longer control. No wonder the villagers were refusing to pay. This type of 'agreement' also best explains the payment of 12*d* 'pro le warrene monye' by John de Porter of Boyton (Suff) in 1539.[100] Such agreements might have been commonplace in the early sixteenth century until landlords recognized their ultimate futility.

Another important factor in undermining the value of the warren in the fifteenth century was the continuing popularity and

97 See above, n 41.
98 PRO,DL29.290/4765 and 4773.
99 PRO,DL44.295.
100 PRO,SC6.3420 m.22.

increasing sophistication of poaching. Not only are court rolls much more explicit about the methods of poachers, but by mid century the size of amercements levied on them had risen appreciably, sometimes to remarkable levels. In the 1460s the Bishopric of Ely amerced four Thetford and Downham men a total of £21 for their activities in Brandon warren, and Thomas Church of Risby (Suff) was ordered to pay £10 at Lackford (Suff) 'as an example to other wrong-doers' in 1516.[101] It is doubtful whether such large sums were ever paid, although their size reflects the extent of seigneurial concern over continued and successful attempts to breach the monopoly of the warren.

That the *market* for rabbits retained some buoyancy in the same period is evident from a number of sources. Its price stability is highly suggestive, reflecting a balance between supply and demand not apparent in other sectors of primary production. New and bigger markets for English rabbit producers emerged in the fifteenth century. Veale has suggested that by mid-century the rabbit had replaced the Russian squirrel as the basic fur of north-west Europe, and the growth of exports from London points to England's role as a major supplier.[102] London was not the only port to benefit, for at Blakeney (Norf) in the sixteenth century rabbit skins were the fourth-largest export commodity.[103] The Low Countries remained an important market, but Norfolk ports also sent furs to Danzig and the Baltic.[104]

Although lower prices and higher costs inevitably meant that profit-margins were lower than they had been in the fourteenth century, the rabbit trade between East Anglia and London remained prosperous. Methwold warren was a regular supplier to the London market, whilst John Hopton entertained London merchants viewing his stock at Blythburgh and Easton warrens (Suff) in the 1460s.[105] In 1529 a London merchant was fined for importing East Anglian rabbits during the close season imposed by the Poulters.[106] Throughout the Middle Ages this guild had fixed the price of rabbits on the London market, and in the fifteenth century one would fetch between 3*d* and 4*d*.[107] Hence a merchant shipping a load of 5000 East Anglian rabbits purchased at 2*d* each would still make a minimum gross profit of £21 or a maximum of £40, depending on the current price. Even after the relatively high costs of transport and labour, the net profit on one trip was still considerable.

Nor does the accumulation of substantial arrears on the payment of warren leases in the fifteenth century necessarily reflect depressed demand for the rabbit. The large annual rents demanded by some warrens were undoubtedly justified in years of normal cullings when the profits would be large, but the rabbit population could fluctuate greatly over short periods. Hence it was by no means certain that a lessee could cull enough stock to raise the price of the lease, and a run of bad years could prove disastrous. The attitude of landlords to these arrears could also prove vital to the well-being of their warrens. An intransigent and demanding creditor may have forced a desperate lessee to cull dangerously large amounts of stock in order to meet his debts. So even as rentier farmers, landlords had to manage their warrens with great care.

101 Bacon 668; WSROB,E.3/15.12/1.17.
102 Veale, *op cit*, 1966, p 177.
103 J Thirsk, 'Farming Regions of England', in J Thirsk (ed) *The Agrarian History of England and Wales*, IV, Cambridge, 1967, p 43.
104 B Cozens-Hardy (ed), *The Maritime Trade of the Port of Blakeney, Norfolk 1587–1590*, Norfolk Record Society, VIII, 1936, p 32.
105 In 1453 the Methwold reeve received £14 6*s* 7*d* from 'John Edmond, Pultere of London', PRO,DL29.293/4826; Richmond, *op cit*, pp 39 and 81.
106 Jones, *op cit*, p 83.
107 *Ibid*, pp 124–36.

III

The rabbit undoubtedly made a significant impact upon those areas to which it was introduced. East Anglian soils display a wide variety of type and composition, from fertile clays to thin, acidic sands, and in the Middle Ages these sands presented a formidable obstacle to cultivation. Hence Breckland was unable to sustain much arable farming, and has consequently been regarded by historians as economically under-developed.[108] Yet Breckland, like the Norfolk Goodsands and Suffolk Sandlings, became an important sheep-rearing area and the subsequent emergence of rabbiting also helped to generate wealth and to counteract its deficiencies in arable production. Rabbits were valuable precisely because they provided an opportunity to make productive use of the poorest soils, and indeed some warrens were founded on soils described as fit *only* for rabbits.[109] Furthermore, as areas of poor soil were most likely to suffer the brunt of the declining grain market in the later Middle Ages, then rabbiting offered a welcome source of alternative income in a difficult period.

The industry presented a range of employment opportunities, not all of them legal, and as output increased so did the occupational spin-offs. The position of warrener was itself financially rewarding, whilst helping with the trapping or guarding of rabbits could provide a useful source of supplementary income at the very least. The preparation of furs was a skilled and specialized task, and towns and villages near the warren areas harboured a number of skinners and barkers dependent on the local rabbit and sheep trades.[110] They were prominent in medieval Thetford and Bury St Edmunds, and at Mildenhall in 1381 John Cope, *pelliparius*, could afford 8*s* annual rent for a newly constructed workshop.[111]

The rabbit industry also encouraged other specialists in the clothing trades, such as listers and glove-makers, and for instance Simon Glover of Brandon owed the local warrener for 253 skins in 1477.[112] It is also probable that the fur was sometimes shorn from the skin and then felted, again for use in clothing. Unfortunately there are no direct references to this art, although if it was undertaken by the group collectively known as 'skinners' then it is unlikely that it would leave any more precise record in medieval documents.[113] Of course, the amount of specialist craftwork generated by the rabbit industry locally should not be overstated, for the largest warrens tended to send their produce directly to London, and so some of the benefit accrued to London skinners and poulters. However, this trade, though largely seasonal, did then provide much-needed stimulus to the boatmen and carriers of the region.

As the mass of the peasantry was legally excluded from taking the rabbit, any benefit to them from the growth of the industry would appear negligible. However, court rolls overwhelmingly suggest that many peasants living in the vicinity of warrens secured a reasonable supply of rabbits illegally, either for domestic consumption or for distribution through the black market. The incidence of poaching as recorded in these rolls increases rapidly from the mid-fourteenth century, reflecting both the growth in rabbits and of poaching itself. There can be no doubt that the recorded cases represent only a part of the total number of offences, as illustrated by a plea to Brandon jurors to ascertain

108 Bailey, *op cit*, pp 1–10.
109 Sheail, *op cit*, 1978, p 348.
110 Bailey, *op cit*, pp 201–4.
111 A Crosby, *A History of Thetford*, Chichester, 1986, pp 51 and 58; R S Gottfried, *Bury St Edmunds and the Urban Crisis 1290–1539*, Princeton, 1982, pp 111–20; BL, Add.Roll 53117.
112 Bacon 296/29 June 1477.
113 M E Burkett, *The Art of the Feltmaker*, Kendal, 1979, pp 100–4; for the export of felt see *CCR*, *Ric.II* vol 1, p 146.

the names of 'wrong-doers in the warren' in the 1380s.[114]

The attraction of poaching was its simplicity and its profitability. Most warrens were situated on vast and isolated tracts of heathland, some distance from the nearest village and were therefore exposed and palpably difficult to protect. In addition, the rabbit prefers to leave its burrow and graze nocturnally, thus presenting poachers with excellent cover from the protective gaze of warren officials and with easier pickings on the ground. With no necessity to drive the colony from its burrows, they merely surrounded the unsuspecting animals with nets and rounded them up with dogs. The stout warren lodges provided a base for the warreners' operations against the poachers and welcome protection in case of danger, but they fought a losing battle.

Many of the peasants who lived in the rabbit-producing regions must have poached at some stage during their lives, and most of the reported cases involved one-off offenders. Occasionally the court jurors distinguished between those actually operating in the rabbit-warren and those who contravened the seigneurial right of free-warren in its more general sense. Hence there are some presentments against men killing hares (*'lepores'*) 'within the lord's warren', which patently refer to the legal, rather than physical, concept of warren.[115] However, the countless references to the use of nets, ferrets and dogs largely concern planned operations within the rabbit-warren itself, and often the perpetrators of these deeds are called *'communes venatores'*, common or habitual poachers. Some travelled appreciable distances to poach, such as the nine miles by an Ickburgh (Norf) man to Brandon warren, and the seven miles by John Newman of Spexhall (Suff) to Westwood warren.[116]

It is also apparent that no-one was beyond reproach, judging by the number of petty clerics involved in poaching. In 1435 the parson of Cressingham (Norf) owed a £10 amercement for poaching at Swaffham, and Augustinian canons from Blythburgh Priory were regular unwanted visitors to Westwood warren. In 1425 one of their number, Thomas Sherman, was described in the court roll as 'a poaching canon'.[117] Most of these regular poachers reared their own ferrets and dogs, and made their own nets. Greyhounds were popular, and were certainly favoured by the Blythburgh canons. However, rough heathland terrain proved demanding and other poachers preferred the more hardy lurcher, a cross between the greyhound and the collie.[118] Court officials kept a watchful eye over these men, and John Brette of Flempton (Suff) was fined because 'he kept a certain dog in order to kill the lord's rabbits'.[119] Some poachers, such as Geoffrey Sewale of Walberswick, preferred to set traps in the warrens instead, but for many ferreting remained ever popular.[120] Indeed, they were in such demand on the Suffolk Sandlings in the fifteenth century that one Blythburgh canon ran a profitable business in leasing his well-trained ferrets to other poachers, presumably for a suitable fee.[121]

By the later Middle Ages poaching had become a sufficiently serious and lucrative business for poachers to organize themselves into gangs. These were not merely some haphazard extension of individual operations, but represented a deliberate and

114 Bacon 292/5.

115 See for example the case of Henry Ingellhous, *chivaler*, of Tunstead who in 1426 hunted hares with his greyhound, PRO,DL30.103/1423.

116 Bacon 289/4 February 1329; IESRO,HA30:312/195 December 1449. The court jurors at Methwold in 1370 complained that one John de Burgh of Cambridgeshire had been poaching in the warren, PRO,DL30.104/1471 m.8.

117 PRO,SC6.944/12; IESRO,HA30:312/194 October 1430, 312/195 December 1442, and 312/196 February 1425'.

118 Turner, *op cit*, p 105.

119 WSROB,E.3/15.12/1.14 December 1410.

120 Sewale was amerced *6d* for setting *laqueus* for rabbits, IESRO,HA30:312/195 April 1448.

121 IESRO,HA30:312/195 July 1449.

carefully planned pooling of knowledge and resources. Their activities were characterized by efficiency and ruthlessness, and they entered warrens heavily armed and equipped with a comprehensive range of poaching accessories. Their success undoubtedly prompted manorial officials to try and catch them with incriminating evidence even before they entered the warrens. The homes of an east Suffolk gang were scrutinized by court officials from Walberswick, who allegedly found four men keeping lurchers 'in their tenements', one man keeping ferrets and a net 'in his house', and another with a supply of 'haypenne' nets.[122] A Thetford gang of the 1440s, equally well equipped but more elusive, was reportedly operating in Downham warren (Suff) attired with 'soldiers tunics, steel helmets, bows and arrows', whilst others were armed 'with cudgels and staffs'.[123] In September 1444 this formidable bunch attacked and wounded three members of a rival gang from Elveden (Suff) 'and without licence abducted and unjustly imprisoned them in the town of Thetford'.[124]

Many of these Breckland gangs were comprised of skilled craftsmen, notably bakers, weavers, fishermen, and hostelers, and with their wide range of contacts hostelers may have been particularly important in co-ordinating activities.[125] It is also possible that some warreners played a double game, for their expertise and local knowledge would have been invaluable. Robert Fisher, a warrener domiciled in Thetford, certainly poached in nearby Downham warren in 1446.[126] With or without inside help, most poaching gangs included a number of men drafted from outside the locality. Court rolls always listed those culprits known to them, but often complained that these were joined 'by many other unknown men'.[127] Such anonymity reduced the courts' chances of breaking up gangs, and provided the gangs themselves with a wider range of dispersal points for their illicit gains.

It is possible that the rise in poaching was motivated by a sense of social grievance as much as by economic necessity. Resistance to the feudal order was endemic in late-medieval East Anglia, and court rolls repeatedly record refusals to perform manorial offices, labour services and the like.[128] Occasionally this flared into violent protest, and most commentators have noted the vehemence of the 1381 revolt in the region.[129] The criminal activities of the poaching gangs were primarily directed against a privilege of the feudal order, and so might have been championed and condoned by other peasants: if this was the case, then it would confirm Hobsbawm's theory of social banditry.[130] The rabbit was undoubtedly a very tangible embodiment of seigneurial privilege and status, and therefore an ideal medium for social protest. The Smithfield rebels of 1381 explicitly demanded that all men should have the right to take game and to hunt hares in the field.[131] The physical damage caused by maurauding rabbits was certainly a source of friction and was amongst the grievances cited in Kett's Rebellion in Norfolk in 1549.[132] Unfortunately, conclusive proof that poaching was a major form of social protest is elusive. Its increase

122 *Ibid*, March 1447.
123 WSROB,651/31/4.
124 *Ibid.*
125 WSROB,651/31/3 and 4.
126 WSROB,651/31/4.
127 In 1426 it was noted that Roger Geddow 'gathered with various other people' in the lord's warren at Northreppes, PRO,DL30.103/1423.
128 See for example Gottfried, *op cit*, chap 6; C Dyer, 'The Social and Economic Background to the Rural Revolt of 1381', in R H Hilton and T H Aston (eds), *The English Rising of 1381*, Cambridge, 1984; M K McIntosh, *Autonomy and Community: the Royal Manor of Havering 1200–1500*, Cambridge, 1986, pp 50–85; Bailey, *op cit*, pp 223–4, 246, and 279–80.
129 E Powell, *The Rising in East Anglia*, Cambridge, 1896; R Hilton, *Bondmen Made Free: Medieval Peasant Movements and the English Rising of 1381*, 1977, chap 6.
130 E J Hobsbawm, *Bandits*, 1969, pp 13–23.
131 R B Dobson, *The Peasants' Revolt of 1381*, p 186.
132 Sheail, *op cit*, 1978, p 352.

in the later fourteenth century certainly corresponded with a rise in social tensions, but also with a rise in the demand for the rabbit. Indeed, there was little sense of camaraderie or social unity between those Thetford and Elveden gangs in the 1440s.

IV

Until evidence about the fortunes of commercial rabbiting from other regions is compiled and assimilated, one must be wary of drawing general conclusions from the experience of East Anglia. This was undoubtedly a favoured area by virtue of its ability to reach the bigger markets cheaply and efficiently, and it remains to be seen how the more remote warrens fared in the Middle Ages.[133] Yet the East Anglian experience provides an interesting insight into patterns of demand in the medieval economy, especially after the Black Death. The limited commercial potential of the rabbit when real wages were low in the thirteenth century comes as no surprise, nor indeed that demand for rabbits – no less than for other 'luxury' goods – should increase with per capita incomes in the late fourteenth century. What *is* surprising is the very rapid increase in aggregate output in the quarter-century after 1370, which suggests that historians may not have realized the potentially wide demand differential between basic and non-essential goods in the later Middle Ages, nor indeed the speed at which new markets expanded. Rabbiting also reveals something about patterns of supply in this period. Landlords, particularly ecclesiastical landlords, have often been regarded as rather conservative, slow to respond to economic change and notoriously poor investors in their agrarian operations.[134] Yet this evidence reveals a remarkable willingness and readiness by landlords to transfer capital/investment into a high-growth project, at the very time that arable farming was becoming less profitable. This flexibility earned them handsome profits initially, and provided an important source of income in the difficult years of the fifteenth century.

The rabbit's ability to convert unproductive heathland into a source of not inconsiderable wealth also carries important implications for regions of poor soils, the so-called marginal economies of England. Because of their inherent and insuperable disadvantages in arable farming, these regions are assumed to have been economically underdeveloped and to have borne the brunt of the late-medieval agrarian depression. After the Black Death, arable cultivation certainly declined in the poor-soil regions of East Anglia, but the extent of economic decline was mitigated to some degree by their ability to develop alternative sources of income.[135] The profitability of commercial rabbiting helped to offset seigneurial losses in income from arable farming, and its occupational spin-offs – legal or not – helped to diversify their economies and bolstered their resilience to demographic decline. There is consequently an intriguing general implication from this study, namely that marginal regions could possess much more flexible and wealthy economies than hitherto assumed, because historians have tended to neglect their ability to develop other specialist agrarian or industrial roles which could offset their natural disadvantages in grain production. As Blomefield succinctly commented, 'the rabbits . . . on the most barren part are not only the more excellent for that reason, but render that which would otherwise be of no use to be of equal value with much better land'.[136] What

133 Sheail, *op cit*, 1971, pp 69–70 has commented on the importance of market accessibility in maintaining a successful warren, and explains the limited development of some Scottish and Welsh warrens in these terms.

134 M M Postan, *The Medieval Economy and Society*, Harmondsworth, 1975, pp 112–16.

135 Bailey, *op cit*, chaps 4 and 5.

136 Blomefield, *op cit*, I, p 554.

Sheail suspected of the early modern period was certainly true of the Middle Ages: the rabbit's meat and fur were so highly regarded that its value far outweighed its destructive capacity. In our nursery days few of us ever realized that when Daddy went a-hunting, he was not after any old skin to wrap the baby Bunting in.

Notes on Contributors

DR MARK BAILEY has recently finished a thesis on the Suffolk Breckland, and is a Research Fellow at Gonville and Caius College, Cambridge. He is currently working on Norfolk to complete his research on medieval Breckland, part of a wider project aimed at assessing the role of marginal regions in the medieval economy as a whole.

DR CHRISTOPHER DYER is Senior Lecturer in Medieval History in the University of Birmingham. His publications include articles on medieval social and economic history, and a book on the estates of the bishopric of Worcester, *Lords and Peasants in a Changing Society* (Cambridge, 1980). He has just completed work on a book on medieval standards of living. He is Editor of *Midland History* and Secretary of the Medieval Settlement Research Group.

DR PAUL GLENNIE is a lecturer in geography at the University of Bristol, having previously been Research Fellow at Jesus College, Cambridge. His interests lie in the commodification of late medieval and early modern English economy and society. His recent and current research concerns the geography of changes in agricultural productivity, long-term changes in occupational structure, and the composition of the domestic market for consumer goods.

DR JOHN E MARTIN is Senior Lecturer in Sociology at the University of Canterbury, Christchurch, New Zealand. He has a strong interest in rural history beginning with a PhD thesis (1979) on English agrarian history, published as *Feudalism to Capitalism* (1983, 1986). More recently in New Zealand he has been involved in research on rural history, with a focus on various groups of wage earners such as shearers, farm and station hands, and harvesters and threshing-mill hands. He has published several articles in this area, together with a history of the shearers' union, *Tatau Tatau: One Big Union Altogether* (Wellington, 1987). He has also been involved in social-policy oriented research for the Government on the impact of contemporary horticultural development, and specifically the kiwifruit industry, published as *Labour and Kiwifruit* (Wellington, 1983). He is currently preparing a social and labour history of rural workers in nineteenth-century New Zealand, which should be published as a book shortly.

COLIN J HOLMES is a Senior Lecturer in Economic History at Kingston Polytechnic. His main research interest is in the development of agricultural science and its effects on English farming in the period 1900–50, and he has recently begun to publish work on this topic. He has also published papers on modern British industrial history, and on the economic functions of government in nineteenth-century Britain.

DR BRUCE M S CAMPBELL lectures in geography at the Queen's University of Belfast. His main research interest is the agrarian economy and society of medieval England. He has published a number of articles on this subject, his essay in the *Journal of Economic History* for 1983 being awarded the Arthur H Cole Prize of the Economic History Association. In 1983–84 he was the recipient of a Personal Research Fellowship from the ESRC which enabled him to complete a long-term investigation of the technology and productivity of demesne husbandry in Norfolk. He is currently preparing the manuscript of a book on medieval agriculture for publication by Cambridge University Press.

Changes in Diet in the Late Middle Ages: the Case of Harvest Workers*

By CHRISTOPHER DYER

Abstract

The custom of feeding workers during the autumn on various manors in eastern and southern England provides an opportunity to quantify changes in diet over two centuries. In the thirteenth century harvest workers were given much bread and some cheese, with relatively small quantities of ale, fish and meat. Two centuries later the importance of bread had much diminished, and a high proportion of the diet consisted of meat and ale. Barley and rye bread was replaced by wheat, bacon by beef, and cider by ale. These workers ate better than most wage-earners and peasants, but the trends in eating patterns were general. The chronology of the changes, which were spread over much of the fourteenth century, and the general relationship between diet, production, the market and demography, have implications for our interpretations of the late medieval period.

For generations knowledge of medieval agriculture has advanced, yet still we have hazy notions of the consumption of foodstuffs, especially by the lower ranks of society. A greater awareness of eating patterns can help our understanding of the social structure, so that such categories as 'wage-earners', 'peasants', and 'gentry' can be visualized in terms of their different material standards of life.[1] If we can learn more about diet we will be better be able to test the hypothesis that the low nutritional status of large sections of the population in the early fourteenth century ended a century or more of increasing numbers and began a long period of demographic stagnation.[2] Finally, information about the use of crops and animal products should provide new insights into the aims and methods of agricultural production.[3]

The search for information about diet leads us to employ a great deal of indirect evidence, by analysing the grain allowances made to retired peasants for example, or by examining the grain liveries given to full-time servants on manors (*famuli*), or by sifting through bones and plant remains found as accumulated rubbish on archaeological sites. These and other areas of study are valuable sources of data, but they all tend to throw light on sections of the diet only, and often their use must be surrounded with uncertainties of interpretation.

The records contained in manorial accounts of the food and drink given to harvest workers provide a sample of lower-class diet over a long span of time, from the mid-thirteenth to the mid-fifteenth century. For this reason harvest-workers' diets are worth investigating, and the first part of this essay will contain a survey of their food consumption. However, the harvest workers were not typical of the whole labour force, and the later part will attempt

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1 For a continental example see L Stouff, *Ravitaillement et Alimentation en Provence aux XIVe et XVe siècles*, Paris, 1970.

2 M M Postan, *The Medieval Economy and Society*, 1972, p 34; J Z Titow, *English Rural Society, 1200–1350*, 1969, pp 64–96; G Bois, *The Crisis of Feudalism*, Cambridge, 1984, pp 268–9.

3 Eg I Blanchard, 'The Continental European Cattle Trades, 1400–1600', *Econ Hist Rev*, 2nd ser, XXXIX, 1986, pp 427–60.

to define their position within the social hierarchy of living standards, and to explore the wider implications.

Most manors paid their harvest workers a cash wage. On the minority of manors which are the subject of this enquiry, mostly in southern and eastern England, the labour force was given both cash and food. The group of workers who brought in the harvest included the *famuli*, the permanent staff of the manor, who for the 'autumn' (a period of four to seven weeks) were given an enhanced cash wage and meals instead of the usual combination of cash and grain. They were joined by workers hired specially for the harvest (both for the duration, and for shorter times), and by administrators. For example, at Sedgeford (Norfolk) in 1273 thirty-four people were said to be 'resident at table', including the supervisors, that is, a sergeant, reeve, hayward, and tithe collector, and the *famuli*, including the herdsmen and two dairymaids. Eleven extra hands were hired for the full 'autumn' of thirty-nine days, and four for ten days only.[4] A dairymaid (*deye*) did some of the food preparation, but usually a cook was employed full-time.

Before analysing the food issued on these occasions, we must consider the nature of this important part of the farming year. The participants worked hard over long hours, scything and raking barley, cutting other types of corn with sickles and binding the sheaves, tossing the sheaves into carts for carriage back to the manorial *curia*, and there 'pitching' the corn onto stacks. The work sometimes had to be hurried, 'for fear of rain' as the accounts say in justifying an extra tip given in encouragement. The intensity of pre-mechanized harvest work has been recorded by nineteenth-century observers, and the illustrator of the early fourteenth-century Luttrell Psalter, with his eye for the grotesque, has captured in the bent backs and strained faces of his figures some of the harsh toil involved.[5]

The harvest was a time of high labour productivity, when workers could keep up the pace better if they ate plenty of food, and employers gained from generous treatment of the workers. It was also a period of intense competition for labour, when the lords of manors, demesne farmers, rectors, and better-off peasants all needed hired hands. Labour mobility reached a peak in August, as people left their homes and normal occupations in search of good pay in the harvest fields. Even in the years around 1300, when labour was relatively abundant before the epidemics of 1348–9, village by-laws were requiring the able-bodied to accept employment in the harvest at 'a penny a day with food', instead of running off to other villages, or making a living by gleaning.[6] After 1349 the struggle for labour intensified, and many harvest workers came before the justices for offences under the Statute of Labourers, accused of demanding and receiving excessive rates of pay, and of breaking contracts in order to take the opportunities of the season. The cases show that daily wages doubled at harvest time, and that workers were also offered high lump sums (such as 6*s* 8*d*) and inducements in kind to work for the whole season.[7]

Because harvest workers were a special case, their diet, which formed an important element of their total pay, was superior to that of wage-earners in other occupations. The employers had the resources to provide ample supplies, in return for which they were able to recruit a large, willing, and efficient work-force, who they might hope would return in subsequent years.

4 Norfolk RO, DCN 60/33/4.

5 B Bushaway, *By Rite*, 1982, pp 107–38; G Ewart Evans, *Ask the Fellows who Cut the Hay*, 1965, pp 85–93; E G Millar (ed), *Luttrell Psalter*, 1932, pp 97–9.

6 W O Ault, *Open-Field Farming in Medieval England*, 1972, pp 29–34.

7 S A C Penn, 'Wage-Earners and Wage-Earning in Late Fourteenth Century England', Research Report for the ESRC, Birmingham, 1986, p 51.

Although the peculiar characteristics of the season and its workers should be borne in mind, they should not undermine entirely the value of studying the harvesters as a group of medieval wage-earners. We are not dealing with a single and exceptional day, like the reaping boon when all tenants turned out to do a day's labour service and were rewarded with a special meal. The autumn normally lasted for about five weeks, or a tenth of the year, more than an insignificantly transient episode in people's lives.

And the harvest workers formed a wide cross-section of the lower ranks of medieval society. Among the *famuli* some were no doubt youths labouring in the early years of their life-cycles, and others included married small-holders like Henry le Driver, the ploughman at Cuxham (Oxon) who was still working on the demesne at the age of about fifty in 1348, and widowed cottagers like Chaucer's *deye*, with her two daughters, three pigs, and three cows, who is of course fictional, but was recognizable as a type to an audience of the 1390s.[8] The temporary employees would also have included small-holders without the ties (or the security) of full-time work on a demesne, and members of their families. Workers in such industries as building and textiles abandoned their jobs for higher pay in August.[9] Temporary migrants came from towns, like the forty-six 'cokeres' from King's Lynn, who worked at Sedgeford in 1378.[10] Itinerants travelled from further afield, notably the bands of Welshmen who worked in the midlands in the autumn. At Brancaster (Norfolk) in 1368 three 'flemynges called Pekkeres' (presumably from Picardy) were hired.[11] All sources agree that both sexes joined in the harvest, for example at Appledram in Sussex in 1450 wages were paid to 'various men and women harvesting, at the lord's table'.[12] A few better-off peasants (who would generally have been busy bringing in their own crops) would have been present at the demesne harvest by virtue of their tenure of such offices as reeve and hayward. By an unusual arrangement at Lullington (Sussex) the supervisors only were fed at the manor and the workers fended for themselves.[13] The sergeant or bailiff, often recruited from the lesser gentry, was the highest ranking of the residents, though monks or senior administrators sometimes stayed on the manor for a few days to keep an eye on the work. These fleeting visits did not usually have much influence on the types or quantities of food consumed.[14] In short, the main body of the harvest workers ranged from the upper peasantry to landless servants, with the great majority at the bottom end of the social spectrum. They included young and old, men and women, townsmen and villagers, householders and itinerants, English and foreigners, people working normally in both industry and agriculture, and those in both continuous and intermittent employment; they represent a varied sample of the whole medieval labour force.

Wealthy monasteries figure prominently among those known to have been employers of harvest workers who ate at the lord's table; they include Norwich Cathedral Priory, Battle Abbey, and St

8 M M Postan, *The Famulus*, Economic History Review Supplement, 2, 1954; A Kussmaul, *Servants in Husbandry in Early Modern England*, Cambridge, 1981; P D A Harvey (ed), *Manorial Records of Cuxham, Oxfordshire, c.1200–1359*, Historical Manuscripts Commission, JP 23, 1976, p 763; idem, *A Medieval Oxfordshire Village: Cuxham, 1240–1400*, Oxford, 1965, pp 77, 125; F N Robinson (ed), *The Works of Geoffrey Chaucer*, 2nd edn, London, 1957, p 199 (Canterbury Tales, VII, ll 2821–46).

9 Penn, *op cit*, pp 17–31.

10 Norfolk RO, Le Strange MSS 1B 3/5.

11 PRO, SC6 931/8.

12 Millar, *op cit*, p 97; S A C Penn, 'Female Wage-Earners in Late Fourteenth-Century England', *Ag Hist Rev*, XXXV, 1987, pp 1–14; PRO, SC6 1018/24. See also M Roberts, 'Sickles and Scythes: Women's Work and Men's Work at Harvest Time', *History Workshop*, 7, 1979, pp 3–28.

13 PRO, SC6 1024/1–2, 4–5, 8, 15; 1016/1.

14 At Mildenhall (Suffolk), in 1323–4, the visitors included the Cellarer of Bury St Edmunds, his entourage, and the estate steward, so wine appears among the harvest expenses: Bodleian Library, Suffolk Rolls no. 21.

Swithun's Priory Winchester. Also the harvest is associated with paternalistic customs, like the many perquisites granted to customary tenants performing labour services in the autumn.[15] Is it therefore possible that the accounts which contain harvest diets are very unrepresentative, recording the generosity of 'good' lords, well in excess of normal provisions? This is unlikely, first because documents from the manors of minor landowners – gentry and very small monastic houses – show a similar autumn dietary regime; and secondly because great lords were very cost-conscious, and employed auditors to make sure that workers did not receive pay greatly in excess of the going rate. Peasant and seigneurial employers were competing in the same labour market, and both gave workers in the late thirteenth century a daily wage of '1*d* with food', and presumably there was some comparability between employers in the payments in kind as well as in cash.

I

Sedgeford has been chosen as an example because of the manor's remarkably long series of accounts, and the detailed information that they contain. They were compiled for Norwich Cathedral Priory, a house famous for its thorough accounting methods.[16] The form of the paragraph in each document headed 'Costs of the Autumn' is ideal for this analysis because the use of cash is given in detail. Many of the foodstuffs came from the manor's own resources, and are recorded twice, under the autumn costs, and on the dorse of the account. The information is imperfect in ways that are common to all medieval accounts. The officials in charge of the manors inevitably cheated the lord, by claiming more than the real expenditure. The harvest costs seem to have been subject to frequent disputes between officials and auditors, judging from the number of alterations on the documents. The vigilance of the auditors is our guarantee that the amounts are not ludicrously over-stated, and our trust in their professionalism receives some reassurance from the marginal notes in which they checked the figures by calculating the number of people receiving bread from a bushel of grain, or the daily cost of food issued to one employee.[17] The quantities are likely to be somewhat exaggerated, but were not fictitious. An administrative complication at Sedgeford arises from the existence of two manors, Easthall and Westhall; the former may have provided goods for the Westhall employees without any reference appearing in the accounts, but this is unlikely. Some items are absent from the accounts because they involved no expenditure of money, notably the vegetables from the manor's garden. Also the documents are silent about the distribution of foodstuffs among the workforce. For example, the meat included such delicacies as doves and poultry, which were likely to have been reserved for the supervisors and not shared equally among the workers. The main problem in using the accounts, however, is that they do not record the actual recipients of the foods. Judging from the vast quantities, the workers must have been handing over much of the food either to assistants or to their families. We know that in later periods harvest workers sometimes worked as teams with wives and children.[18] It is also possible that some food was sent out of the temporary harvest

15 A Jones, 'Harvest Customs and Labourers' Perquisites in Southern England, 1150–1350: the Corn Harvest', *Ag Hist Rev*, XXV, 1977, pp 14–22; Bushaway *op cit* for a general discussion.

16 E Stone, 'Profit-and-loss Accountancy at Norwich Cathedral Priory', *Transactions of the Royal Historical Society*, 5th ser, XII, 1962, pp 25–48.

17 This type of checking calculation was recommended in auditors' text-books; eg D Oschinsky (ed), *Walter of Henley*, Oxford, 1971, pp 417–45.

18 D H Morgan, 'The Place of Harvesters in Nineteenth-Century Village Life', in R Samuels (ed), *Village Life and Labour*, 1975, pp 29–72; idem, *Harvesters and Harvesting*, 1982, pp 23–5, 59. Cf K D M Snell, *Annals of the Labouring Poor*, Cambridge, 1985, pp 52–3.

household to dependants. Certainly the diets that we are investigating must have been consumed by a much wider circle of people than the accounts reveal.

Sedgeford lay in the 'good sand' district of north-west Norfolk.[19] The sown acreage of the demesne sometimes exceeded 400 acres before the Black Death, and shrank to 268 acres by 1424. The land was used to grow barley with some wheat, rye, peas, and oats. Stock kept on the manor included a dairy herd of about two dozen cows in the late thirteenth century, together with pigs and poultry, and a large flock of sheep.

Every year between twenty and fifty full-time workers appear on the harvest pay-roll of Sedgeford.[20] The content of the diet issued to them is indicated by Table 1, which gives the percentage of each type of food calculated by value. In the thirteenth century the bulk of the supplies was produced on the demesne, so the values have been calculated from current prices, mostly given in the Sedgeford accounts or from accounts of manors as near as possible to Sedgeford. In the fourteenth and fifteenth centuries more food was purchased, and the accounts themselves provide valuations for the products of the manor. Long-term and short-term variations in prices have influenced the figures, but they reflect changes in quantity rather than prices. Violent short-term fluctuations did not occur in the years chosen for analysis, and the long-term decline in grain prices was to some extent offset by the substitution of wheat for cheaper grains in the later part of the period. Therefore the main reason for the trends shown in Table 1 is the change in the actual quantity and quality of different foods issued, not movements in prices. The information is provided in approximate ten-year intervals, so far as the uneven survival of the documents allows. The figures usually derive directly from the documents. Estimation has been been used only in the case of the oatmeal for the pottage, for which the accounts usually give the quantity only for the whole year, and for milk which is often stated to be the product of the cows during the autumn, which has to be calculated from the yield before and after the harvest period.

TABLE 1

Analysis (by Value, in Percentages) of Foodstuffs Consumed by Harvest Workers at Sedgeford, Norfolk, 1256–1424*

Year	*1256*	*1264*	*1274*	*1286*	*1294*	*1310*	*1326*	*1341*
Bread	41	48	49	47	48	43	39	34
Pottage corn	1	1	2	2	1	1	1	1
Ale	13	7	11	12	16	14	17	21
Meat	4	4	7	14	8	8	11	9
Fish	13	16	12	12	9	10	10	17
Dairy produce	28	24	19	13	18	24	22	18

Year	*1353*	*1368*	*1378*	*1387*	*1407*	*1413*	*1424*
Bread	31	19	15	14	17	20	15
Pottage corn	1	1	1	1	1	1	1
Ale	26	28	22	20	33	29	41
Meat	15	25	24	30	28	50	28
Fish	14	13	15	23	10		6
Dairy produce	13	14	23	12	11		9

* All columns total 100%

Table 2, which attempts to quantify the diet in two sample years by giving the items provided, and the share of each person per day, is much more speculative than Table 1. Meat and fish have been put together, though in reality they would have been eaten on separate days according to the church's rules. The figures for shares rest on questionable assumptions about the weight of foods, the translation of medieval into modern measures, the amount of waste in preparation, and the calorific values of medieval foods (the assumptions behind the calculations are given in Appendix 1). As noted above, the very large quantity of food allowed for each person, much in excess of the 2000–3600 calories

19 J Williamson, 'Norfolk', in P D A Harvey (ed), *The Peasant Land Market in Medieval England*, Oxford, 1984, pp 84–102.

20 Norfolk RO, DCN 60/33/1,2,4,5,7,10,14,19,25,30,31; Le Strange MSS, 1B 1/4, 3/5.

TABLE 2
Food Allowances at Sedgeford (Norfolk)

	Food	*Amount per man-day* (imperial)	*Amount per man-day* (metric)	*Kcal* (%)
1256 (1443 man-days)				
Bread	1 qr 7 bu wheat 27 qr 2 bu barley	6.99 lb	3171 g	9,602 (74%)
Pottage	1 qr 2 bu oats	2.49 oz	71 g	285 (2%)
Ale	8 qr 4 bu malt	2.83 pt	1.61 l	513 (4%)
Meat	1 pig 20 fowls and *6s* 8¼*d* spent	3.68 oz	104 g	243 (2%)
Fish	170 mulwell 1050 herrings	15.52 oz	440 g	694 (5%)
Dairy produce	120 eggs	0.12 oz	3 g	
	602 lb cheese	6.67 oz	189 g	1,630 (13%)
	518 gall milk	2.87 pt	1.63 l	
				12,967 (100%)
1424 (906 man-days)				
Bread	3 qr 4 bu wheat	1.97 lb	894 g	1,994 (40%)
Pottage	4 bu oats	1.59 oz	45 g	180 (4%)
Ale	12 qr malt	6.36 pt	3.61 l	1,154 (23%)
Meat	3 pigs 1 bullock 8 sheep 8 geese and 10*s* 0*d* spent	16.87 oz	478 g	1,169 (23%)
Fish	30 cod	3.46 oz	98 g	135 (3%)
Dairy produce	Cheese, milk, butter, eggs – calculated as 224 lb cheese	3.96 oz	112 g	336 (7%)
				4,968 (100%)

now regarded as a normal adult's daily intake, must be explained by assuming that helpers and families were being fed out of the harvest allowances, and consequently no certain judgements can be made of the actual quantity eaten by individuals each day. Nor should the reduction in the size of the shares between the late thirteenth and early fifteenth century be taken as evidence of a decline in food intake. Over the period the method of payment shifted; at the beginning the average pay of individual workers for the harvest period was a little over 2*s* in cash, with food allowances worth about 2*d* per day, while in the 1420s the cash wage for the season had risen to about 7*s* each and food allowances were valued by the auditors of the accounts at around 1½*d* per person per day. So workers after the Black Death were receiving a higher proportion of cash, and food allowance of lower quantity and value, but of generally higher quality. The valuations of the individuals' allowances in both cash and calories suggest that in the thirteenth century (when skilled workers were paid about 3*d* per day) the harvest workers were getting enough to feed a whole family, while after the Black Death they received a good proportion of a household's needs

and the rest would have come from any land held by them or from purchases. The mechanics of food distribution among assistants or families are not known. The accounts insist that the grain was milled and baked and the malt brewed, so the workers were receiving prepared food and drink, not sacks of grain. Medieval bread was often kept, even in aristocratic households, for days, even a week, before consumption, so it could have been sent out occasionally to dependants. Liquids, like pottage and ale, were more difficult to transport in quantity, so it seems likely that they were consumed by the harvest workers themselves.

The diet of the thirteenth century revealed by these accounts is characterized by a high proportion of bread, with a great deal of dairy produce in the form of cheese made from the manorial cows earlier in the summer, and milk from the cows during the harvest season. Together these two elements totalled about four-fifths of the calorific value of the food issues. The malt could have provided a share of two or three pints (1.3–1.7 litres) of strong ale, in which case, in view of the heat and sweat of the harvest field the workers must have drunk much milk and water. A more likely way of using the malt would have been to brew a larger quantity of thinner ale (four or five pints ?), though even then some other drink would have been needed to quench the thirsts of these active workers, especially in view of the unrecorded numbers of assistants or relatives receiving some of the ale.

Changes in the diet are apparent in the early fourteenth century (see Table 1), when the percentage spent on bread declined, and the value of the ale increased. By 1341 enough malt was provided to give as much as five pints (2.8 litres) of strong ale for each worker on the pay roll. After 1349 these trends were emphasized, with the value of bread corn, once a half of the total spent, falling to only a fifth, while the brewing malt rose from about an eighth to a quarter of the budget. By the early fifteenth century the quantity of malt would have been sufficient to give shares of six pints (3.4 litres) of the best ale, or a gallon of thinner stuff (4.5 litres), though each person, allowing for undocumented helpers, may have received a smaller amount. Perhaps Hillman's advice to farmers brewing for the harvest, written in 1710, indicates earlier practice: 'make three sorts of beer, the . . . strongest for your own use, the second is what is called best beer, whereof each man ought to have a pint in the morning before he goes to work, and as much at night as soon as he comes in . . . Small beer they must also have in the field.'[21] Meat increased greatly in importance in the late fourteenth century, from a tenth or less of the food budget to a quarter or a third of the total, while dairy produce, and at a later stage, fish, declined. In terms of nutritional values, the allowances of the fifteenth century contained much fewer calories deriving from cereals consumed in the form of bread. Meat, which contributed a negligible proportion of calories two hundred years earlier, was now a source of a fifth or more of the total.

Another way of expressing the changes in the balance of the diet would be to set the ale aside and concentrate on solid foods. In that case, bread in the third quarter of the thirteenth century accounted for about a half of the total cost, and meat between 4 and 8 per cent, while in the early fifteenth century a quarter of the expenditure went on bread, and 42–47 per cent on meat. For every 2 lb of bread that they ate in the thirteenth century, the workers received an ounce or two of meat and about 5 oz of fish. A century and a half later, for every 2 lb of bread workers were allowed a pound of meat and 3–4 oz of fish.

21 T Tusser, *Five Hundred Points of Good Husbandry*, Oxford, 1984, p 305.

The quality of the foods also changed. Bread was baked mainly from barley in the thirteenth and early fourteenth century. Wheat accounted for less than 8 per cent (by volume) of the bread corn, and probably the sergeant and the other supervisors ate the wheat bread, along with other 'luxuries' such as poultry. An increase in the proportion of wheat and rye at the expense of barley is apparent in 1341, and continued rapidly until the wheat and rye amounted to almost a half by 1353, and by 1387 barley bread had disappeared completely from the harvest food allowances. Then the proportion of wheat increased until it replaced rye entirely in 1407. In this year, the bread which was purchased for holidays when the Sedgeford baker took a rest was described as 'white', suggesting the use of flour with a high extraction of bran. When wheat replaced barley as the main bread corn the daily quantity dropped sharply to about 2 lb per head, so presumably the workers were exchanging quality for quantity, and gave a much smaller proportion to assistants.

The meat provided in the thirteenth century consisted mainly of bacon. Fresh beef was included from as early as 1286, and after the mid-fourteenth century the proportion of beef rose until three cattle were being slaughtered in some years; also in the fourteenth century fresh mutton was being added to meat supplies. Towards the year 1400 the allowance of meat for each officially listed worker had reached a level near to a pound per day, counting only the carcass meat, and a chance statement in the account for 1387 makes it clear that the offal was also consumed. Fish supplies consisted mainly of salt cod and preserved herring throughout the period, though its unpopularity is suggested by the diminishing quantities issued in the late fourteenth century, and fresh fish (that is, fresh sea fish) is mentioned for the first time in the early fifteenth century. Presumably the harvest workers kept the same pattern of meat and non-meat ('fast') days as did aristocratic households, observing fast days on Fridays and Saturdays, on the vigils of feasts, and perhaps also on Wednesdays, in which case it might be expected that the average quantity of meat would be equal to, or rather greater than, the weights of fish. Before 1349 fish exceeded meat, suggesting that cheese was eaten, either with the meat, or instead of meat on non-fast days. After the mid-fourteenth century the situation was reversed, and as the meat increased and the fish dwindled the cheese would have supplemented the fish. However, the quantities of dairy produce declined in the long term, being displaced by meat and perhaps (for liquid milk) by ale. No change in the types of milk-products is known, though butter is specifically mentioned for the first time in 1309 and regularly thereafter.

The physical arrangements for the harvest workers' meals can be glimpsed from hints in the accounts. At least one meal each day was eaten *ad mensam*, at the lord's table, set out in the hall of the manor house. A canvas table cloth five ells long was bought in 1378, but a longer table would have been needed to seat all of the workers of that year, and perhaps only the supervisors enjoyed the privilege of a covered board. Expenditure on candles suggests that either some eating or food preparation took place in the dark, leaving the daylight hours for work in the field – unless such work as carting or stacking sometimes continued after dusk.[22] The morning meal, *prandium*, was eaten out-of-doors, judging from the employment of a servant to carry food and drink *versus campum* (to the field). The food was eaten from dishes, plates, and bowls of wood bought for the purpose, together with wooden spoons; the brewing required the purchase and maintenance of large vessels. The custom of feeding harvest workers

22 Night harvesting in Norfolk is attested in *c*1710: *ibid*, p 305; see also Ault, *op cit*, pp 36–7.

helps to explain why estates maintained manor houses which were used only rarely as residences for the lords.

To sum up, the Sedgeford records give a picture of harvest workers and their dependants of the thirteenth century sitting down to heavy meals of barley bread and cheese, accompanied by a little salt meat or preserved fish, with ale, milk, and water to drink. Their successors of the fifteenth century were issued with ample quantities of wheat bread, nearly a gallon of ale per day, and (except on fast days), large portions of fresh meat.

II

The custom of feeding harvest workers at the lord's table was especially common in Norfolk, but is found sporadically in the records of manors in other counties. Information for comparison with Sedgeford has been obtained from seventeen manors, five in Norfolk, four in Hampshire, two each in Suffolk and Sussex, and single manors in Huntingdonshire, Lincolnshire, Oxfordshire, and Warwickshire. There are broad similarities between the general trends at Sedgeford and these other manors, and some important variations.

First a general tendency can be recognized for the balance of the diet to shift from cereal-based foods (bread, oat-meal pottage, and ale), towards meat, fish, and dairy produce, which the accounts sometimes call *companagium* (literally, 'that which goes with bread'). At Hindolveston, another Norfolk manor on the same estate as Sedgeford, the bread element amounted to about a half (by value) in the mid-thirteenth century, and was reduced to 28 per cent in 1362 and 15 per cent by 1412.[23] At Martham in north-east Norfolk, in a much more fertile, intensively cultivated district, the proportion of expenditure on bread fell in a similar way from 48 per cent in 1266 to 16 per cent in 1389.[24] At both of these places the amount of meat increased markedly over the same period, from a tenth to more than a quarter of the food budget. On a different estate (that of Merton College, Oxford), at Cuxham (Oxon) the value of the cereal-based foods amounted to 69 per cent of the total in 1297, and by 1357 had fallen to 58 per cent, with a corresponding increase in the proportion of *companagium*.[25] The importance of the change in the mid-fourteenth century is indicated by the figures from Thurlby (Lincs) where the proportion of meat in the harvesters' food budget increased from 8 per cent in 1341 to 26 per cent in 1362, and the ratio between cereal-based foods and *companagium* changed from 77:23 to 56:44.[26]

Secondly, as at Sedgeford, there was a tendency for a greater proportion of cereals to be used for brewing rather than baking, with ale accounting for 16 per cent of the value of the supplies in 1287 at Appledram (Sussex), but 30 per cent and above in many years between 1341 and 1450.[27] A more modest increase is found at Cuxham, from 30 per cent in 1297 to 37 per cent in 1357.

Thirdly, the content of the *companagium* changed, the proportion of meat rising while that of dairy produce decreased. This was especially marked at Hindolveston and Martham. At Appledram in 1375 an explanation to the auditor shows that fresh meat was being deliberately substituted for dairy produce: 'and no more [cheese and butter] because six wethers and ewes were expended in the autumn, and three geese'.[28]

Variations from the Sedgeford example are mainly apparent in the types of food eaten. In Norfolk in the thirteenth century

23 Norfolk RO, DCN, 60/18/1,14,30,38,59.

24 Norfolk RO, DCN 60/23/3,23; NNAS, 5899/20 D1.
25 Harvey (ed), *op cit*, pp 281–588.
26 PRO, SC6 914/6,7.
27 PRO, SC6 1016/5,7,9,12,13,14,15,18; 1017/1,4,5,6,8,10,11,14, 16,18,20,24,25; 1018/22,24.
28 PRO, SC6 1017/8.

barley and rye were the main bread corns, though in the early fourteenth century the Hunstanton harvest workers were given maslin bread (wheat and rye).[29] Elsewhere the move towards wheat as the main or sole bread corn was a marked development of the fourteenth century, and the change had often been completed by the 1380s. The workers at Mildenhall, a Suffolk manor of Bury St Edmunds Abbey, advanced slowly and the proportion of wheat issued to them rose from a third in 1324 to below a half in 1382, when maslin and rye bread still accounted for much of the total.[30] In other counties, notably in Hampshire, Oxfordshire, and Sussex, harvest workers were given wheat bread even in the late thirteenth and early fourteenth century. An exception is Combe (Hants) where 39 per cent of the harvest bread in 1307 was baked from *beremancorn* and the rest from wheat, and the harvesters at another Hampshire manor, Chilbolton, ate mainly wheat bread but a quarter or a third of the bread was baked from barley in the decades around 1300, and the barley was replaced by wheat in the course of the fourteenth century.[31]

On southern manors before 1349 cider often provided a major part of the drink supplied to harvest workers, even exceeding the quantity of ale supplies. On such manors as Appledram, Lullington, and Chilbolton in the late fourteenth century cider was replaced by ale, though at the former manor it continued to make an intermittent appearance after 1370.[32]

In Norfolk the meat mainly eaten by harvest workers changed from bacon to fresh beef. Similarly at Cuxham bacon figured prominently in the diets of the 1290s, and fresh mutton was added during the fourteenth century. Mutton appeared for the first time in the Appledram accounts in 1354 and then became a normal feature of the harvest workers' diet for at least the next century. At Manydown (Hants) mutton already figured prominently among the types of meat in 1338, and the innovation of the late fourteenth and fifteenth century was the introduction of quantities of fresh beef.[33] Poultry, especially geese, formed a fairly consistent minor element in harvest food supplies throughout the later middle ages. Traditionally geese were fattened on the grain that lay among the autumn stubble, and then slaughtered for a celebratory feast, called the *ripgoos*; they may also have been served on the 'high table' of the bailiff and supervisors throughout the whole season.[34]

While recognizing the improvement in the meat allowance, some reservations should be made about the quality of the provisions. While medieval taste did not entirely share our preference for young animals, some appreciation of such meat in aristocratic households is indicated by the calves, piglets, and lambs served in addition to predominantly mature animals. The harvest workers were generally given animals too old or too inadequate to perform their normal functions on the manor; the accounting officials were anxious to impress this on the auditors who might have questioned the use of high quality stock for this purpose. Hence the procession of ancient bulls, enfeebled oxen, sterile cows, and *kebb* (culled) wethers and ewes slaughtered for harvest workers. When those at Mildenhall (Suffolk) were supplied with two heifers, the auditors were informed that the beasts were thought to be diseased – perhaps the har-

29 Norfolk RO, Le Strange MSS BG 4; NH 4a; G H Holley, 'The Earliest Roll of Household Accounts in the Muniment Room at Hunstanton for the 2nd year of Edward III', *Norfolk Archaeology*, 21, 1920–2, p 95.

30 Bodleian Library, Suffolk Rolls No 21; British Library, Add Roll 53,116.

31 M Chibnall (ed), *Select Documents of the English Lands of the Abbey of Bec*, Camden Society, 3rd ser, LXXIII, 1951, pp 149–52; J S Drew, *The Manor of Chilbolton (Hants)*, Typescript in the Institute of Historical Research, University of London.

32 See notes 13, 23, and 31 above.

33 G W Kitchin, *The Manor of Manydown, Hampshire*, Hampshire Record Society, 1895, pp 150–8; Winchester Cathedral Library, Box 29/nos 47, 49.

34 Tusser, *op cit*, p 178.

vest workers were not told of this.[35] As at Sedgeford, on other manors they consumed the offal of animals killed for the harvest.

The fish purchased for the autumn meals usually included some type of salted white fish and either red or white herrings. At Appledram after 1370 and in 1384 at Boarhunt (Hants) the harvesters ate fresh fish as well as the preserved kinds.[36]

Harvest workers were provided with pottage, which was also given to the full-time *famuli* all year round, when they received no other food apart from their liveries of grain. Oatmeal, and sometimes peas and beans, provided the basis of this dish. The other ingredients to some extent remain a mystery, except that at Catton (Norfolk) in 1274 5*d* was spent on *olera* (vegetables) for pottage.[37] Normally such crops as onions and leeks were grown in the garden of the manor, and because they involved little expenditure, were not mentioned in the accounts. There is direct evidence at Lakenheath (Suffolk) where in 1329–30 the garden of the manor was leased out on condition that vegetables were still supplied for the pottage of the *famuli*.[38] In view of the relatively small effort that went in general into manorial gardening, certainly in terms of payments of cash, the production of vegetables must have been severely limited in quantity. Their virtual omission from the documents was not just accidental – it is a measure of their small importance in the eyes of lords and their officials. The vegetables contributed flavour to the meals, like the garlic supplied to the Cuxham harvest workers in 1357.[39] Salt is mentioned as a separate item in some accounts, but more often it came from the manors' general supply.

The domestic arrangements of the other manors resembled those of Sedgeford. At Catton, because the harvest workers collected rectorial tithes as well as bringing in the demesne crops, in 1274 they were 'at table' both in the hall of the manor, and in the 'church house'. Treen utensils were in use everywhere, and the purchase of a linen table cloth at Wibtoft (War) in 1377 shows that Sedgeford was not unique in providing such a refinement.[40]

The detailed chronology of dietary change deserves closer investigation. Clearly the pattern of consumption changed most rapidly when the size of the whole labour force fell precipitously in 1348–9, but the diets cannot be simply resolved into those prevailing before and after the plague. The Sedgeford figures show a definite downward movement in the proportion of the budget devoted to bread in 1341, and the beginning of the substitution of wheat and rye for barley. Another Norfolk manor, Catton, has more plentiful documents for the early fourteenth century, and they confirm a decline in expenditure on bread and an increase on meat long before the Black Death, even beginning as early as the 1290s.[41] Rye generally replaced barley on this manor in the early fourteenth century, and by 1339 wheat and rye together accounted for more than half of the corn for baking bread. Similarly the introduction of fresh meat appears generally in the early fourteenth century, in 1317 in the case of mutton at Cuxham. So in diet, as with other indices of economic change, the Black Death appears as intensifying and accelerating

35 Feeding old animals to the harvest workers was advised by Hillman in the early eighteenth century: 'a cow or two, some fatted crones (old ewes) may be timely provided, . . . and if you have but plenty, and fat, provided it be sweet, your guests will ask no further questions: for at this time they do expect a full diet'. Tusser, *op cit*, p 302.

36 Hampshire RO, 5 M50/72.

37 Norfolk RO, DCN 60/4/5.

38 Cambridge University Library, EDC 7/15/11/1/8 M5, M13. (Transcript by Miss J Cripps in the School of History, University of Birmingham.)

39 Harvey (ed), *op cit*, p 577. Saffron and pepper were provided, probably because a fellow of Merton College was visiting.

40 British Library, Add Roll 49,748.

41 Norfolk RO, DCN 60/4/1,5,6,11,15,22,25,36.

processes that had begun in previous decades – it was not an initiator of trends.[42]

Nor did the first major epidemic lead to an immediate transformation of harvest workers' dietary standards. The shift in the balances of the diet between cereal-based foodstuffs and *companagium*, the rise of fresh meat to become the most important non-cereal food, and the emergence of wheat as the main bread corn, all worked their way through the system for fifty years and more after 1349. The peak of dietary improvement seems not to have been reached until the fifteenth century.

In addition to the long-term trends, food consumption was affected by year to year fluctuations in grain production. At Catton in 1322–3, a bad year, the price of barley had risen from the usual 3*s* or 4*s* per quarter to 8*s*, 9*s*, and 10*s*, and rye cost 10*s* per quarter.[43] The quantity of grain allocated to the harvest workers did not change, but the estate managers stopped providing rye for bread as they had done regularly for more than twenty years, and the bread was therefore made entirely from the less-costly barley. They economized slightly on ale, meat, and dairy produce, but still provided foodstuffs worth 64*s*, compared with a normal 30*s* to 50*s*. The extra expenditure was perhaps judged to be profitable because of the high value of the harvested grain. In extreme shortages like the great famine of 1315–17 in Yorkshire, monastic employers did not scruple to lay off servants to save cash and grain.[44] The managers at Catton did not choose the harsh option of beating their workers down to a bare minimum when there must have been a queue of potential employees. Instead they responded predictably by switching to cheaper cereals, by using cereals for bread rather than for ale, and by economizing on non-essential animal products. Independent wage earners and peasants presumably changed their consumption in years of shortage, but in much more extreme ways, for example by cutting out completely ale and animal products.

42 M J Hatcher and E Miller, *Medieval England: Rural Society and Economic Change, 1086–1348*, 1978, pp 240–51.

43 Cf H E Hallam, 'The Climate of Eastern England, 1250–1350', *Ag Hist Rev*, XXXII, 1984, pp 124–32.

44 I Kershaw, *Bolton Priory*, Oxford, 1973, pp 52–8.

III

The study of the food given to harvest workers ought to have wider implications. Can we simply state that a normal lower-class daily diet throughout the middle ages contained thousands of calories with ample quantities of bread and *companagium*, and that the balance between cereals and meat improved considerably over the period 1250–1450?[45] The answer must be decisively negative. We must attempt to define the relationship between harvest workers' diets and those consumed by wage-earners of all kinds, especially in the nine-tenths of their lives when they were not working in the harvest field, and also to see how the harvest diets may have compared with those of peasants who consumed their own produce.

It is a simple task to show that some of the people who worked in the special circumstances of the harvest ate less well at other times. Some of those 'at the lord's table' on Norfolk manors were the demesne *famuli*, and the allowance of grain that they normally received was consistently inferior in both quantity and quality to the grain consumed in the autumn. The *famuli* received barley as their livery throughout the period, while the harvest workers were given a growing proportion of rye and wheat. The livery outside the harvest season increased in quantity during the upheavals of the fourteenth century, from a quarter every 10 weeks (about 4½ qrs per annum) to a quarter every 8 weeks (5½–6 qrs per annum). This was marginally inferior to the allowance in the harvest

45 H E Hallam, *Rural England 1066–1348*, 1981, p 15, apparently supports this view.

season which often exceeded a bushel per week. For most of the year the *famuli* cannot have consumed much drink and *companagium*, as the 4*s* per annum cash wage of a *famulus* in the early fourteenth century, rising to 13*s* 4*d* per annum a century later, would not have bought ale, meat, fish, and cheese on the same scale as in the autumn. The same inequality between harvest provisions and daily fare is found throughout the country: the Cuxham *famuli* were given a mixture of 'currall' (low grade wheat), dredge (barley and oats), and peas, while the harvest workers ate wheat bread; and at Manydown (Hants) in the 1440s, where the harvesters were similarly well-fed, the *famuli* received barley and *berecorn* (winter barley). The *famuli* did not necessarily live entirely off their wages and liveries, as some of them had smallholdings, but it seems likely that their liveries reflect the types of grain eaten by agricultural wage-workers generally.

Nor is it likely that the householding peasantry would have eaten as well as the harvest workers. There is some similarity between the types of grain issued to harvest workers and the allowances of grain made to retired peasants (including better-off peasants) under the terms of maintenance agreements. So, for example, in the early fourteenth century retirement allowances in Hampshire contained wheat as a third or a half of the total, not unlike the bread-corn consumed by the harvest workers of Chilbolton, Combe, and Manydown.[46] Sedgeford peasants in the 1260s agreed to accept for their maintenance combinations of rye and barley, similar but rather superior to the mainly barley bread eaten by the harvest workers.[47] Also the emphasis on dairy produce and bacon in the pre-1349 harvest diet would have been typical of the peasantry. There, however, the resemblance ends, because only an extreme optimist would expect peasants to eat as much dairy produce, fish, or meat as did the harvest workers. At Sedgeford in the late thirteenth century forty or so harvest workers had the use of the products of twenty or more cows, whereas the better-off peasants who had a cow or two would only have drunk a little milk and would have made as much cheese as possible in the summer and autumn for consumption during the winter.[48] The wealthiest peasants may have consumed more food than usual in the harvest time, and offered workers a share that was comparable with that provided by their rival employers in order to obtain labour, but they would have eaten more frugally at other times. Peasants were better off than harvest workers overall because of the relative security of their source of income, while the harvesters taken on in August would not all have had a guaranteed job from October to July. To quote a fourteenth-century poem, in words attributed to a herdsman, 'Better were meles many than a mery nyghte'.[49] The smallholding peasantry were especially disadvantaged in the bad harvest years, because they would not have produced enough from the land to feed themselves, and their meagre earnings would not have bought much extra food.

The ratio between cereal-based foods (bread, oatmeal, ale) and *companagium*, measured in terms of value, provides a means of comparing diets. After the advance of the fourteenth century the harvest workers achieved a ratio of about 50:50. This places them well above the paupers of Sherborne hospital, Dorset, in 1439–40 (78:22) and somewhat superior to the carters employed by the same institution (62:38), or building workers at Bridgwater, Somerset, in 1420 (63:37), or

46 I am grateful to Dr J Z Titow for letting me see his transcriptions from the pipe rolls of the bishopric of Winchester (in Hampshire RO) of maintenance agreements.

47 Norfolk RO, DCN 5282; I am grateful to Dr J Williamson for this information.

48 M M Postan, 'Village Livestock in the Thirteenth Century', in *Medieval Agriculture and General Problems of the Medieval Economy*, Cambridge, 1973, pp 214–48; R H Hilton, *A Medieval Society*, 2nd edn, Cambridge, 1983, pp 109–10.

49 I Gollancz (ed), *Winner and Waster*, Oxford, 1921, l 365.

building workers at Wyre Piddle (Worcs) in 1377–8 (58:42).[50] Before the Black Death the harvest workers' provisions were markedly inferior to those of minor aristocrats. The accounts of Thurlby (Lincs) of 1341 (see Table 3) record both the harvest costs and the household expenses of the prioress of the poor nunnery of Stamford.

TABLE 3
Expenditure on Food at Thurlby (Lincs), 1340–1[51]

	Harvest workers	*Prioress and companions*
Bread	7*s* 1*d* (22%)	3*s* 4*d* (21%)
Pottage	6*d* (1%)	—
Ale	17*s* 8*d* (54%)	3*s* 2*d* (20%)
Meat	2*s* 8*d* (8%)	8*s* 2*d* (53%)
Fish	3*s* 6*d* (11%)	3*d* (2%)
Dairy Produce	1*s* 2*d* (4%)	3*d* (2%)
Spices	—	4*d* (2%)
TOTAL	32*s* 7*d* (100%)	15*s* 6*d* (100%)

Not only are the differences indicated by the ratios of cereal foods to *companagium* (77:23 for the harvest workers, 41:59 for the prioress), but the prioress also consumed such luxuries as spices and piglets. In the 1450s however, the ratio of 50:50 is found in the budget of the chantry priests of Bridport (Dorset), and is comparable with the harvest workers of the same period.[52]

So the autumn diets that we have been examining can be located at the apex of the wage-earning classes, suggesting that the harvest workers formed an aristocracy of labour, much better off than agricultural workers in normal seasons, wealthier than some building workers, having similarities with the standards of the peasantry, and, as the period developed, closing part of the gap between themselves and the lower ranks of the clergy or gentry.

Although the quantity and quality of their diet put the harvest workers into a special category, the changes in their food allowances reflect more widespread developments throughout the lower ranks of society. The *famuli*, especially those who did not receive the bonus of meals at the lord's table in the autumn, were given a higher proportion of wheat in their liveries in the late fourteenth and fifteenth century, though they rarely achieved the privilege of an entirely wheat diet. *Famuli* and servants generally were criticized by late fourteenth-century clerical and gentry writers for their demands for good ale, and fresh meat that was well-cooked and hot. Evidence after 1349 for a shift in agricultural production from arable to pasture suggests a general increase in meat consumption, and the professionalization of brewing may point to a greater volume of ale-drinking.[53]

IV

The changes in diet so precisely measurable in the case of the harvest workers, and arguably affecting a wide section of society, seem to be capable of a simple demographic explanation. The quality of foodstuffs varied in inverse proportion to the size of the population, with cheap cereals being issued during the period of high and growing numbers of people in the late thirteenth century, and a switch to wheat and meat eating after the famines and plagues of the fourteenth century. However, closer examination of the changes suggests that more complex explanations are necessary. The early fourteenth century poses a problem, because there is

50 Dorset RO, D 204/A14; R H Hilton, 'Pain et Cervoise dans les Villes Anglaises au Moyen Age', in *L'Approvisionnement des Villes de l'Europe Occidentale*, 5e Flaran Journées Internationales d'Histoire, Auch, 1985, p 222; PRO, SC6 1071/5.

51 PRO, SC6 914/6.

52 K Wood-Legh, *A Small Household of the Fifteenth Century*, Manchester, 1956, *passim*.

53 C Dyer, 'English Diet in the Later Middle Ages', in T H Aston et al (eds), *Social Relations and Ideas*, Cambridge, 1983, pp 210–16; P Clark, *The English Ale House: a Social History 1200–1830*, 1983, pp 20–38.

clear evidence then, especially in Norfolk, of improvements in the diet of harvesters, very much in line with the general tendency for both cash wages and real wages to creep upwards in the three decades between the agrarian crisis of 1315–22 and the first outbreak of plague in 1348–9.[54] This would be compatible with the controversial argument that the population had reached a ceiling by 1315, and that decline was beginning before the Black Death. However, direct evidences of population movements are few and contradictory. Essex figures support the view that population declined, while in a Norfolk example a continued increase up to 1349 has been argued.[55] Real wages may have increased in this period because of economic factors, notably the growing competition between industrial and agricultural employment, but with such a large agricultural workforce it seems difficult to believe that industry (such as cloth-making) could have generated enough employment to have a general impact on wages. The diet evidence – the most direct index of real earnings available to us – seems to support the view that population was declining and therefore causing a growing scarcity of labour, as is proposed by those who argue that population outstripped resources in the early fourteenth century. The discovery that individuals around 1300 were receiving food allowances in excess of 10,000 calories per day might seem to be incompatible with the idea that the same period suffered from problems of undernourishment. But, as has already been suggested, the allowances were in fact supporting whole families at perhaps 2000–3000 calories each per day, and the harvest workers were located at the top of a hierarchy that included at the bottom wage-earners and smallholders who would have been much less well fed because of their low wages and intermittent employment. Above all, the harvest workers' food allowances were not much affected by the crises of subsistence, but the rest of society was not so insulated. Even the harvest workers who had lived quite well in August might have faced severe hardships at other seasons in such years as 1310 and 1323.

The changes in diet after 1349 took some time to have their maximum effect, in spite of the suddenness and the severity of the demographic catastrophe. This is partly because population levels, though reduced by 40 per cent or more in 1349, did not reach their lowest limit until after 1400. And the economy of the period 1350–75 had as one of its determining characteristics a succession of poor harvests and consequently high grain prices. Also the food allowances, as an element in wages, were subject to the complex combination of pressure and inertia that lay behind the increases in cash remuneration. The employees had to bargain for improvements, as at Appledram in 1354, where the provision of ale instead of cider was at issue. More ale was bought, explained the manorial officials to the auditors, 'because the reap-reeve would not drink anything but ale in the whole of the harvest time'. At any period of rapid social change time is needed to adjust to new circumstances, and the resistance of lords and employers provided a strong obstacle in the fourteenth century. As lords they had a grip on the *famuli* who were often also their serfs, and they could discipline them through the manor courts. Behind them lay the legal force of the kingdom, albeit inefficiently enforced, acting through the Statute of Labourers. The sense of shock felt by aristocratic employers at the new social climate was expressed in contempor-

54 D L Farmer, 'Prices and Wages', in H E Hallam (ed), *Agrarian History of England and Wales*, II, Cambridge, 1988, pp 716–817.

55 L R Poos, 'The Rural Population of Essex in the Later Middle Ages', *Econ Hist Rev*, 2nd ser, XXXVIII, 1985, pp 521–3; B M S Campbell, 'Population Pressure, Inheritance and the Land Market in a Fourteenth-Century Peasant Community', in R M Smith (ed), *Land, Kinship and Life-cycle*, Cambridge, 1984, pp 87–134.

ary literature as well as legislation. For intellectuals to comment on such mundane matters as servants' eating habits is in itself an indication that an upheaval had taken place, which seemed to threaten the social order. The relationship between lords and *famuli* was informed by paternalism, signalled in the accounts by the many gifts and tips given at various times during the farming year. To demand more pay and food, the *famuli* had to overcome habits of deference, no doubt helped by the more mercenary attitudes of the temporary hired hands who joined them in the autumn. Custom acted as a brake on innovation, as is shown by the formalized rules under which labour services were performed, whereby boon workers ate barley bread long after the harvest hands had changed to wheat. Village custom, enshrined in by-laws, must have influenced the bargaining over the rewards of harvest workers when they were being employed by the wealthier peasants.[56]

So in the late fourteenth and early fifteenth century demographic factors influenced diet in the long term, but social pressures and institutional restraints slowed down the pace of change. Demography and nutrition interacted in very complex ways. Substantial improvements in food were achieved by the fifteenth century, most readily quantified in the case of the harvest workers, but clearly shown by the indirect evidence of plenty in falling grain prices and the relatively infrequent harvest failures between 1375 and 1520. This might have promoted earlier marriage, healthier children, and longer life expectation, so leading to population growth. On the continent, the diet of the lower orders improved in much the same way as in England, and in France and Italy the populations were growing in the second half of the fifteenth century.[57] In England stagnation continued well into the sixteenth century. Was this because the English were peculiarly vulnerable to epidemics, or because they adopted customs, such as late marriage, which helped them to maintain their higher living standards? Whether we emphasize the influence of mortality or fertility at this period, there can be no doubt that this example shows that dietary improvement on its own could not promote population growth.[58]

Changes in diet of the fourteenth and fifteenth centuries have been treated here as improvements partly because they were so regarded by contemporaries. Wage-earners strongly favoured white bread, fresh meat, and strong ale. The attractions of such a diet were largely social and cultural: in adopting this pattern of eating, the lower orders were aping the lesser gentry.[59] In nutritional terms the harvest workers' food of the thirteenth century contained the main elements of a healthy diet, including a combination of carbohydrates and animal protein, with vitamins A and D being provided by dairy produce, offal, and herrings. Outside the harvest season however all of these foodstuffs may not have been consumed regularly by poorer people. As the diet changed in the fourteenth century the contribution of fish and milk products declined, but probably not to such a low point that the recipients would suffer vitamin deficiencies. The new diet with its growing proportion of fatty meat would not be regarded as an improvement by modern nutritionists. But there

56 On the general problems of this period, see R H Hilton, *The Decline of Serfdom in Medieval England*, 1969, pp 32–43; A R Bridbury, 'The Black Death', *Econ Hist Rev*, 2nd ser, XXVI, 1973, pp 577–92.

57 On continental diet, see eg B Bennassar and J Goy, 'Contribution à l'histoire de la consommation alimentaire du XIVe au XIXe siècle', *Annales ESC*, XXX, 1975, pp 402–30; D Menjot, 'Notes sur le marché de l'alimentation et la consommation alimentaire à Murcie à la fin du moyen âge', in D Menjot (ed), *Manger et Boire au Moyen Age*, I, Nice, 1984, pp 199–210; on population, Bois, *op cit*, 346–56; D Herlihy and C Klapisch-Zuber, *Les Toscans et Leurs Familles*, Paris, 1978, pp 181–8.

58 Cf T McKeown, 'Food, Infection, and Population', *Journal of Interdisciplinary History*, XIV, 1983, pp 227–47.

59 On diet as a 'system of communications', and an element in social competition, see M Montanari, *L'Alimentazione Contadina nell'alto Medioevo*, Naples, 1979, p 461; S Mennell, *All Manners of Food*, Oxford, 1985, pp 40–61.

can be no doubt that in terms of palatability a variety of meats eaten with wheat bread was a great advance on the stodgy monotony of barley bread. Throughout the period the sources of vitamin C must remain a mystery. The supposition must be that the amount of green vegetables, although so small as to virtually escape reference in our documents, reached a minimum level sufficient to prevent serious deficiency diseases. The main nutritional problem in the later middle ages was not the lack of specific vitamins and minerals, or the excess of fats that causes concern in a modern affluent society, but simply that at certain times, and especially in the late thirteenth and fourteenth century, those sections of the population who fell below the harvest workers' privileged standard of living survived on cereals with very little animal protein, and that in some years even the inferior cereals were scarce and expensive.

Finally, too simple a demographic explanation of agrarian history would suppose that agriculture could adjust itself easily to the new demands by shifting from arable to pasture. This was the trend, but it involved difficult structural changes for those peasant communities whose agrarian system was closely involved with grain production. The fifteenth century saw in the midlands the development of specialized pastoral farms of a novel kind as landlords, lessees, and wealthier peasants took advantage of the growing market for meat. In particular they were responding to an increased demand for beef. Cheaper grains and legumes, once grown largely for human consumption, must have been used more often as fodder crops. We are only beginning to appreciate the interaction between consumption and production in the medieval economy.

Appendix 1

The calculations in Table 2 are based on the assumption that 1 quarter (2.9 hl) wheat made 510 lb (231 kg) of bread; that 1 quarter of barley made 336 lb (152 kg) of bread; that 1 quarter of oats made 180 lb (82 kg) of meal (E J T Collins, 'Dietary Change and Cereal Consumption in Britain in the Nineteenth Century', *Ag Hist Rev*, XXIII, 1975, p 108; D W Kent-Jones and J Price, *The Practice and Science of Bread Making*, 2nd edn, Liverpool, 1951, pp 290–1; W Tibbles, *Foods. Their Origin, Composition and Manufacture*, 1912, p 425).

Other assumptions are that 1 quarter of malt made 60 gallons (273 l) of ale (in late medieval household accounts the figure ranges from 60 to 100 gallons, see Dyer, *op cit*, p 203), and that animal carcasses weighed as follows: cattle 250–450 lb (113–204 kg); pigs 70–90 lb (32–41 kg); sheep 31 lb (14 kg); geese 8 lb (4 kg); poultry 1–2 lb (0.45–0.9 kg). And that fish weighed: cod 6.6 lb (3 kg); herring ½ lb (0.2 kg) (L Stouff, *op cit*, pp 186–9, 301–19; I Kershaw, *op cit*, pp 157–8; H Clarke and A Carter, *Excavations in King's Lynn, 1963–1970*, Society for Medieval Archaeology Monograph, 7, 1977, pp 403–8). Meat and fish weights have been reduced for waste, and calorific values have been calculated, from figures supplied in A A Paul and D A T Southgate, *McCance and Widdowson's The Composition of Foods*, 4th edn, 1978. For example, it is assumed that 74% of a pork carcass was edible, and that in boiled form its calorific value was 286 per 100 g.

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Sheep and Enclosure in Sixteenth-Century Northamptonshire*

By JOHN MARTIN

Abstract

It is commonly accepted that there was a slackening of the enclosure movement, if not outright reconversion to arable, in England in the latter half of the sixteenth century. This is usually ascribed to lower wool prices making sheep-grazing less attractive. There are difficulties with this perspective linking prices and enclosure activity directly. The example of Northamptonshire, a county in the forefront of enclosure, suggests that there was no trend away from sheep-farming. Two surveys of sheep numbers on enclosed pasture, conducted in 1547 and 1564, indicate that sheep-grazing spread throughout the county, and that grazing was concentrated on deserted village sites. While there was some reduction in the size of large flocks, this was more than balanced by the proliferation of smaller flocks – overall sheep numbers increased in this period. By the end of the century, sheep flocks were grazing on enclosed pasture in half of the parishes in Northamptonshire.

SINCE Bowden's detailed work on wool prices for the period 1490–1610, it has been argued that, after the mid-sixteenth century, lower wool prices relative to those of wheat deflected graziers from sheep-farming and halted the process of enclosure, or even caused a considerable reconversion of pasture to arable land. Bowden himself considered that the most interesting aspect of the trend in wool prices was its role in explaining the pattern of the Tudor enclosure movement. He sought to draw a dividing line down the middle of the sixteenth century on this basis.

> The reason why farmers were enclosing their land for pasture in the first half of the sixteenth century and reconverting it to tillage in the second half thus appears to have been clearly associated with the changing relationship between the price of wool and the price of grain.[1]

Such an interpretation has replaced the earlier one stressing that enclosure was an enduring problem throughout the sixteenth century. Gay's work was central in this respect. He made extensive use of the Enclosure Commissions of 1517–18 (drawing upon Leadam's studies) and those of 1607, together with substantial research into enclosure prosecutions in the prerogative courts throughout the century, and concluded that there was no slackening of the enclosure movement.[2] Tawney also

* This research was prompted by the discovery of a document from 1564 listing sheep numbers in the County, in the Northamptonshire County Records Office amongst the papers of Sir Edward Montagu, Deputy Lieutenant of the County and responsible for purveyance in its Eastern Division in the 1590s. (Northamptonshire County Records Office, Montagu Papers, second series, 'A Book of Fines and Estreats, Eliz. I and Jac. I', ff. 69–91, 112–18.) This stimulated an interest in locating a similar document of a different date to analyse changes for a county which was crucial in the enclosure movement. While reading the Gazetteer of deserted villages in Northamptonshire (K J Allison *et al*, *The Deserted Villages of Northamptonshire*, University of Leicester, Dept of Local History, Occasional Papers, XVIII, 1966) I became aware of an unreferenced source for numbers of sheep grazing on deserted village sites in 1547. I wrote to both Keith Allison and Maurice Beresford about the source but they did not know its whereabouts. The only hint was that the information had come from a 'purveyance' document. While reading Woodworth's article (A Woodworth, 'Purveyance for the Royal Household in the Reign of Queen Elizabeth', *Transactions of the American Philosophical Society*, new series, XXXV, 1945) in the feeble hope of some clue, I came across a reference to such a document – British Library, Additional MS 25084. This proved to be exactly what I was after – a comprehensive survey of sheep flocks in 1547, organized in strikingly similar fashion to the document of seventeen years later.

1 P J Bowden, 'Movements in Wool Prices 1490–1610', *Yorkshire Bulletin of Economic and Social Research*, IV, 2, September 1952, pp 122–3. Also see P J Bowden, *The Wool Trade in Tudor and Stuart England*, 1962, pp 4–6.

2 E F Gay, 'Inclosures in England in the Sixteenth Century', *Quarterly Journal of Economics*, XVII, 1903, pp 584–6.

Ag Hist Rev, 36, I, pp 39–54

argued for the continued importance of enclosure, largely on the grounds of continued government concern and popular disturbances and outcry over the issue.[3]

The crucial difficulty for the earlier perspective, based on Gay's work, was the lack of information for the period 1518–77, which was not covered by the Enclosure Commissions. The abortive Commissions of 1548 failed to yield information other than a few notes on enclosure in Warwickshire and Cambridgeshire, and that of 1566 entailed only partial coverage of Buckinghamshire and little else.[4] Gay also drew upon the evidence of enclosure cases in the Courts of Star Chamber and Requests, and the extensive prosecutions under the Tillage Act of 1563 (involving land enclosed from arable since 1528).[5] However, although supporting his position in general terms, these sources cannot offer the advantages of a systematic quantitative recording of enclosure activity, such as contained in the records of the Commissions. In fact Gay, like Tawney, bolstered his argument with reference to the continued complaint and agitation at that time. Other documented anti-enclosure activity in the Courts of Exchequer, Chancery and King's Bench in the period 1518–77 concerned prosecutions arising out of the enquiries of 1517–18, and thus does not indicate continued enclosure activity but rather the government's determination to follow up cases of enclosure recorded prior to 1518.[6]

In later work Bowden sought to relate more detailed supposed changes in the pace of enclosure to the fortunes of sheep-farming, in the sixteenth and early seventeenth centuries, on the basis of inspection of shorter-term trends in prices. Specifically he argued that

> with the sharp decline of cloth exports and wool prices in the early 1550s the business of raising sheep lost much of its former attraction . . . Many large landowners who had been drawn into wool production during the earlier period of rising demand now decided to reduce the size of their flocks or to give up sheep farming altogether.[7]

This situation persisted until the early 1570s, according to Bowden, when the growth of the new draperies revived sheep-farming in the Midlands and East Anglia.

This view, associating enclosure activity and sheep-farming directly with annual movements in prices, has been influential in revising our understanding of the agrarian history of the period. Beresford integrated it into an explanation of the slackening of the desertion of villages in the sixteenth century, observing that there was a shift from depopulating enclosure towards enclosure by agreement which included smaller peasant farmers.[8] More generally, it is now widely accepted that the enclosure movement itself was less intense from the mid-sixteenth century onwards until late in the century, because of the relative increase in wheat prices compared to wool.[9]

3 R H Tawney, *The Agrarian Problem in the Sixteenth Century*, 1912, p 11.

4 Gay, *op cit*, pp 577, 585.

5 *Ibid*, pp 590–1. J Thirsk in J Thirsk (ed), *The Agrarian History of England and Wales, Vol IV: 1500–1640*, Cambridge 1967, pp 225, 227–8.

6 M W Beresford, *The Lost Villages of England*, 1954, pp 109–17. E F Gay, 'Inquisitions of Depopulation in 1517 and the Domesday of Inclosures', *Transactions of the Royal Historical Society*, new series, XIV, 1900, pp 239–40. This concerns evidence of Court activity over the period 1517–99.

7 P J Bowden, 'Agricultural Prices, Farm Profits, and Rents', in J Thirsk (ed), *op cit*, p 638.

8 M W Beresford, *op cit*, p 212. Also see M W Beresford, 'The Poll Tax and census of sheep (Part II)', *Ag Hist Rev*, II, 1954, p 28. For his view on the role of agreements, see 'Habitation versus Improvement: the debate on enclosure by agreement', in F J Fisher (ed), *Essays in the Economic and Social History of Tudor and Stuart England*, Cambridge 1961. The extent to which enclosure by agreement was associated with depopulation in the Midlands is debated in an unpublished paper – J E Martin, 'Habitation for the peasantry versus improvement by enclosure for the landlord'.

9 For example, see J Thirsk, 'Enclosing and Engrossing', in J Thirsk (ed), *op cit*, p 228. P Ramsay, *Tudor Economic Problems*, 1963, pp 25–7. However, in an earlier publication Thirsk was less certain, suggesting that Bowden's case for changes in land usage remained to be proved. J Thirsk, *Tudor Enclosures*, 1959, p 18. A recent article minimizes the extent of sixteenth-century enclosure. J R Wordie, 'The chronology of English enclosure, 1500–1914', *Econ Hist Rev*, second series, XXXVI, 4, 1983; J Chapman, 'The chronology of English enclosure' and J R Wordie, 'A Reply', both in *Econ Hist Rev*, second series, XXXVII, 4, 1984. Wordie argues that the seventeenth century was the crucial period of enclosure, basing this on a figure of

I

Yet certain difficulties remain. The wool price series is particularly weak in the mid-sixteenth century which is the most crucial period, and it is not largely drawn from the Midland counties, where the enclosure movement for permanent pasture was most concentrated at that time. Most importantly, the link between the movement in prices of wool and enclosure activity largely remains to be demonstrated. For the first point, Wright observed that no long-term price series is used for the period 1520–70; instead there is only a scatter of values based on not more than several points in every case, and there is in fact little conformity to the long-term constructed series.[10] This is a critical period for Bowden's argument. If the mid-century price data are weak then the contrast between this, and earlier and later periods (with high wool prices) is less strong than it might appear. Secondly, not only is the wool series generally weak in mid-century, but it lacks a sustained Midland series in particular. The heartland Midland counties experiencing enclosure at that time (such as Northamptonshire and Leicestershire) are represented by eleven price values only. The linking of synthetic and generalized price data and enclosure presupposes that prices were national in character and varied in unison from one region to another, and secondly that enclosure was a simple response to this price mechanism felt equally throughout England. This approach neglects regional differences in price trends and that motives for enclosure might be more complex than a simple response to national prices. Gould argues along these lines in suggesting there is a need for regional and county studies of prices, and crop and stock distributions and their changes.[11] Kerridge and Thirsk also argue for a more detailed regional perspective on the variety of forms of enclosure, some of which involved conversion to pasture, evictions and depopulation, while in other areas enclosure was less detrimental and represented the increased regional specialization of farming practices.[12] While Thirsk concedes that enclosure remained a social problem in the Midlands, Kerridge suggests that much enclosure there, especially on lighter soils, was in fact for 'up-and-down husbandry' rather than for permanent pasture as previously assumed.

Finally, the most important criticism is

only 2 per cent for the sixteenth century (from Gay's Enclosure Commission figures). He relates this to a figure of 47 per cent of land enclosed at 1600, arrived at by very different means. Subsequently the 2 per cent is subtracted from 47 per cent, giving circa 45 per cent enclosed prior to 1500. This is not a very meaningful result which has arisen by relating two incommensurable forms of estimate. As Chapman points out (p 557), the sixteenth-century Tudor concern (reflected in Gay's figures) was with a very specific form of enclosure – the conversion of arable to pasture and depopulation – and it is invalid to relate this in a simple manner to the aggregate estimates which Wordie derives.

10 J F Wright, 'A Note on Mr Bowden's Index of Wool Prices', *Yorks Bull Econ and Soc Res*, VII, 2, September 1955. P J Bowden, 'Movements in Wool Prices – a Reply', *Yorks Bull Econ and Soc Res*, IX, 2, November 1957.

11 Gould suggests that Bowden, by adopting Rogers's wheat prices, used an index which reflects the growing metropolitan demand for corn in London. In areas such as the inner Midlands, the remoteness and difficulty of transporting corn may well have kept corn prices low, allowing the Midlands to remain as a centre of enclosure for conversion to pasture. J D Gould, 'Mr Beresford and the Lost Villages: a Comment', *Ag Hist Rev*, III, 1955, p 112.

12 E Kerridge, *The Agricultural Revolution*, 1967. E Kerridge, *Agrarian Problems in the Sixteenth Century and After*, 1969. J Thirsk, *Tudor Enclosures*, 1958. J Thirsk, 'Enclosing and engrossing', in J Thirsk (ed), *op cit*. J Broad, 'Alternate husbandry and permanent pasture in the Midlands, 1650–1800', *Ag Hist Rev*, XXVIII, 1980. In Kerridge's view these changed practices represented a crucial part of the agricultural revolution. He suggests that 'up-and-down husbandry' expanded rapidly after 1560 in the Midlands, and particularly so in the period 1590–1660. However, he concedes that even by the mid-seventeenth century it was still not the most important system in the Midlands – this took another hundred years (*The Agricultural Revolution*, pp 194, 212). But Broad suggests that the very period in which 'up-and-down husbandry' was consolidating according to Kerridge, was a time when the practice was being superseded by permanent pasture farming. If this is indeed so, the overall long-term impact of this form of enclosure is much diminished, being squeezed between Kerridge's projection into the late seventeenth and eighteenth centuries and Broad's lessening of its impact post mid-seventeenth century. It is also worth considering that 'up-and-down husbandry' would probably require in total as much land as would be laid down in permanent pasture to support a similar number of sheep, even if Kerridge's suggestion that the carrying capacity was twice that of permanent pasture is accepted. This would mean that a similar amount of land would have been taken out of the common-field system for use in 'up-and-down husbandry' as if it had been enclosed for permanent pasture.

that Bowden fails to provide convincing evidence of a direct link between price trends and enclosure activity, but largely assumes the existence of the link. The lack of precise information for the period 1518–77 has made it difficult to assess the validity of the price-based perspective on enclosure. In particular, actual reconversion to arable remains almost entirely unresearched. Bowden cites three graziers who reduced the size of their own flocks or leased their pastures, two of whom (the Fitzwilliams and Brudenells) were from Northamptonshire and studied by Finch.[13] But Finch's study does not draw generalized conclusions about farming practices; it links the specific changes in these families' estate management to their own particular circumstances. The fact that these families chose to move out of direct sheep-farming to leasing of land says little about the use of that land which seems to have remained in sheep pasture.

II

In this article I wish to present some information for the County of Northamptonshire, which questions the existence of a trend away from sheep-farming and reconversion of pasture to arable in the second half of the sixteenth century. To my knowledge these two comprehensive, detailed and consistent surveys of sheep flocks some seventeen years apart are unique sources.[14] The sheep returns for 1547 and 1564 provide detailed information on the progress of sheep-farming for a county which was at the very centre of the enclosure movement and at a time when, according to Bowden, grazing of sheep was on the wane and land was being recon-

13 M E Finch, *The Wealth of Five Northamptonshire Families, 1540–1640*, Oxford 1956. Bowden specifically refers to the Fitzwilliams who leased out manors in 1549 and stopped sheep-farming at Milton, and to the Brudenells of Deene who stopped sheep-farming after mid-century. While Finch does refer generally to the possible impact that less steeply rising wool prices might have had in the latter half of the century, she gives no direct evidence of the impact of prices on these estates.

The Fitzwilliams were a recently-established Northamptonshire family, with modest resources and considerable complexities and difficulties in inheritance of the estate. The family's income was never enough to establish a substantial and secure estate. From the 1550s onwards, additional burdens were imposed by life at the Court on slender resources. This caused the family to go into debt, resulting in the mortgaging and sale of lands. This caused the family to go into debt, resulting in the mortgaging and sale of lands. In the 1570s, Sir William Fitzwilliam III attempted to rationalize the estate by new purchases and consolidation of lands, but again was beset by new inheritance demands and expenditure on a new house. The two manors Bowden refers to were Woodcroft (in Etton) leased in 1549, and Minskippes (one of eight manors in Castor) leased after mid-century. Woodcroft was lost by mortgage altogether and then repurchased shortly afterwards, in 1553. According to Finch, these two manors were the only ones leased by the Fitzwilliams. The Fitzwilliams held 170 acres of closes in Woodcroft, probably from 1537 onwards, on which about 350 sheep could graze. *Ibid*, p 115. The leasing seems to have been associated with an increase in sheep numbers, the opposite of what Bowden would argue, since the sheep surveys show that the number of sheep on Woodcroft actually increased at this time, from 200 in 1547 to 500 in 1564! Bowden also mistakenly draws the conclusion that the Milton manor no longer supported sheep by 1576. However, Finch says nothing about the use of the by-then wholly enclosed manor, only observing that before 1576 the pastures were in part rented out and in part directly farmed for sheep by the Fitzwilliams. In that year all the pastures were leased out, presumably to continue in sheep pasture. By 1583 the Milton closes comprised about 860 acres. *Ibid*, p 114. (Certainly when Milton was resumed at some time before 1607, it became the nucleus of the Fitzwilliams' sheep pastures.) The Fitzwilliams grazed 500 sheep at Milton in 1547 according to the survey, and this number remained in 1564.

The Brudenells suffered greatly from the fragmentation of their lands, which although increasingly enclosed, did not permit the large-scale consolidation and development of sheep-farming, such as was achieved by the Spencers. In the circumstances, it was more profitable for the family to lease out these pastures, surely to other capitalist sheep farmers. It is likely that the land remained as pasture rather than reverting to arable cultivation. The surveys of 1547 and 1564 suggest that there was little change in sheep numbers where the Brudenells had pastures. While there were some decreases (Biggin, 500 to 400 – where they leased 1200 acres from the Abbot of Peterborough; Orlingbury, 200 to 100; and Titchmarsh, 200 to no sheep recorded) this was matched by the increases elsewhere (Stanion, no sheep to 100; and Weldon closes, no sheep to 300). The Finedon pastures continued to graze 100 sheep. The third example Bowden uses was from East Anglia where Sir Nicholas Bacon had leased all his foldcourses by 1561. Even if one grazier found it more suitable to earn an income from leasing land rather than sheep-farming, it is likely that these lands continued to be grazed.

14 M W Beresford, 'The Poll Tax and the Census of Sheep', Parts I and II, *Ag Hist Rev*, I and II, 1953–4, provides another source of information on sheep numbers for 1549, but this survey was incomplete and not successful in catching the larger graziers. Some 414 flocks were recorded, but the median flock size was only 142 sheep, in strong contrast to the data presented here. There is information for four counties, but only in Huntingdonshire and Nottinghamshire were many flocks recorded. No flocks were recorded near the illegal size of 2400 although Beresford noted that they would have existed.

verted to arable.[15] The sheep surveys do not confirm a picture of reconversion of pasture to arable, nor even a halt to sheep-farming, from the mid-sixteenth century onwards. Instead, they indicate that grazing spread throughout the County and the total numbers of sheep increased, while at the same time there was some reduction in the number and size of large flocks specifically. These sheep returns suggest that a modification is necessary to a simple association of price movements and the pattern and pace of enclosure.

The County of Northamptonshire in the East Midlands provides one of the best examples of the mixed husbandry common-field system in its largely 'felden' western part and the Nene Valley[16] (see Map 1). Further east and north were the forest areas of Rockingham and Whittlewood-Salcey, and the fens of the Soke of Peterborough. Much of the upland heavy cold clay areas – the Northamptonshire Heights, Whittlewood-Salcey and Rockingham – were in fact more fit for grass than crops. Both the Wolds (upland but with lighter soils), and the Nene Valley (with alluvial loams and gravels) were better suited to the mixed husbandry of the open common-field system. The forest areas of Rockingham and Whittlewood-Salcey comprised large areas of common and wastes and many old closes, offering considerable grazing. Here arable farming was subsidiary to the raising of livestock. In the Fens in the far north-east of the County there was practised pastoral farming of a kind similar to the fen areas of Lincolnshire and Norfolk. This was based upon considerable and varied common and pastoral resources and few arable common fields.

The 1547 sheep survey

The 1547 survey 'A Booke of all the Townes and Hundreds with Pastures' listed all the flocks of fifty or more sheep on enclosed pasture in the Western and Eastern Divisions of the County of Northamptonshire, and was commissioned as a result of an agreement reached between the Crown and the County for the compounding of purveyance for the Royal Household (subsequent reference to 'flocks' is to those of fifty or more sheep).[17] Instead of levying produce the practice was established of drawing up contracts with counties for a fixed price for the animals concerned. The parish where each flock was kept, and often the owner's name, was noted. Additionally, every 'town', that is parish, was listed and taxed at a flat rate of four sheep, with hamlets within parishes being exempt. The survey also included a list of those who were levied from one to three oxen from 'parkes and laundes'.

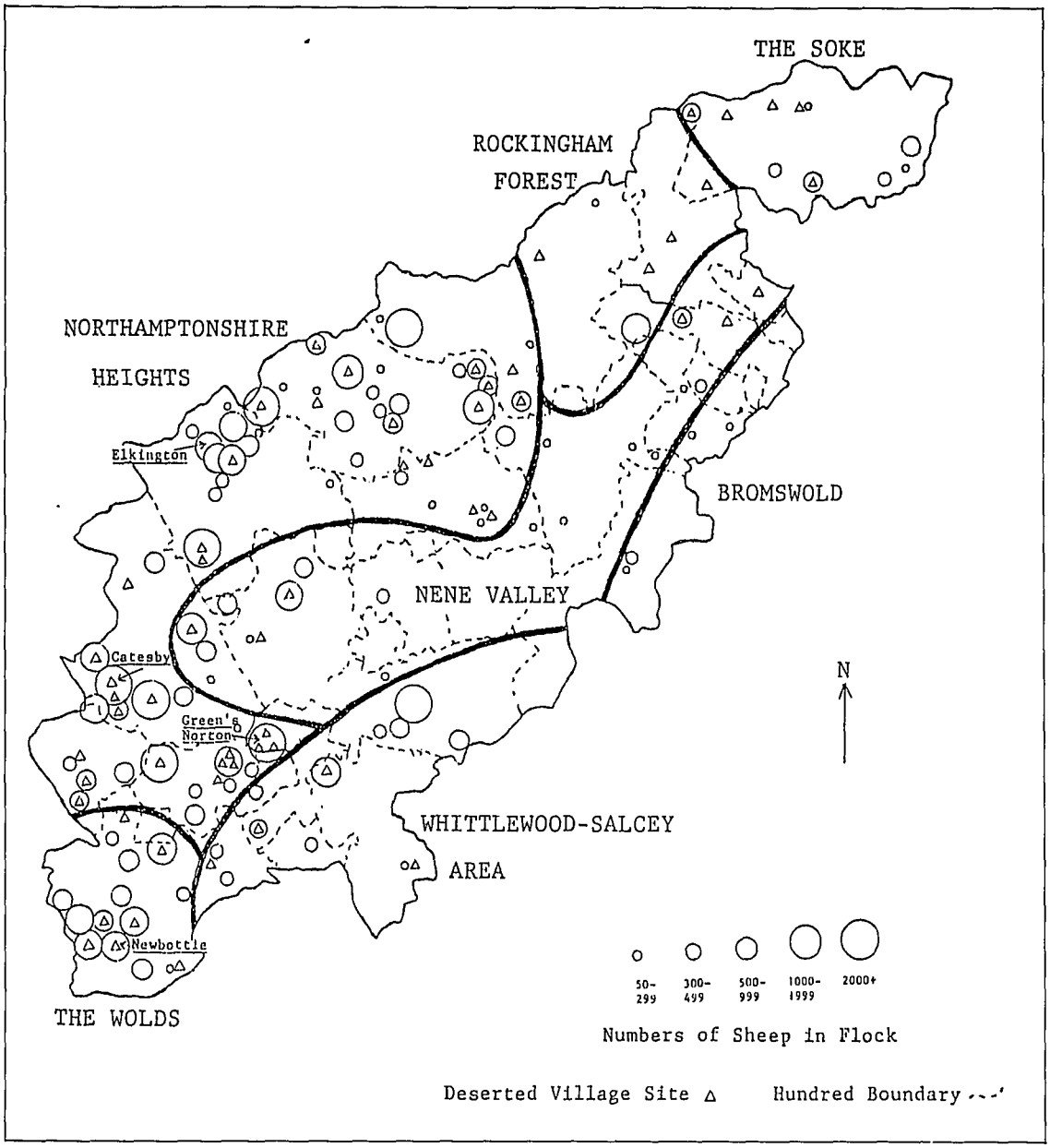
These sheep flocks were undoubtedly being run on enclosed pastures, even though the term 'enclosed' was not rigorously used.[18] Those who kept large flocks were recorded individually and levied separately from the parishes. The later similar survey of 1564 often refers to closes specifically and the explicit reason for

15 Information from the Enclosure Commissions of 1517–18 and 1607 indicates clearly the centrality of Northamptonshire, alongside other inner Midland counties. In both enquiries the County ranked first in terms of area enclosed. E F Gay, 'The Midland revolt and the Inquisitions of Depopulation of 1607', *TRHS*, new series, XVIII, 1904. The latter enquiry covered the years 1578–1607 in which some 27,335 acres and 118 places were involved, according to Gay – by far the largest area recorded by county. Much of this enclosed land must have been turned over to the grazing of sheep. On the basis of about two sheep per acre (see Finch, *op cit*, p 139) perhaps an additional 25,000 to 30,000 sheep were pastured in this period. This accepts Gay's caveat that we cannot necessarily assume that acreage severed was in fact converted to pasture. The area explicitly recorded as enclosed and/or converted to pasture in the County over this period was 14,278 acres. Such estimates are based on a degree of confidence that the information collected did indeed represent real enclosure, unlike the argument mounted by Kerridge. See E Kerridge, 'The Returns of the Inquisitions of Depopulation', *English Historical Review*, LXX, 1955. For a critique of Kerridge's argument and support for the above view, see J Martin, 'Enclosure and the Inquisitions of 1607', *Ag Hist Rev*, XXX, Part I, 1982.

16 This is based upon J Thirsk, 'The East Midlands', in J Thirsk (ed), *op cit*, and J M Steane, *The Northamptonshire Landscape*, 1974, Chapter 1.

17 British Library, Additional MS 25084. Woodworth, *op cit*.

18 The average Midland peasant flock grazing on the commons would have been no more than twenty to thirty sheep. Bowden, *The Wool Trade*, p 1.



MAP I
Sheep Flocks in the County of Northamptonshire, 1547

updating this survey in 1595 was the extensive enclosure in the meantime. Many of those recorded in these surveys are known from other sources to have grazed sheep on enclosed land. We can take it that the instructions to compile a list of the 'names of such pastures and persons as be contributory to the king's most honourable household' and the enumeration of persons and flocks do indeed refer to flocks on enclosed land.

In total some 112 flocks of sheep were recorded for Northamptonshire in 1547, of which 66 were in the Western Division and 46 in the Eastern Division. Altogether, 66,700 sheep were recorded: 46,200 in the

TABLE 1

1547 Sheep Survey: Numbers of Flocks and Sheep in Northamptonshire Hundreds, by Size Group

Western Division	*No of flocks in size group* 1000+	500–1000	300–500	50–300	*Total no of flocks*	*Total no of sheep*	*Average flock size*	*% of parishes with flocks*
King's Sutton	4	6	4	1	15	8,700	580	60.9
Chipping Warden	1	3	1	0	5	3,000	600	45.5
Green's Norton	3	1	5	0	9	7,300	811	66.7
Fawsley	5	4	1	2	12	10,800	900	47.6
Towcester	0	0	0	0	0	0	n/a	0.0
Cleyley	1	0	0	0 1	2	1,400	700	13.3
Nobottle Grove	1	2	0	2	5	2,700	540	25.0
Guilsborough	5	1	3	3	12	8,600	717	36.8
Wymersley	1	1	2	1	5	3,400	680	23.8
Spelhoe	0	0	1	0	1	300	(300)	11.1
Total – West Div (157 parishes)	21	18	17	10	66	46,200	700	36.3
Eastern Division								
Rothwell	3	6	4	3	16	10,100	631	50.0
Orlingbury	0	0	1	4	5	1,000	200	29.4
Corby	2	1	0	3	6	4,000	667	19.4
Hamfordshoe	0	0	0	0	0	0	n/a	0.0
Higham Ferrers	0	0	1	1	2	400	200	14.3
Huxloe	0	1	1	4	6	1,500	250	28.6
Navisford	0	0	0	3	3	400	133	37.5
Polebrook	0	1	0	0	1	500	(500)	11.1
Willybrook	0	0	0	0	0	0	n/a	0.0
Nassaburgh	0	3	2	2	7	2,600	371	31.0
Total – East Div (173 parishes)	5	12	9	20	46	20,500	446	25.4
Total – Northants	26	30	26	30	112	66,700	596	30.6

Western and 20,500 in the Eastern Division. Table 1 presents the information analysed by Hundred and flock size.

Table 1 suggests considerable concentrations of large flocks in King's Sutton, Green's Norton, Fawsley and Guilsborough Hundreds in the West, and Rothwell in the Eastern Division. This is indicated in Map 1 which shows the distribution of flocks in the County. These large flocks were particularly evident in the classic areas of deserted villages such as the Wolds (the south-western tip of the County, largely conterminous with King's Sutton Hundred) and Northamptonshire Heights (including Chipping Warden, Green's Norton, Fawsley, Guilsborough and Rothwell Hundreds). The Northamptonshire Heights were grazier territory par excellence and had 'depopulated sites as

close-packed as anywhere in England'.[19] The close association of large flocks and deserted village sites is clearly shown on Map 1 (which also displays the location of the sixty village sites which were probably deserted prior to the mid-sixteenth century). Only four sites in Northamptonshire Heights, Whittlewood-Salcey and the Wolds did not have any flocks on them. In the Western Division there were concentrations of deserted village sites used for grazing in the area of Green's Norton (with seven sites), Catesby (five sites) and Newbottle (four sites), and in the East, Rushton (four sites). Some thirty-four sites in thirty-one parishes were recorded as grazing sheep in this survey and were definitely deserted by the mid-sixteenth century, and we could add another eleven sites probably deserted by this time. By 1564, another nine deserted village sites had flocks on them, all but one in the Eastern Division. The vast majority of these villages had been deserted during the previous century when wool-growing was expanding rapidly, rather than earlier. Upon the forty-five sites recorded for 1547, some 40,200 sheep grazed; an average of 855 sheep per flock, much larger than the average for Northamptonshire (596 – see Table 1). Sheep farmers who could acquire such large tracts of pasture were at a distinct advantage.

The percentage of parishes with recorded flocks in a Hundred may be taken as a measure of the impact of sheep in an area. In three Hundreds – King's Sutton (60.9 per cent); Green's Norton (66.7 per cent); and Rothwell (50.0 per cent) – half or more of their parishes contained flocks. In another two – Chipping Warden and Fawsley – between 40 and 50 per cent of parishes had flocks. Throughout the County 30.6 per cent of parishes had flocks – 36.3 per cent in the West and 25.4 per cent in the East. In other words capitalist sheep-farming was present in close to a third of all parishes in 1547. Some thirty-one places in twenty-eight parishes were both recorded in the Royal Commissions of 1517–18, as having suffered enclosure and depopulation in the period 1484–1517, and appeared in the sheep surveys of 1547 and 1564. Of these places, prosecutions for the offences were recorded for fourteen places in the Court of Exchequer prior to the 1547 survey, and another three prior to 1564.[20] The links between sheep-farming in the County in the sixteenth century, and previous enclosure, depopulation and desertion of villages are clearly apparent.

The 1564 sheep survey

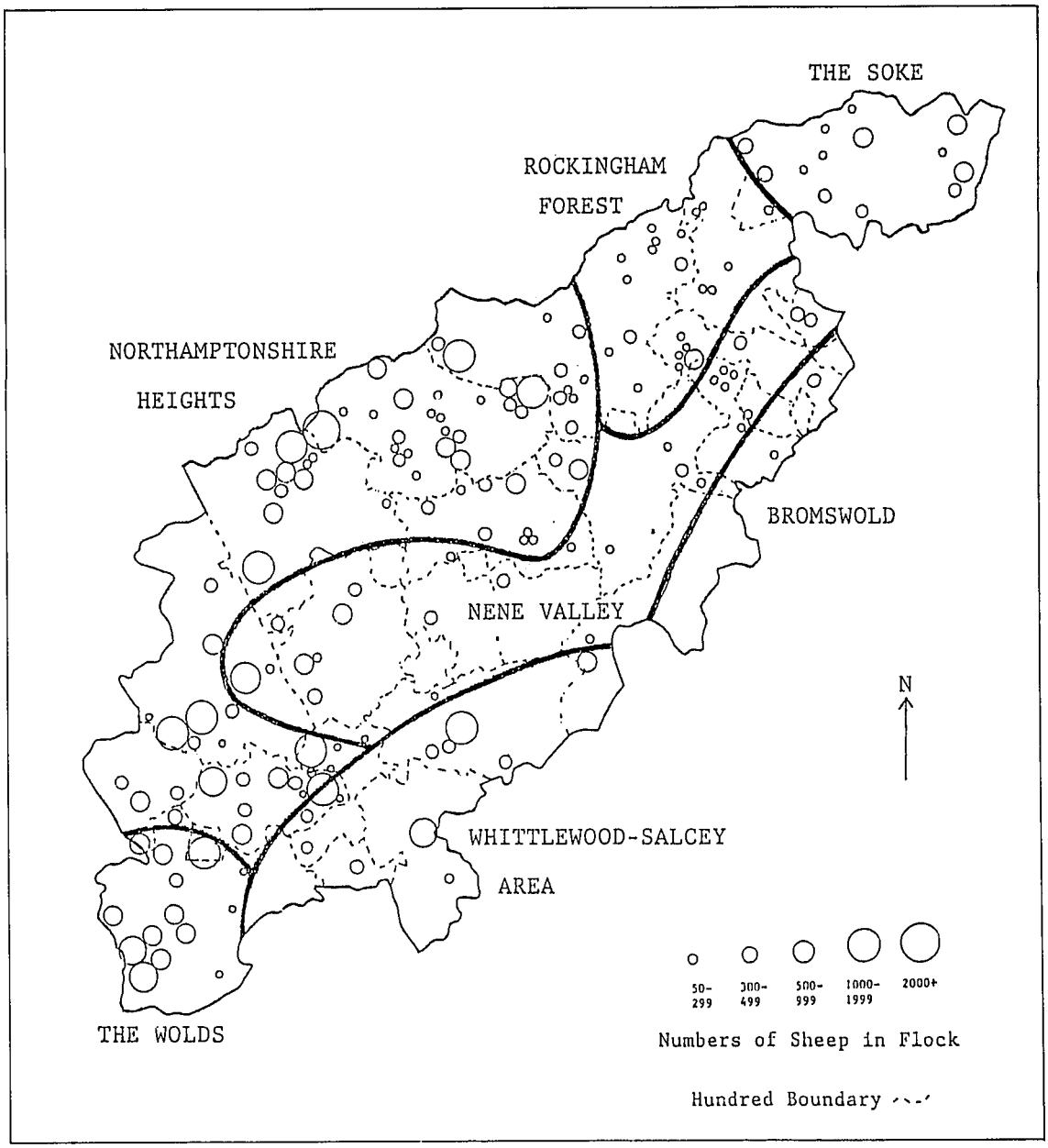
This survey is contained within a Book of Fines and Estreats belonging to Sir Edward Montagu when he was Sheriff of the County at the end of the sixteenth century.[21] This record contains a schedule and

19 Steane, *op cit*, pp 27, 161. For Map 1 we include the thirty-four deserted village sites where sheep flocks were found in 1547, cited in Allison *et al*, *op cit*. To these have been added another twenty-six sites which were deserted prior to 1700 and for which there is good evidence in Allison *et al* that this occurred prior to 1518 (p14). These sixty sites represented 73.2 per cent of the total for the County (eighty-two) recorded in Allison *et al*, and 76.9 per cent of the total (seventy-eight) recorded up to *c*1700, including those of uncertain but probable dates. By 1564, nine previously ungrazed sites now had flocks on them – in the East, eight sites with eleven flocks, total 2400 sheep; in the West, one site with one flock of 400 sheep. These additional sites occupied by 1564 are not depicted on Map 1.

According to Allison *et al* (*op cit*, pp 20–1), there were three areas of low density of deserted medieval villages: 1, the northeast tip of the County which was fenland thinly scattered with large villages not threatened by enclosure for pasture; 2, Rockingham Forest (only Kirby and Cotes were deserted between Wothorpe and Boughton) and Whittlewood Forest in the southwest. Both were lightly settled, and lacked the nucleated villages and extensive open fields which were tempting to graziers; 3, the Nene Valley – Allison *et al* consider that this area's immunity is difficult to explain, but speculate that the proximity of Northampton town favoured cattle for the leather industry rather than sheep.

20 I S Leadam (ed), *The Domesday of Inclosures, 1517–1518*, 1897, Vol 1, *Northamptonshire*, pp 261–318. Unfortunately we do not have access to similar information about specific parishes from the 1607 Commissions. Gay, 'The Midland Revolt', *op cit* only provides aggregate data for the county, and it seems that the documents have deteriorated since he used them so as to be virtually unreadable in parts. The documents are in the Public Record Office, Chancery C/205/5/5. Beresford, *Lost Villages*, *op cit*, Table 15a, p 402.

21 Northamptonshire County Records Office, Montagu Papers, second series 'A Book of Fines and Estreats, Eliz. I and Jac. I', ff 69–91, 112–18.



MAP 2
Sheep Flocks in the County of Northamptonshire, 1564

notes on purveyance relating to the year 1564, with additional enclosures noted since that time up to 1595. As in 1547, each parish with flocks of sheep was noted so that a systematic comparison can be made. By 1564 the number of flocks recorded had risen substantially to 173 (an increase of 54.5 per cent), and the number of sheep had also increased to 69,980 (an increase of 4.9 per cent). While there was a reduction in sheep numbers in the Western Division to 39,900, the number in the

TABLE 2

1564 Sheep Survey: Number of Flocks and Sheep in Northamptonshire Hundreds, by Size Group

	No of flocks in size group				*Total no of flocks*	*Total no of sheep*	*Average flock size*	*% of parishes with flocks*
Western Division	*1000+*	*500–1000*	*300–500*	*50–300*				
King's Sutton	2	6	3	4	15	8,500	567	60.9
Chipping Warden	1	2	2	0	5	3,100	620	45.5
Green's Norton	2	2	5	4	13	6,300	485	75.0
Fawsley	3	2	2	3	10	6,500	650	42.7
Towcester	1	0	0	2	3	1,200	400	50.0
Cleyley	1	0	0	1	2	1,400	700	13.3
Nobottle Grove	0	2	3	1	6	2,600	433	35.0
Guilsborough	2	4	2	4	12	7,600	633	42.1
Wymersley	1	0	3	1	5	2,300	460	23.8
Spelhoe	0	0	1	1	2	400	200	22.2
Total – West Div	13	18	21	21	73	39,900	547	40.8
Eastern Division								
Rothwell	2	5	5	10	22	9,350	425	54.2
Orlingbury	0	1	3	6	10	2,700	270	58.8
Corby	1	1	7	16	25	6,630	265	64.5
Hamfordshoe	0	0	2	1	3	650	217	42.9
Higham Ferrers	0	1	0	1	2	700	350	14.3
Huxlow	0	1	2	4	7	2,000	286	33.3
Navisford	0	0	0	6	6	1,000	167	75.0
Polebrook	0	0	4	0	4	1,400	350	44.4
Willybrook	0	0	0	5	5	550	110	23.1
Nassaburgh	0	4	5	7	16	5,100	319	58.6
Total – East Div	3	13	28	56	100	30,080	301	49.1
Total – Northants	16	31	49	77	173	69,980	405	45.2

Eastern Division had increased considerably to 30,080. This information is presented in Table 2 and Map 2.[22]

The general geographical pattern evident for larger flocks in 1547 persisted in 1564 with concentrations in King's Sutton, Green's Norton, Fawsley and Guilsborough in the Western Division, and Rothwell in the East. But by 1564 Nobottle Grove in the West and virtually all Hundreds in the East apart from Higham Ferrers and Hamfordshoe experienced considerable increases in flock numbers. There was marked expansion in Corby and Polebrook, previously virtually without sheep, and a proliferation of small flocks in Rothwell, Orlingbury, Willybrook and Navisford Hundreds. In terms of regions, wool-growing had now expanded from the higher country down into the length of the Nene Valley and Rockingham Forest, where few flocks had been previously recorded. Flocks were now particularly evident in Rockingham Forest, a wooded-pastoral area.

22 I have been unable to trace and map the exact parish location for four small flocks in 1564 – on in Spelhoe; one in Hamfordshoe; and two in the Nassaburgh Hundred. Only 650 sheep in total are involved.

III

The changes evident in the period 1547–64 were the result largely of a proliferation of smaller flocks which spread throughout much of Northamptonshire, especially in the Eastern Division. The average flock size fell from 596 to 405, but at the same time the percentage of parishes with flocks grew substantially. By 1564 nearly half (45.2 per cent) of Northamptonshire parishes contained one or more flocks and thereby felt the impact of sheep grazing on enclosed pasture. In three Hundreds of the Western Division, half or more of the parishes were affected (King's Sutton, Towcester and Green's Norton). In the last-named a full three-quarters of its twelve parishes contained flocks, comprising a total of 6300 sheep. In another three Hundreds in the West, between 40 and 50 per cent of parishes contained flocks. Now more than half of parishes in the Eastern Division Hundreds of Rothwell, Orlingbury, Corby, Navisford and Nassaburgh had flocks.

In the intervening seventeen years, five Eastern Hundreds had increased flock numbers by five or more, and another three by three or four flocks, while only two Western Hundreds had increased by three or four flocks and none by a greater amount than this. Two countervailing trends were at work. Large flocks reduced in number, while at the same time there were many more smaller flocks. Geographically, these trends are manifest in a reduction in sheep numbers in the West and a significant increase in the East which more than counterbalanced the trend in the West.

The 1564 survey was used by Sir Edward Montagu, Deputy Lieutenant, as a basis for revised purveyance schedules in the 1590s. The original levy was 11*s* 6*d* per hundred sheep. This was raised to 18*s* per hundred at that time. Montagu evidently felt that the survey of 1564 gave an adequate minimum baseline for the new levy, for he relied upon it heavily. This suggests that there was no significant reduction in numbers of sheep, flocks or owners that might require a new survey. Indeed, the changes noted in the document comprised two new lists of 'dyvers other grounds by decaying of tillage improved' and 'grounds inclosed since her Majesties reign'. This suggests that sheep-grazing had expanded further. The first contains thirty-three places in the Western Division, and the second a further thirty in the East, on which flocks of sheep undoubtedly grazed.[23] Excluding those parishes already recorded as grazing sheep (thirteen in the Western Division and twelve in the East) the number of parishes with sheep on enclosed pasture in Northamptonshire rose

TABLE 3
Extent of Surveyed Flocks of Sheep in Northamptonshire, 1547–95

	1547		*1564*		*1595*	
	No of parishes with flocks	*% of total parishes*	*No of parishes with flocks*	*% of total parishes*	*No of parishes with flocks*	*% of total parishes*
Western Division	57	36.3	64	40.8	73	46.5
Eastern Division	44	25.4	85	49.1	93	53.8
Northamptonshire	101	30.6	149	45.2	166	50.3

23 A further twenty-one places recorded enclosure in the period 1564–95 for which either the names were indecipherable or the places could not be traced (probably eleven in the Western Division and another ten in the East, judging by location of these places in the lists). These twenty-one places are not included in Table 3, but if included the impact of enclosure would be further increased.

from 101 (or 30.6 per cent of the total) in 1547, to 149 (or 45.2 per cent) in 1564, and to at least 166 (50.3 per cent) by the 1590s, as indicated in Table 3. In other words the spread of sheep farming in the half century since 1547, from a position of affecting 30.6 per cent of parishes in the County, now affected half of the parishes, with a fairly even balance between the Eastern and Western Divisions. The number of parishes with sheep flocks increased by at least two-thirds during this period.

IV

In mid-century, there were considerable numbers of farmers with large flocks, especially in the Western Division and in Rothwell Hundred in the East. Some of the more important names might be mentioned. The largest flock of 2500 sheep was run by Sir Valentine Knightley in Fawsley, a deserted village site. Knightley, together with Sir Thomas Newnham, also had a flock of 500 sheep in Everdon. This was followed by a number of flocks of 2000, run by Mr Oneley in Catesby; Lady Lane in Sulby; Mr John Gyfford in Watford; Mr Hickling and Mr Goodwyn in Green's Norton; and John Coope in Canon's Ashby. The last three flocks were pastured on deserted village sites. Coope also ran 600 sheep in the parish of Eydon, adjacent to Canon's Ashby.

These and other large sheep flocks were clustered in a number of adjacent parishes. Between Catesby and Green's Norton there was a great corridor of sheep pasture, where more than 15,000 sheep were recorded.[24] There the largest flock in the County grazed at Fawsley. The parish of Newbottle, a deserted village site in the southwestern corner of the county, was also an important centre of pastures with 6300 sheep in its vicinity. In Guilsborough Hundred, Elkington (a deserted village site) was the centre for more than 10,500 sheep.

Taken together, these concentrations of flocks in the Western Division accounted for almost half of the total surveyed sheep in the county in 1547. The details concerning larger flocks and the changes experienced by 1564 are given in Table 4.

For these flocks there was an overall reduction in sheep numbers of 22.2 per cent. Averaged over all twenty-seven flocks in 1547 this meant a loss of 433 sheep on an average flock size of 1385. But against this new flocks appeared and this mitigated the decline in size. This is indicated in Table 5.

This trend in larger flocks was more than counterbalanced by an increase of 11,580 sheep in flocks of less than 1000 in number, from 1547 to 1564. This was a result of the massive expansion of smaller flocks in the Eastern Division, in particular into Corby and Nassaburgh Hundreds as

24 In the area of Green's Norton there were the large flocks already mentioned in Canon's Ashby and Green's Norton, as well as a flock of 1000 sheep owned by Lawrence Washington in Sulgrave (a deserted village site). This flock had grown to 1500 in 1564. There were also Mr Watt's flock of 1000 sheep in Blakesley, and Mr Foxley's of 400 in adjacent Woodend, both on deserted village sites; a flock of 300 in Muscott, a deserted village site in the parish of Green's Norton; a flock of 700 in Weedon Lois; 300 sheep in Plumpton; and 400 in Adstone.

In the area of Catesby, as well as Knightley's flock of 2500 in Fawsley, there was the Oneley flock of 2000 accompanied by another of 1500 owned by the Bailey of Stowe, in Catesby. Mr and Mrs Andrews pastured 1200 sheep in Charwelton, a deserted village site, where there was also a flock of 300 belonging to Thomas Knight and one of 500 of Sir Valentine and Lady Knightley. Mr Richard Andrews ran 1000 sheep at Daventry and Thrupp in Norton. In Everdon there was a flock of 500 sheep jointly owned by Knightley and Sir Thomas Newnham. The latter also pastured a flock of 1200 in Newnham itself in 1564.

In the area of Newbottle, Peter Dormer owned a flock of 1000 sheep in Newbottle itself; in adjacent King's Sutton there was another flock of the same size. Fulco Barker ran a flock of 1000 in Steane, a deserted site on the other side of Newbottle, and two flocks of 1000 and 600 grazed on a deserted site on the boundary of Newbottle and King's Sutton. There was also a flock of 600 sheep in adjacent Farthinghoe, two of 500 in Warkworth and Croughton and another of 100 in Evenley.

In Elkington Mr John and Mr William Lane, Mr Cave and Mr Dorrell ran flocks of 1000 sheep apiece, and there were also three smaller flocks there adding up to another 1000, making some 4000 in all. In adjacent Welford, Mr Dorrell owned 1500 sheep and there was another flock of some 200 sheep. The two large flocks of 2000 belonging to Lady Lane and Mr John Gyfford grazed in nearby Sulby and Watford. Smaller flocks of several hundred sheep existed in Sibbertoft, Stanford and Winwick also.

TABLE 4

Change in Size of Flocks of 1000 or more in Northamptonshire Hundreds, 1547–64

Hundreds	*Owners*	*Number of Sheep* 1547	1564	*Change*
Western Division				
King's Sutton				
King's Sutton (and Walton)		1,000	1,400	+400
Newbottle	Peter Dormer, 1547	1,000	600	−400
Steane	Fulco Barker	1,000	500	−500
Purston [?]	Halles Pargetor [?]	1,000	1,500	+500
Chipping Warden				
Sulgrave	Stuchbury, Lawrence Washington	1,000	1,500	+500
Green's Norton				
Canon's Ashby	John Coope, 1547	2,000	1,600	−400
Blakesley and Woodend	Mr Watts	1,000	800	−200
Green's Norton	Mr Hickling and Mr Goodwyn, 1565	2,000	1,000	−1,000
Fawsley				
Fawsley	Sir Valentine Knightley	2,500	1,500	−1,000
Daventry and Thrupp	Mr Richard Andrews	1,000	800	−200
Catesby	Mr Oneley	2,000	—	−2,000
	The Bailey of Stowe	1,500	—	−1,500
Charwelton	Mr and Mrs Andrews	1,200	1,400	+200
Newnham	Sir Thomas Newnham and Mr Harrison	—	1,200	+1,200
Towcester				
Potcote	John Hickling	—	1,000	+1,000
Cleyley				
Grafton Regis	Sir John Williams	—	1,200	+1,200
Easton Neston	Sir John Williams and Mr Goodwyn [same flock?]	1,200	—	−1,200
Nobottle Grove				
Althorp	Mr John Spencer, 1547	1,200	800	−400
Guilsborough				
Watford and Silsworth	Mr John Gyfford, 1547	2,000	1,500	−500
Welford	Mr Dorrell, and Mr Saunders, 1564	1,500	1,400	−100
Elkington	Mr John and Mr William Lane	1,000	800	−200
	Mr Cave	1,000	800	−200
	Mr Dorrell	1,000	800	−200
Wymersley				
Preston Deanery		2,000	1,000	−1,000
Total – West Division		29,100	23,100	−6,000
Eastern Division				
Rothwell				
Sulby	Lady Lane, 1547	2,000	2,000	0
Little Oxenden, in Great Oxenden		1,000	600	−400
Pipewell, in Rushton		800	1,000	+200
Glendon, in Rushton		1,500	600	−900
Corby				
Brampton Ash		2,000	1,000	−1,000
Lyveden		1,000	800	−200
Total – East Division		8,300	6,000	−2,300
Total — Northamptonshire		37,400	29,100	−8,300

TABLE 5
Summary of Changes in Large Flocks of 1000 or more in Northamptonshire, 1547–64

	Stable	*Gains*	*Losses*	*Total flocks*
West Division	0	7	17	24
East Division	1	1	4	6
Northamptonshire	1	8	21	30

evident in Table 6, and Map 2 above. At the same time average flock size decreased (from 345 to 280). Unfortunately, flock-owners' names were only rarely included for the Eastern Division of the County so we cannot tell whether there was a corresponding proliferation of small graziers, or whether fewer individuals ran a substantial number of smaller, scattered flocks as did Thomas Tresham for example (see below).[25] Graziers may well have had to run smaller flocks in more dispersed enclosures as large consolidated tracts of pasture on deserted village sites in one or more adjacent parishes were increasingly hard to come by. The marked expansion of sheep-grazing into the wooded-pasture area of Rockingham Forest would have been in smaller closes typical of this kind of area.

There is other evidence supporting the general extent of sheep-farming evident in the two surveys of 1547 and 1564.[26] Two examples involving key Northamptonshire graziers are presented here. The most renowned sheep-master of all, Sir John Spencer, is noted in the surveys by name only for Althorp, his home manor. He was recorded as keeping 1200 sheep in 1547 and 800 in 1564. By the early seventeenth century the Althorp flocks ranged between 1104 and 1451 sheep. In 1547 a number of gentlemen had substantial flocks in Elkington – a total of 4000 sheep. By the end of the century Spencer was involved in pasturing more than a thousand sheep there. In 1575 Spencer bought from William Gent the manor and farm of Muscott (comprising four closes of pasture) in Green's Norton. Mr Gent had run a flock of 300 sheep in these closes in 1547 and 1564. Spencer's flock at Muscott was noted as consisting of 284 sheep in 1633.

We now turn to the activities of Thomas Tresham of Rushton, another well-known grazier of the time. In 1547, Rushton (including Pipewell in Rushton) and nearby Lyveden were shown as having 2800 and 1000 sheep respectively. In 1564 the figures were 1900 and 1400. In 1540 Tresham emparked 420 acres in Lyveden, sufficient for about 800 sheep. By 1544 he had bought further pastures in the same

25 We are unable to determine the social status of flockowners, whether aristocrat, gentry or peasant – sometimes individuals were given the honorific 'Sir' or 'Mr' but this was not common. However, because the minimum flock-size recorded was fifty this tends to exclude peasant flocks. Only six flocks of less than 100 sheep were recorded in 1564. Parker suggests that there was considerable peasant involvement in enclosure in Leicestershire in the latter half of the sixteenth century, suggesting that peasants enclosed 19 per cent of the total area. L A Parker, 'Enclosure in Leicestershire, 1485–1607', University of London, PhD thesis, 1948. However, only a very small proportion of this area was enclosed by freeholders and yeomen specifically (299 acres out of 1826 acres, or 16.4 per cent). The remainder was enclosed by tenants of unknown status. In other words, it is unclear whether these people were true peasants or larger grazier leaseholders.

26 For this section, see Finch, *op cit*, generally and especially pp 8, 31*n*, 40–3, 48, 69, 74, 171*n*. Further examples of corroboration of the survey figures could be given. Watford recorded 2000 sheep in 1547, and 1500 sheep in 1564. This matches well the numbers grazed there some fifty years later. In 1606, William Watkin of Watford was charged in the Court of Exchequer for holding more than 2000 sheep. In 1564, there were 300 sheep at Lamport; in the period 1571–96 John Isham of that parish held between 731 and 1572 sheep there. In 1547, 500 sheep were recorded in Kelmarsh, and in 1564 there were 1050 of which 800 were owned by Mr Osborne. Some 400 of these sheep were in Osborne's New Close. In 1598, Robert Osborne was accused in the Court of Star Chamber of having 1400 sheep at Kelmarsh. Public Record Office, Star Chamber Proceedings, Sta. Cha. 5/A13/36. Others from Northamptonshire who were at the same time accused of depopulation and conversion of arable into pasture were Thomas Isham of Lamport (see above) and Richard Humphrey of Barton Seagrave. In 1547, Barton Seagrave contained 200 sheep and in 1564, 800 sheep. Beresford, *Lost Villages*, pp 193–4, cites a document *circa* 1530–40, in which the largest wool growers in various counties are listed. In Northamptonshire Lord Vaux, Sir Richard Knightley, Sir Robert Lee, Sir Robert Dormer and Mr Anthony Cave were named. The Knightleys, Dormer and Cave were specifically cited in the surveys of 1547 and 1564. The Knightleys pastured a total of 3,500 sheep in Fawsley, Charwelton and Snorscombe in 1547. This correlates reasonably well with the 30 sacks of wool (or approximately 3600–5400 sheep) Beresford suggests the Knightleys produced just before that date.

TABLE 6
Changes in Smaller Flocks and Numbers of Sheep in Northamptonshire Hundreds, 1547–64

	1547		*1564*		*Change*	
Western Division	*Flocks*	*Sheep*	*Flocks*	*Sheep*	*Flocks*	*Sheep*
King's Sutton	11	4,700	11	4,500	0	−200
Chipping Warden	4	2,000	4	1,600	0	−400
Green's Norton	6	2,300	10	2,900	+4	+600
Fawsley	7	2,600	6	1,600	−1	−1,000
Towcester	0	0	2	200	+2	+200
Cleyley	1	200	1	200	0	0
Nobottle Grove	4	1,500	5	1,800	+1	+300
Guilsborough	7	2,100	7	2,300	0	+200
Wymersley	4	1,400	4	1,300	0	−100
Spelhoe	1	300	2	400	+1	+100
Total – West Div.	45	17,100	52	16,800	+7	−300
Mean size of flock		380		323		
Eastern Division						
Rothwell	12	4,800	18	5,150	+6	+350
Orlingbury	5	1,000	10	2,700	+5	+1,700
Corby	4	1,000	23	4,830	+19	+3,830
Hamfordshoe	0	0	3	650	+3	+650
Higham Ferrers	2	400	2	700	0	+300
Huxloe	6	1,500	7	2,000	+1	+500
Navisford	3	400	6	1,000	+3	+600
Polebrook	1	500	4	1,400	+3	+900
Willybrook	0	0	5	550	+5	+550
Nassaburgh	7	2,600	16	5,100	+9	+2,500
Total – East Div.	40	12,200	94	24,080	+54	+11,880
Mean size of flock		305		256		
Total – Northants	85	29,300	146	40,880	+61	+11,580
Mean size of flock		345		280		

area for another 300 sheep. Tresham also bought Luscottes assart lands in Brigstock in 1538, comprising eight closes of 170 acres. In 1564 some 200 sheep were recorded for these closes. In 1597, Tresham held a total of 3440 sheep in Rushton and Pipewell, and a further 2860 in Lyveden. These figures on numbers of sheep which are drawn from other sources strengthen confidence in the figures compiled from the two surveys, and illustrate the extensive enclosure in the second half of the sixteenth century.

VI

The information provided by these two surveys gives us a detailed understanding of the pattern and changes in sheep-grazing in Northamptonshire in the second half of the sixteenth century. The surveys show us that large-scale grazing was prevalent in the County and that many flocks were on deserted village sites. Sheep-grazing spread throughout Northamptonshire in the latter half of the sixteenth century, particularly into Eastern Hundreds, and there was a considerable increase in the

number of flocks of less than a thousand sheep. By the end of the century, half of the County's parishes contained flocks on enclosed pasture. In other words, capitalistic sheep-farming had become a feature of the County. Northamptonshire did not experience the contraction in sheep numbers which might have been expected if the changing price relativity between wool and grain was indeed so crucial in causing the reconversion of pasture to arable. Instead, graziers increased in number and importance and the County remained in the forefront of the enclosure movement.

Notes and Comments

WINTER CONFERENCE, 1987

The 1987 Winter Conference was held jointly with the Historical Geography Research Group of the Institute of British Geographers. Four papers were given on the theme of 'Food production, land use and diet during war'. P Dewey considered 'Production problems in British farming, 1914–18'; J Chapman discussed 'The effects of the First World War on trends in land-use change'; J Martin presented a paper on 'The British food production campaign of the Second World War: a reassessment'; and the conference concluded with D Oddy on 'Diet and food supply in the two world wars'. The Society is grateful to Dr Turner for organizing yet another successful conference. The Society's winter conference will be breaking from custom in 1988 in that it will not be held jointly with the Historical Geography Research Group. In the future it is hoped that the winter conference may be held in conjunction with other bodies with an interest in agrarian history.

SPRING CONFERENCE, 1988

Full details and a booking form for the 1988 Spring Conference, which is to be held at Plaxtole House, King's Lynn, should have been received by members or included with this copy of the *Review*.

ANNUAL GENERAL MEETING, 1988

The 36th Annual General Meeting of the Society will be held at 9 am on Thursday 7 April 1988 at Plaxtole House, King's Lynn. Nomination forms for officers and members of the Executive Committee should be inserted in this issue of the *Review*. Nominations should reach the Secretary *no later than* Thursday 31 March 1988. Members are reminded that it was agreed at the 1986 AGM that those nominating candidates for the Executive Committee should supply a twenty-word statement about each candidate to be circulated at the AGM of the Society.

MEMBERSHIP SUBSCRIPTION

It is quite remarkable that the Society's membership subscription has remained at £5 since 1 February 1977. The costs of printing the *Review* now far exceed the income from subscriptions, and so a proposal will be put to the AGM in April that the Society's annual subscription be raised to £9 with effect from 1 February 1989. If the meeting agrees to this increase it is hoped that it will be maintained at this level for at least four years.

COMPUTER-BASED INDEX TO THE IRISH ORDNANCE SURVEY MEMOIRS

Members of the Society may be interested in a project, based at the Institute of Irish Studies, Queen's University of Belfast, which aims to transcribe and index an important collection of manuscripts belonging to the Royal Irish Academy, the Ordnance Survey Memoirs, and make them more accessible to scholars and the interested public. These uniquely detailed parish accounts record Irish landscape, economy and society in the 1830s and were written as part of the first Ordnance Survey of Ireland. They describe 19 counties of Ireland but most attention was paid to the northern half, particularly counties Antrim and Londonderry. Very few Ordnance Survey Memoirs have been edited and published. By transcribing edited texts of the parish Memoirs, putting them on computer, and then indexing every text individually, a database has been established. An information retrieval programme developed at Queen's University of Belfast has been run on the texts. This indexes every significant word in the texts which are specially structured with fields or headings and text. The Memoirs are particularly diverse in subject matter describing buildings and antiquities, trades and occupations, land use, farming practice and produce, markets and manufactures, giving school and dispensary statistics and other

(continued on page 75)

Continuity and Change in Hertfordshire Agriculture 1550–1700: I – Patterns of Agricultural Production*

By PAUL GLENNIE

Abstract

The rural economies of the London area have long been seen as having responded particularly vigorously to the commercial opportunities created by the rapid growth of London in the early-modern period. This paper, the first of two, presents the results of an analysis of archdeaconry court probate inventories of farmers from the county of Hertfordshire. Topics covered include the relative importance of various cereal crops and of different types of livestock, the innovation of new fodder crops, the importance of particular types of farm enterprise, and patterns of geographical specialization. The results are used to discuss the chronology and geography of developments in agricultural production, and to compare these with the accounts of agrarian historians. It is concluded that these accounts do not adequately describe the chronology and geography of production changes. This has implications for explanations of the causes of agricultural change based on inferences from trends in grain and livestock prices.

AMONG the welter of advice and comment in Thomas Tusser's *Five Hundred Points of Good Husbandry* of 1573, his comment on his progress in life

> To carke and care and ever bare,
> With loss and paine, to little gaine,[1]

might often have struck a sympathetic chord among agrarian historians of the early modern period. Twenty years on from the appearance of *The Agrarian History of England and Wales*, volume IV, and other important works[2] in the mid-1960s our theoretical and empirical knowledge of agricultural change has significantly, but very unevenly, increased. While the efforts of Dr Thirsk and her collaborators have immeasurably increased our appreciation of the diversity of early-modern agriculture, and of the attitudes of contemporaries towards it, a number of key topics – particularly yield and productivity trends and their causes – remain highly problematic. The recent appearance of volume V of the *Agrarian History*[3] provides a convenient point at which to take stock of debates on early modern agricultural change.

It is disappointing that the volume does not squarely address the hypotheses advanced by E L Jones and by A H John that this period was one of major agricul-

* An early version of part of this paper was presented at the British Agricultural History Society conference at Newton Abbot in April 1986. The author is grateful to participants there, particularly Mark Overton, for helpful comments and suggestions.

1 T Tusser, *Five Hundred Points of Good Husbandry*, Oxford, 1984, p 205. 'To carke' is to be anxious.

2 J Thirsk (ed), *The Agrarian History of England and Wales* (hereafter *AgHEW*), volume IV, 1500–1640, Cambridge, 1967; E Kerridge, *The Agricultural Revolution*, 1967; E L Jones (ed), *Agriculture and Economic Growth in England, 1660–1815*, 1967.

3 J Thirsk (ed), *AgHEW*, V, 1640–1750, Cambridge, 1984, in two volumes. Amongst reviews, see M Havinden, 'Evolution or revolution?: agriculture's critical period, 1640–1750', *Jnl Hist Geog* 12, 1986, pp 204–10, M Overton, 'Depression or revolution? English agriculture, 1640–1750', *Journal of British Studies* 25, 1986, pp 344–52, E A Wrigley, 'Early modern agriculture: a new harvest gathered in', *Ag Hist Rev* 35, 1987, pp 65–71, and R B Outhwaite, 'Review article. English agricultural efficiency from the mid-seventeenth century: causes and costs', *Historical Journal* 30, 1987, pp 201–9. In *AgHEW* V (i), Hertfordshire is discussed at length in R C Richardson, 'Metropolitan counties: Bedfordshire, Hertfordshire, and Middlesex', pp 239–69.

Ag Hist Rev, 36, I, pp 55–75

tural change.[4] Briefly, Jones and John each suggest that a recession in grain prices from the 1640s (rather than the preceding boom period for grain producers) stimulated arable sector technological innovations designed to raise grain yields. This apparently perverse response of expanding output in response to low prices was, they argued, rational for commercial farmers whose physical or social environment prevented a switch towards more pastoral farming. Thus these accounts provide expectations of both the chronology (later seventeenth century onwards) and geography (principally light-soiled downlands) of new or intensified husbandry practices.

Several studies at a regional or local scale have directly considered these topics.[5] In the main these have rejected accounts of agrarian change which overemphasize either the pre-1650 period or the post-1750 period as the pre-eminent times of changing production patterns or technical innovations. It has become widely accepted that, in many areas at least, the later seventeenth and early eighteenth centuries witnessed some major changes in farming organization and farming practices, including intensified regional product specialization.

Simultaneously, several aggregate-level statistical and econometric analyses have suggested major changes in the performance of the English agrarian economy at this time.[6] Substantial productivity improvements, both per acre and per man, appear to have been achieved. These set England apart from the general experience of late seventeenth- and early eighteenth-century Europe. Even if there remained obstacles to continued expansion beyond *c*1740, the English agrarian economy seems to have achieved higher grain yields, and to have maintained a very much larger non-agricultural population than hitherto. Unfortunately, econometric approaches have yet to be closely integrated with work specifying precisely how this improvement was achieved in particular farming systems. This is due partly to the deficiencies of agricultural sources, and partly to scepticism about the validity of heroically specified agricultural variables within highly aggregate econometric work. Nevertheless, perhaps the most important task facing agrarian historians is to achieve a closer integration between models of long-term economic and social change, and particular developments in yields, production patterns and techniques.

It should be noted straight away that this paper does not aim to provide a comprehensive account of agrarian change in Hertfordshire, but rather to focus more

4 A H John, 'The course of agricultural change, 1660–1760' in L S Pressnell (ed), *Studies in the Industrial Revolution*, 1960, pp 125–55; A H John, 'Agricultural productivity and economic growth in England, 1700–1760', reprinted in Jones (ed), *Agric and Econ Growth*, pp 172–93; E L Jones, 'Agricultural and economic growth in England, 1660–1750: agricultural change', reprinted in Jones (ed), *Agric and Econ Growth*, pp 152–71; E L Jones, *Agriculture and the Industrial Revolution*, Oxford, 1974. Convenient summaries are provided by P K O'Brien, 'Agriculture and the industrial revolution', *Econ Hist Rev*, 2nd ser, xxx, 1977, pp 166–81; C Clay, *Economic Expansion and Social Change: England 1500–1700*, Cambridge, 1984, I, pp 126–41; M Overton, *The Agricultural Revolution in England: the Transformation of the Rural Economy, 1500–1830*, Cambridge, 1987.

5 Lack of space precludes an exhaustive list, but the two most important regional-level studies have been those of Yelling and Overton. Among recent papers are J Yelling, 'Livestock numbers and agricultural development 1540–1750: a study of east Worcestershire', in T Slater and P Jarvis (eds), *Field and Forest: an Historical Geography of the West Midlands*, Norwich, 1982, pp 281–300; M Overton, 'Estimating crop yields from probate inventories: an example from East Anglia, 1585–1735', *Jnl Econ Hist* 39, 1979, pp 363–78; M Overton, 'Agricultural revolution? Development of the agrarian economy in early modern England', in A R H Baker and D J Gregory (eds), *Explorations in Historical Geography: Interpretative Essays*, Cambridge, 1984, pp 118–39; M Overton, 'The diffusion of innovations in early modern England: turnips and clover in Norfolk and Suffolk, 1580–1740', *Transactions of the Institute of British Geographers*, new series 10, 1985, pp 205–21.

6 E A Wrigley, 'Urban growth and agricultural change: England and the continent in the early modern period', *Journal of Interdisciplinary History*, 15, 1985, pp 683–728, especially pp 695–705; E L Jones, 'Agriculture, 1700–1800' in R Floud and D McCloskey (eds), *The Economic History of Britain since 1700* I, 1981, pp 66–86; R V Jackson, 'Growth and deceleration in English agriculture, 1660–1790', *Econ Hist Rev*, 2nd series, XXXVIII, 1985, pp 333–51; P K O'Brien, 'Agriculture and the home market for English industry, 1660–1820', *Eng Hist Rev* 100, 1985, pp 773–800; N F R Crafts, 'English economic growth in the eighteenth century: a re-examination of Deane and Cole's estimates', *Econ Hist Rev*, 2nd series, XXIX, 1976, pp 226–35; N F R Crafts, 'British economic growth, 1700–1831: a review of the evidence', *Econ Hist Rev*, 2nd series, XXXVI, 1983, pp 177–99.

narrowly on aspects of production. Developments in agricultural production are approached here through a statistical analysis of farmers' probate inventories, to illustrate the sorts of developments which inventories are capable of revealing.[7] Probate inventories are relatively uninformative about tenurial and organizational aspects of agrarian change and these will not be discussed in any detail. The restricted focus of this paper is deliberate. I regard a large-scale analysis of probate inventories as important and worthwhile for at least two reasons.

First, it has appeared to several historians that large-scale quantitative analyses of probate inventories may provide a wide range of new data against which divergent interpretations of the development of early modern agriculture can be evaluated. In *Economic History Review* recently, Outhwaite suggested that 'inventory analysis techniques . . . look particularly promising [in confirming or denying assertions about changes in cropping and livestock patterns], and hold out promise for systematic regional investigations from the mid-sixteenth century onwards'.[8] Similarly Thirsk expects the computer handling of data from large numbers of inventories to enable 'much more comprehensive analyses' of patterns of farming activities.[9]

Moreover the development of new techniques for the statistical analysis of inventory data, mainly by Mark Overton,[10] offers an approach to some hitherto unresolved problems, such as trends in crop yields. This is *not* to suggest, as some agricultural historians have implied, that the availability of better agricultural statistics would of itself resolve major agricultural debates. But more reliable estimates of yield levels and other measures of farming activity do mean that the terrain for debate is better defined. Neither is it my intention to claim that inventories provide some 'privileged' kind of data on these topics compared with other sources, but merely to emphasize the broad temporal, social and geographical coverage of the farming population that they provide.

However, since there have as yet been few large-scale inventory studies, it is difficult fully to evaluate their worth. Economic historians such as Holderness have made sceptical comments about the value of inventories, describing their use as the framework of recent studies as 'problematical' and 'restrictive',[11] but without elaborating why these limitations apply more severely to studies based on probate inventories than to studies based on any other (scarcer) source. Thus the second aim of the paper is to provoke some debate over how useful the results are, and to highlight questions whose solutions will require inventory data to be related to data from other sources such as farm accounts, legal and estate records, diaries, husbandry manuals and so on.

Obviously, an overall verdict on the usefulness of inventories will also depend on the ways in which we choose to define and conceptualize agricultural change and the economic, social and cultural processes which it involves. Those predisposed to see agricultural change as a basically technical process are likely to be more enthusiastic than those for whom changes in agricultural production are basically a function of changing power-relations within society as a whole. However, this interpretative

7 For detailed discussion see M Overton, 'English probate inventories and the measurement of agricultural change', *AAG Bijdragen*, 23, 1980, pp 205–15; M Overton, 'Probate inventories and the reconstruction of agricultural landscapes', in M Reed (ed), *Discovering Past Landscapes*, 1983, pp 167–94.

8 R B Outhwaite, 'Progress and backwardness in English agriculture, 1500–1650', *Econ Hist Rev*, 2nd series, XXXIX, 1986, p 18.

9 J Thirsk, *England's Agricultural Regions and Agrarian History, 1500–1750*, 1987, p 20.

10 M Overton, 'Computer analysis of an inconsistent data source: the case of probate inventories', *Jnl Hist Geog* 3, 1977, pp 317–26; Overton, 'English probate inventories and agricultural change'; Overton, 'Estimating crop yields'.

11 B A Holderness, 'Review of periodical literature: 1500–1700', *Econ Hist Rev*, 2nd series, XL, 1987, p 102.

dispute is an argument which the analysis of empirical data is not capable of resolving, and which requires debate beyond the scope of this discussion.

This discussion consists of two papers. The first, below, concentrates on changing patterns of aggregate production and their geography in the county of Hertfordshire, a short distance to the north of London, between 1550 and 1700. Important new information relating to agriculture in south-east England is presented and discussed. Most of the topics dealt with are familiar from existing work using inventories, though some of them are here approached in new ways. Section I discusses trends in farm size, measured through total valuations of crops and livestock. Patterns of cropping, livestock ownership, and the innovation of new fodder crops are outlined in section II. The geographical distribution of particular product specializations is mapped in section III. Cluster analysis is used to determine the relative importance of different farm-types in section IV, and these are mapped to further identify patterns of regional specialization in section V. The second paper, 'Trends in crop yields and their determinants', will address a variety of questions concerning aspects of grain output and productivity.

I

The present results derive from about 2150 Hertfordshire probate inventories proved in archdeaconry courts, the lowest level of the multi-tiered English probate system, between 1550 and 1699.[12] These inventories provide varying levels of information and detail, and not all of them provide information for each topic to be discussed. As can be seen from Table 1 the majority of farmers' inventories date from the seventeenth century. Prior to this time fewer inventories are available because the survival of the various archdeaconry court records is rather patchy. Prior to 1607, the only inventories available are from the archdeaconry of St Albans, mainly in south-west Hertfordshire.[13]

The core of this paper is provided by the 1300 or so inventories relating to 'active' farmers, and made during the late-spring

TABLE 1
Mean Inventory Valuations of Farmers' Personal Estates (£)

	Yeomen			*Husbandmen*		
	Total	*Farm*	*No*	*Total*	*Farm*	*No*
1540–49	32	20	(2)	21	12	(6)
1550–59	49	22	(19)	29	22	(22)
1560–69	68	34	(9)	53	30	(13)
1570–79	132	74	(17)	56	37	(12)
1580–89	131	77	(26)	70	40	(12)
1590–99	139	79	(23)	39	20	(20)
1600–09	128	77	(48)	42	19	(25)
1610–19	144	78	(81)	37	20	(55)
1620–29	196	123	(70)	47	22	(66)
1630–39	194	116	(88)	41	19	(68)
1640–49	204	116	(85)	61	26	(47)
1650–59	208	145	(20)	51	22	(13)
1660–69	176	109	(85)	75	35	(60)
1670–79	281	169	(76)	94	50	(50)
1680–89	275	152	(82)	87	42	(51)
1690–99	285	194	(68)	87	61	(41)

Source: archdeaconry court probate inventories of active farmers. 'Total' = total *gross* value of inventory; 'Farm' = value of grain and fodder (both growing and stored), and livestock, but excluding farm equipment and gear; 'No' = number of inventories.

12 The archdeaconry court inventories used in this study are preserved in the Hertfordshire County Record Office, County Hall, Hertford (hereafter HCRO). The series for the archdeaconries of St Albans (from 1538) and Huntingdon (from 1607) are filed separately, apart from the wills to which they relate. The office holds a card index by surname only for all its holding of probate documents. An index for the period 1550–1700 by parish and by occupation compiled by the author is available in typescript.

13 For the boundaries of probate jurisdictions in the county see C Humphrey-Smith (ed), *Atlas and Index of Parish Registers*, Chichester, 1984. Wills from eastern parishes in the archdeaconry of Middlesex are preserved at the Essex County Record Office at Chelmsford, but without inventories.

to late-autumn period.[14] By an 'active' farmer I mean someone whose inventory suggests that the ascription of the term 'yeoman' or 'husbandman' was not solely a status label, and that they were not retired. A farmer was deemed to be retired if he fulfilled three of the following four criteria: first, that he owned little or no stored grain and no crops; second, that he possessed not more than two animals of any kind; third, that he possessed no farm equipment or tools; and fourth, that he did not live in his own house, but in a single lodging room in somebody else's house. Thus the retirement threshold set is low. The 'active' farmer category does include some small farms, although the smallest farms are excluded from calculations in sections IV and V.

Table 1 summarizes aggregate trends in the gross total value of the inventories of 'active' yeomen and husbandmen, and in the total value of their crops and livestock. Given that price levels changed over time, it is necessary to distinguish between inflation and increasing personal wealth as causes of the rising valuations in Table 1. The total valuations of crops and of livestock in each inventory were deflated by price series, for 'all arable crops' and 'all livestock' respectively, derived from *The Agrarian History of England and Wales*.[15] The adjusted amounts have then been recombined and indexed to produce the graphs in Fig 1. Although these are national rather than local price series, general trends in farm valuations may be distinguished.

Among yeomen, whose numerical and landholding importance relative to husbandmen was becoming increasingly marked,[16] valuations in real terms increased in two phases either side of a period of relatively stable valuations: first in the third quarter of the sixteenth century, and again in the late seventeenth century. Husbandmen's farm valuations were also increasing in these periods, but had collapsed in the aftermath of several poor harvests in the late 1580s and 1590s. These economic difficulties may have helped to reinforce trends towards a closer relationship between wealth and the definition of status by contemporaries. However, changing use of terminology can only account for a small element of overall trends in yeomen's wealth. Whilst it would be naive to expect more than a broad correlation between farm valuations and farm size, Fig 1 is probably indicative of the direction of trends in mean farm size among inventoried farmers. Farm valuations of course depended on factors other than size, but the use of valuations does deal with farms as working units, whereas the analysis of farm size from sources such as survey field books and rentals is bedevilled by the likelihood of widespread sub-letting. A detailed elaboration of trends in landholding structure needs to be pursued through more intensive local studies, integrating inventories and other documentary sources.

II

The relative importance of crops and livestock in farm valuations illustrates the predominantly arable nature of agriculture within the county. Making allowance for different rates of price inflation for crops

14 A detailed analysis of the agricultural activities of tradesmen and craftsmen in this area is in preparation. The major conclusion of this analysis is that craftsmen and tradesmen in Hertfordshire had very limited agricultural activities compared with more remote areas where the 'dual economy' household was more normal, as discussed by Joan Thirsk, 'Industries in the Countryside', in F J Fisher (ed), *Essays in the Economic History of Tudor and Stuart England*, Cambridge, 1961, pp 70–88.

15 P J Bowden, 'Statistical appendix', in *AgHEW* volume IV; P J Bowden, 'Statistical appendix', in *AgHEW* volume V.

16 Among the adult male population of the county as a whole, I estimate that the approximate proportions designated 'yeoman' and 'husbandman' were respectively 27% and 15% in 1540–79, 26% and 11% in 1580–1609, 25% and 8% in 1610–39, 20% and 8% in 1640–69, 11% and 4% in 1670–99. These figures are derived from occupational indexes for a sample of parishes. They are compiled using occupational information from several sources applied to lists of adult males derived from parish registers (plus an estimate of the farm servant group) and population listings, although the latter are very scarce.

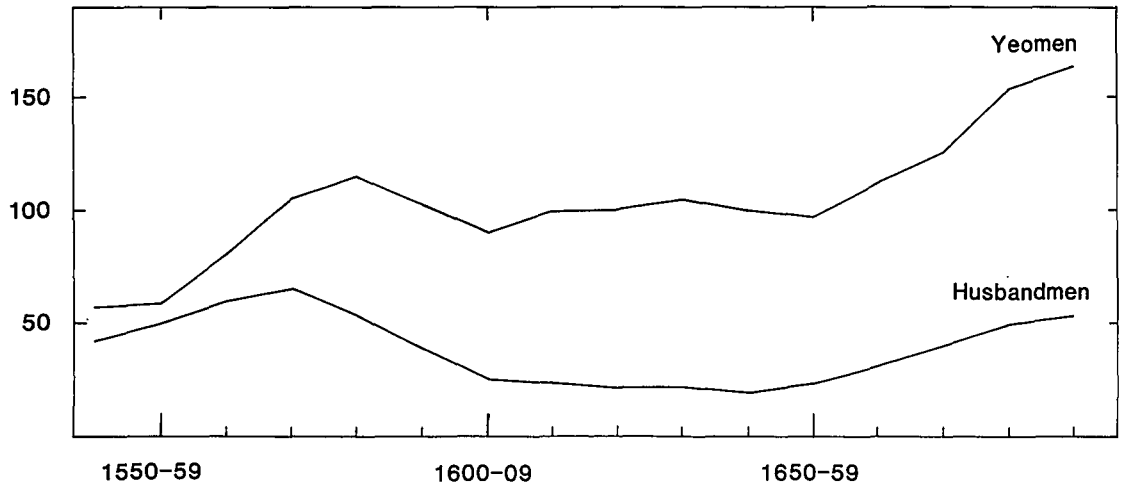


FIGURE 1
Combined crop and stock valuations in real terms, 1540–1699. Inventory valuations adjusted for inflation. Three-decade moving average, indexed relative to Yeomen 1620–29 = 100

and livestock, the arable emphasis of Hertfordshire agriculture increased steadily during the sixteenth century, by the end of which crops accounted for over 60 per cent of farm valuations. The rate of increase slowed during the seventeenth century, levelling off at just over 70 per cent of farm valuations. This level was maintained even when price relatives were moving against grain products after *c*1650.

Within this general picture of arable specialization, changes in the relative importance of the major arable crops are summarized in Fig 2. The major feature of the period was an increase in the area devoted to barley. At an aggregate level this was at the expense of rye, although at a regional level there were some areas where barley cultivation also expanded to replace wheat and other areas where wheat replaced rye. By the 1690s the cultivation of rye had all but disappeared from Hertfordshire, having lingered longest on poor soils in the south-west. By then barley was more widely cultivated than wheat in many northern districts: a development intimately related to the increasing scale and sophistication of the malting industry in centres like Hitchin and Ware. Thus Richardson's claim that 'wheat and oats were certainly the main crops grown in Hertfordshire in the seventeenth century' is at best an oversimplification.[17] Not too much significance should be attached to small changes in the level of these graphs, but we can also pick out a small overall decline in the cultivation of oats and an overall increase in the proportion of cropped land under peas, beans and other pulses.

While the increase in the proportion of cropped acreages under pulses was relatively modest, their cultivation became much more widespread among farmers. From being grown on under half of inventoried farms before 1580, they were grown on more than three-quarters of inventoried farms a century later. Since cultivation levels were similar in both the archdeaconry of St Albans and the archdeaconry of Huntingdon, the increase is not an artefact produced by the uneven geographical coverage of inventories before 1607. Among both yeomen and

17 Richardson, 'Metropolitan counties', p 243.

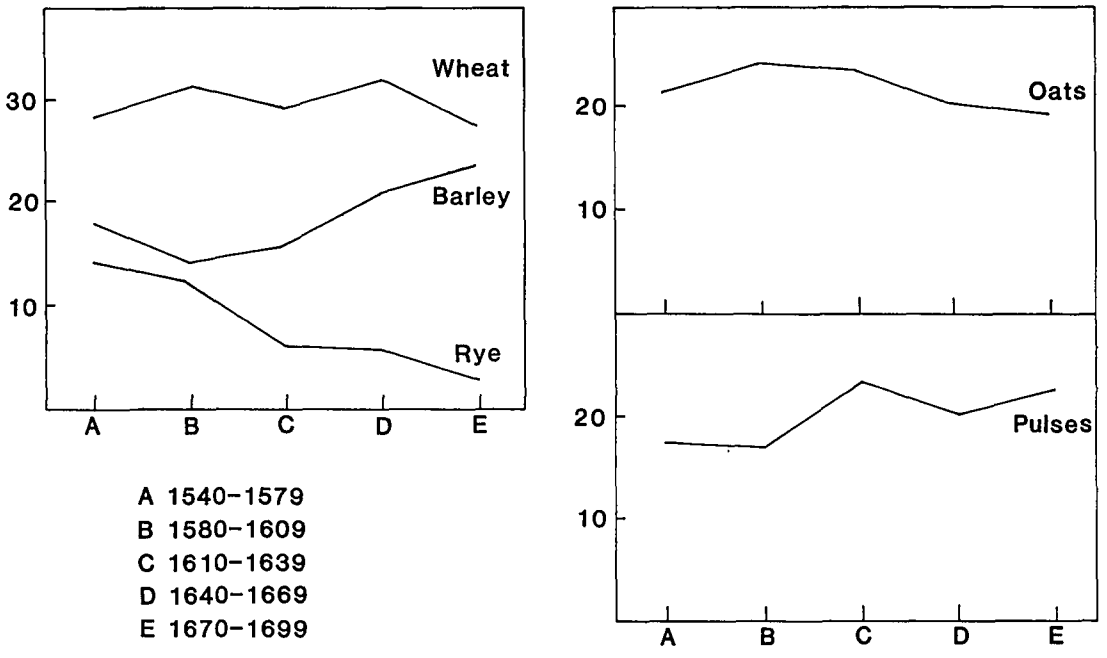


FIGURE 2
Relative importance of cereal crops shown as percentage of cereal area in summer inventories

husbandmen, the proportion growing pulses increased steadily: from just under 50 per cent of each group in the period 1540–79, to over 75 per cent of yeomen and about 55 per cent of husbandmen in 1610–39, and 85 per cent and 80 per cent respectively in 1670–99.

Although there was little difference between the two status groups in terms of their cultivation of all pulses (mainly peas) this was in marked contrast to the cultivation of the more highly-valued pulses such as lentils, vetches and tares. Initially, these were grown by yeomen far more often than by husbandmen. In 1610–39 just over a quarter of yeomen's inventories included these pulses, compared with just under 10 per cent of husbandmen's. By the last thirty years of the century the gap had narrowed. After 1670, roughly 30 per cent of yeomen and 25 per cent of husbandmen were growing lentils, vetches or tares.

A similar pattern of narrowing social differentiation in the cultivation of pulses emerges when we turn to variations in their cultivation according to farm size. Taking total cropped acreage as a measure of farm size, variations in the cultivation of pulses among farms of different sizes were modest, especially after about 1610. The same was not true, though, of the relative importance of barley on farms of different sizes. Throughout the period, larger farms devoted considerably more of their cropped area to barley than did smaller farms. Indeed, variations in the importance of barley with increasing farm size became more pronounced over time. By the period 1670–99 farms with fewer than 10 acres under crops devoted on average less than 10 per cent of their area to barley, those with 10–19 acres devoted just under 15 per cent, those with 20–49 acres devoted just over 20 per cent, and those farmers with more than 50 acres under crops on average devoted well over 25 per cent of this to barley. These figures are particularly relevant with regard to total output per farm because, as we shall see, barley produced higher yields per acre than

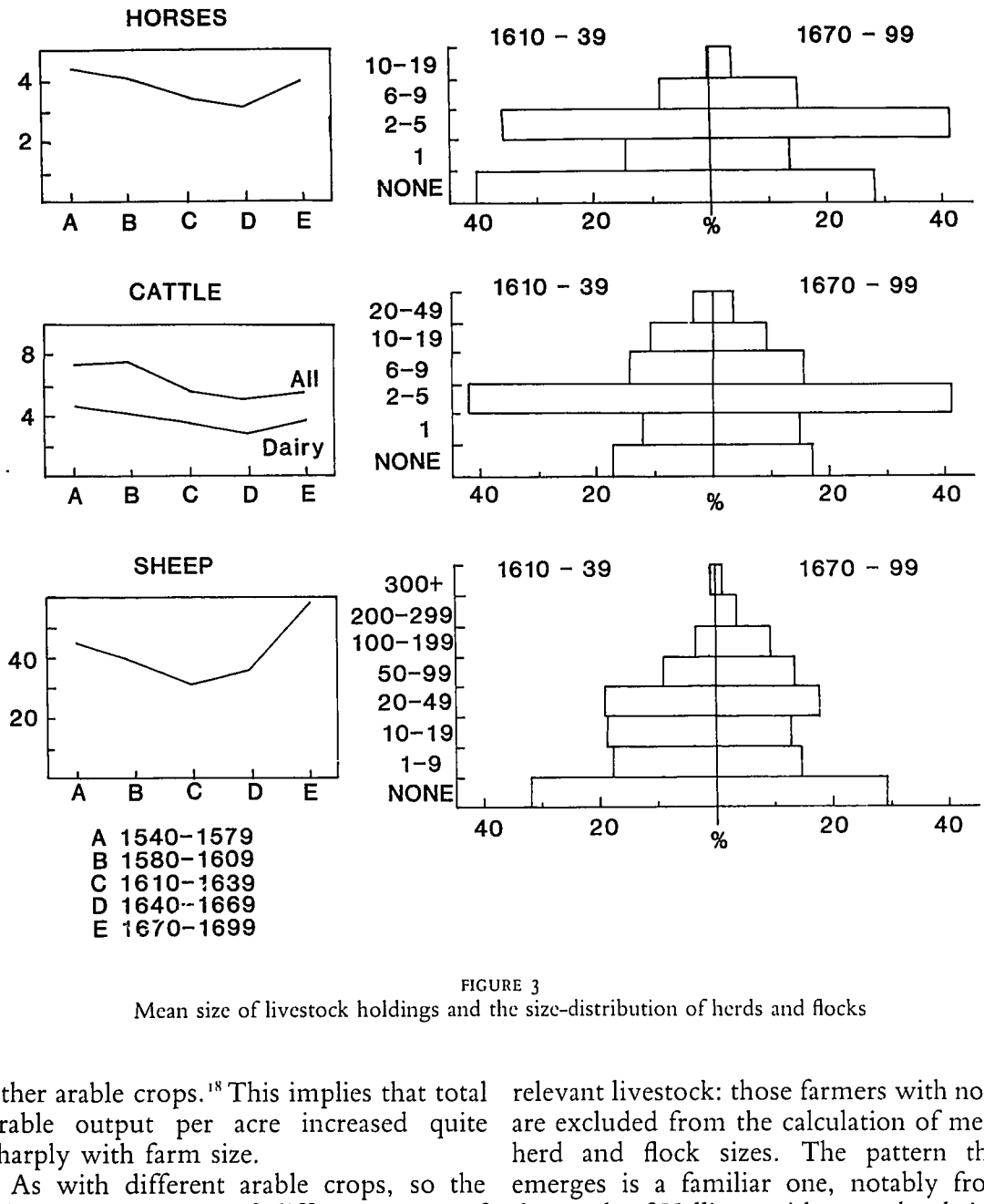


FIGURE 3
Mean size of livestock holdings and the size-distribution of herds and flocks

other arable crops.[18] This implies that total arable output per acre increased quite sharply with farm size.

As with different arable crops, so the relative importance of different types of livestock varied over time. Fig 3 depicts trends in the numbers, and the size-distribution where available, of horses, cattle and sheep. The mean herd and flock sizes on the left-hand side of Fig 3 are the means for those farmers who had some of the relevant livestock: those farmers with none are excluded from the calculation of mean herd and flock sizes. The pattern that emerges is a familiar one, notably from the work of Yelling, with mean herd sizes declining by at least one-third between the middle of the sixteenth century and the middle of the seventeenth. After about 1620, however, hitherto similar trends for the different livestock types diverged.

First, the ownership of horses became more widespread after about 1640 as the top right-hand diagram of Fig 3 illustrates.

18 Discussed below in section VII.

The proportion of farmers with no horses dropped by nearly half between 1610–39 and 1670–99; and average herd size increased because there were more large holdings, with six or more horses. There was no such recovery in the size of cattle herds, and the mean number of cattle possessed by farmers remained stable through the seventeenth century. This stable herd size was underlain by a very stable size-distribution of herd sizes: the pyramids of herd size-distributions in 1610–39 and 1670–99 are almost identical. This aggregate stability nevertheless concealed a shift away from cattle breeding and rearing towards dairying. By the close of the seventeenth century dairy cattle accounted for about 70 per cent of cattle enumerated. This was rather above their relative frequency in the late sixteenth century.

The most dramatic indication of growing livestock numbers per farm comes from the mean size of sheep flocks, which increased during the seventeenth century, especially after 1670, to reach new levels higher than those at any earlier period in this study. However the rise in mean flock size was not associated with an increase in the number of farmers keeping some animals, as was the case with horses. After about 1640 there was a sharp increase in the proportion of farmers with large flocks of fifty or more sheep, but almost as many farmers as before had no sheep at all. Farmers with fifty or more sheep comprised 13 per cent of all farmers with sheep in 1610–39, but 27 per cent of all farmers with sheep in 1670–99. So compared with other branches of livestock farming, sheep farming was becoming an increasingly specialized activity.

It is notoriously difficult to turn estimates of the livestock held per inventoried farmer into overall trends in the number of livestock in an area,[19] since changes in mean farm size could reinforce, or cancel out, or outweigh trends in livestock per farm. If we take the attempt to calculate farm values in real terms in Fig 1 as a crude surrogate for farm size, two conclusions follow. First, if mean farm size among farmers was increasing at all between 1550 and about 1580 (or beyond), then the decline in livestock numbers in the county as a whole was more precipitous than that in livestock per farmer shown in Fig 3. Secondly, there are strong indications that mean farm size in the last three decades of the century (my period E) was significantly larger than before.[20] Naturally, the effect of this is to lessen the apparent increase in the numbers of horses and sheep in the county, and it can be suggested that numbers of cattle continued to decline after 1650 rather than stabilizing. Overall then, any aggregate increase in livestock numbers in the late seventeenth century was probably on a modest scale. Accounts of agrarian change which invoke substantial increases in livestock numbers in arable-dominated areas of the metropolitan counties seem to be of limited relevance here.[21]

In Hertfordshire, as in East Anglia,[22] both new grass substitutes and root crops (mainly turnips) were more widespread by 1700 than they had been a century earlier, with most of the increase recorded in inventories occurring after *c*1670 (Fig 4). Of the two groups of crops, by far the commoner were clover, sainfoin and the other grass substitutes. By the end of the seventeenth century, about 8 per cent of

19 The total number of livestock in the county could be estimated very approximately in one of two ways. One way is to develop indices of livestock density per cultivated acre, and via a model of changing land-use patterns, to multiply densities up to obtain total livestock numbers (suggested by Yelling, 'Livestock numbers and agricultural development'). A second is to estimate the average herd and flock sizes for different occupational groups (gentry, clergy, yeomen, husbandmen, tradesmen, craftsmen, labourers, etc) and to use estimates of the occupational composition of the population to combine the figures for each group to obtain total livestock populations.

20 Growing farm sizes in the late seventeenth century are noted by G Longman, *A Corner of England's Garden: An Agrarian History of South West Hertfordshire 1600–1850*, Bushey, 1977, p 40.

21 John, 'Course of agricultural change', pp 124–33; Jones, *Agriculture and the Industrial Revolution*, pp 72–8.

22 Overton, 'Diffusion of innovations', p 208.

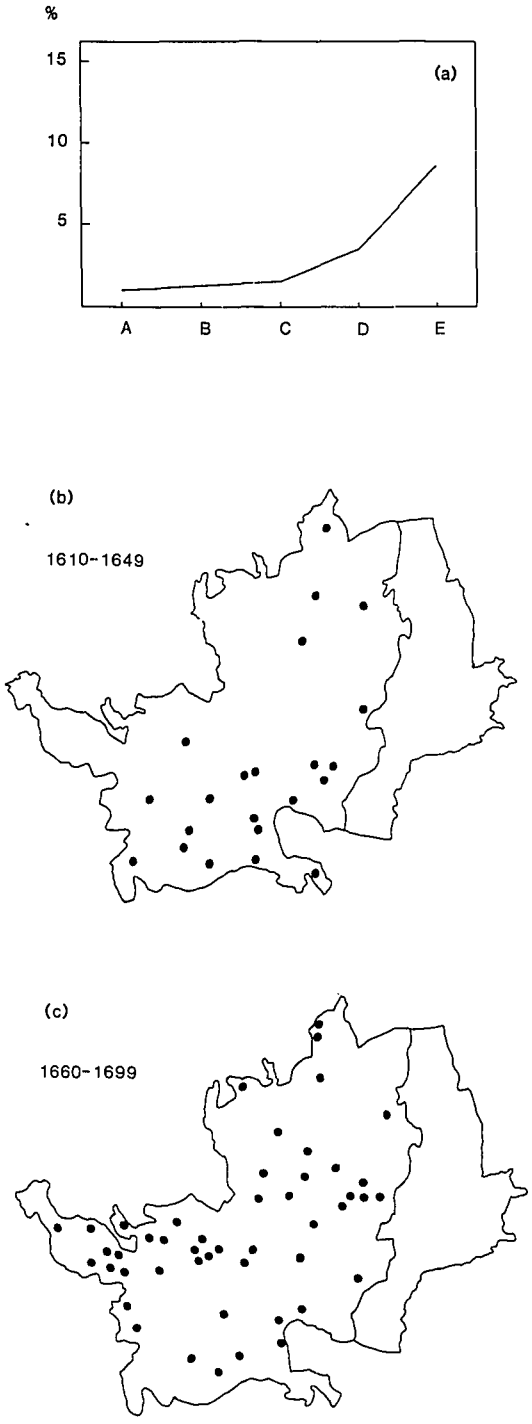


FIGURE 4
Cultivation of grass substitutes. (a) Percentage of farmers growing grass substitutes (A to E denote time periods as in Fig 2); (b) and (c) Location of farms where grass substitutes recorded

farmers possessed one or more grass substitute crops but only 3 per cent appear to have been growing turnips. Early innovations of new grasses were most frequent in southern areas where fodder production and stock fattening had long been a prominent element of farming, although these early references almost invariably involve only a very small acreage or quantity of seed. After 1660, however, their recording became more widespread, and the larger acreages involved suggest that some farmers were growing these crops as an integral part of crop rotations, rather than on odd areas of spare ground. In the later decades of the century, the grass substitute crops remained scarce only on the northern chalk soils. By contrast, even in the 1690s, very few farmers grew turnips on a large scale, which suggests that they did not at this time play a significant part in crop rotation systems.

III

Obviously, we need to do more than examine agricultural changes at an aggregate level over the whole county. Discussions of agricultural change have long focused on the appropriateness of particular innovations or techniques to particular types of physical and social environment. Clearly, aggregate patterns or trends in as large an areal unit as a county may be an illusion produced by the averaging together of very different patterns and trends in different localities. Where were particular activities concentrated? What were the relationships among the physical environment, economic setting, agrarian context, and agricultural production? Did these relationships change over time?

Discussions of the geography of agricultural change have often been couched in general terms (as in simple distinctions between downland and clayland farming, or between largely open and largely

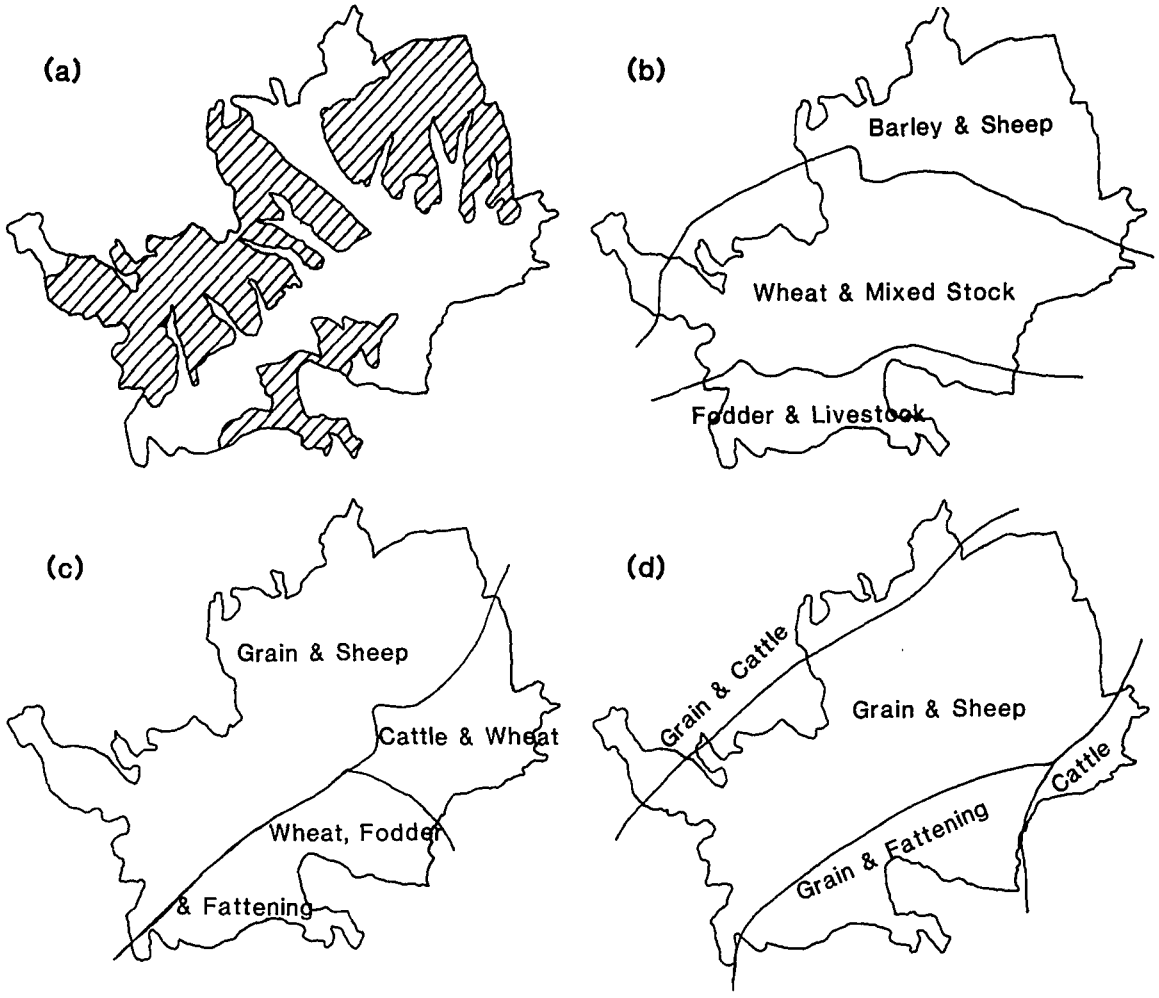


FIGURE 5
Proposed farming regions in Hertfordshire. (a) Relief, shaded area indicates the approximate extent of land above 250 feet; (b) to (d) Approximate extent of agricultural regions in the classifications proposed by Thirsk (1967), Kerridge (1967) and Richardson (1984). The main product specializations discussed by these authors are indicated.

enclosed areas),[23] but three more specific agricultural regionalizations of England have been proposed in the last twenty years.[24] These each include an attempt to delimit 'agricultural regions' in this area, and the geography of agricultural change (Fig 5).

Thirsk[25] (Fig 5b) recognizes three farming regions in Hertfordshire by 1640. In the south, from Watford to Cheshunt, horse-breeding and the cultivation of oats for fodder were specialities. Wheat was the main cash crop, with other grains (mainly barley) fed to poultry and young pigs. 'In short . . . a region of mixed farming, where nearly all the arable crops except wheat were used for the production of

23 Overton, 'Agricultural revolution?', p 126; J Yelling, *Common Field and Enclosure in England 1450–1850*, 1977, p 190.

24 The schemes are summarized, with some general comments on agricultural regions and their delineation, in Thirsk, *English Agricultural Regions*, pp 23–36.

25 Thirsk, *AgHEW* volume IV pp 50–2.

stock.' A mixed farming system also occupied the loams and clays of central Hertfordshire, but concentrating on fattening bullocks bought as stores, with wheat as a cash crop. Large sheep flocks, '50 to 100 animals or more', were common, but valued more for manure than wool. Finally on the northern chalk hills 'prevailed . . . the sheep-corn husbandry of wolds and downland'. Sheep were folded on the arable, with wheat and barley the main cereals. Malting was important based on both local produce and barley carried from Cambridgeshire. These developments owed much to demand from London markets, with return manure shipments by road and barge of growing importance. Some places saw conversion to pasture in the sixteenth century, with both convertible husbandry and new fodder crops such as turnips evident in the south by 1640.

Kerridge[26] (Fig 5c) adopts a slightly different three-fold division. Most of Hertfordshire was 'Chiltern country', dominated by sheep-corn husbandry with barley and a little wheat as market crops, and some dairying or stock fattening. Further east, more wooded areas were the location for intensive wheat cultivation, stock-fattening and some dairying. Closer to London, in the south,

> despite all local peculiarities, the vale was fashioned into a distinctive farming country by the presence of the great and growing city . . . drawn into the supply of food and fodder . . . and received in return an abundance of the city's natural produce of refuse and muck.

The major features of this area were market gardening, wheat and hay production, and specialized types of stock fattening.

Richardson[27] (Fig 5d) also emphasizes how the demands of the metropolitan food market led to a largely arable specialization, even on poor soils. Across the county as a whole he suggests that wheat and oats were the most important crops, followed by rye (which was declining in importance) and barley, with some peas also. Of the two most important areas in Richardson's scheme the first was a broad swathe of central and northern Hertfordshire (by no means confined to the chalk uplands as the text asserts), where 'sheep-corn husbandry was the general practice and barley a major crop' for malting. The second was further south where access to London encouraged specialization in 'the breeding of horses; the fattening of pigs, lambs and bullocks; and the growing of oats'. In several parts of this area, though, hay was more important than any arable crop, and wheat and especially rye were in part replaced by fodder crops during the period 1640–1750 as overall tithed areas grew. There were two minor areas of specialization in cattle fattening: around Tring in the west and, more intensively, in the Lea and Stort valleys, an area for which, unfortunately, no probate inventories survive. Here especially, but also more widely, back carriage of soot, night-soil and other waste in carts and barges that had carried hay, grain or malt to London made an important contribution to manuring both grassland and arable. This was a notable factor in the rise of intensive market gardening in the late seventeenth and early eighteenth centuries.

Inventory data dealing with single aspects of agricultural production such as particular types of crops or livestock are easy to map, and such maps are easy to interpret in broad regional terms. Fig 6 illustrates three changes in aggregate production patterns which had particular geographical impacts. First, the increasing cultivation of barley, which at an aggregate level was largely at the expense of rye (Fig 2) was, at a regional level, more complicated than this simple substitution. In some parts of Hertfordshire, especially central and southern districts, rye was largely replaced by more winter wheat. Further

26 Kerridge, *Agricultural Revolution*, pp 56–9, 89–91, 173–80.
27 Richardson, 'Metropolitan counties', pp 239–69.

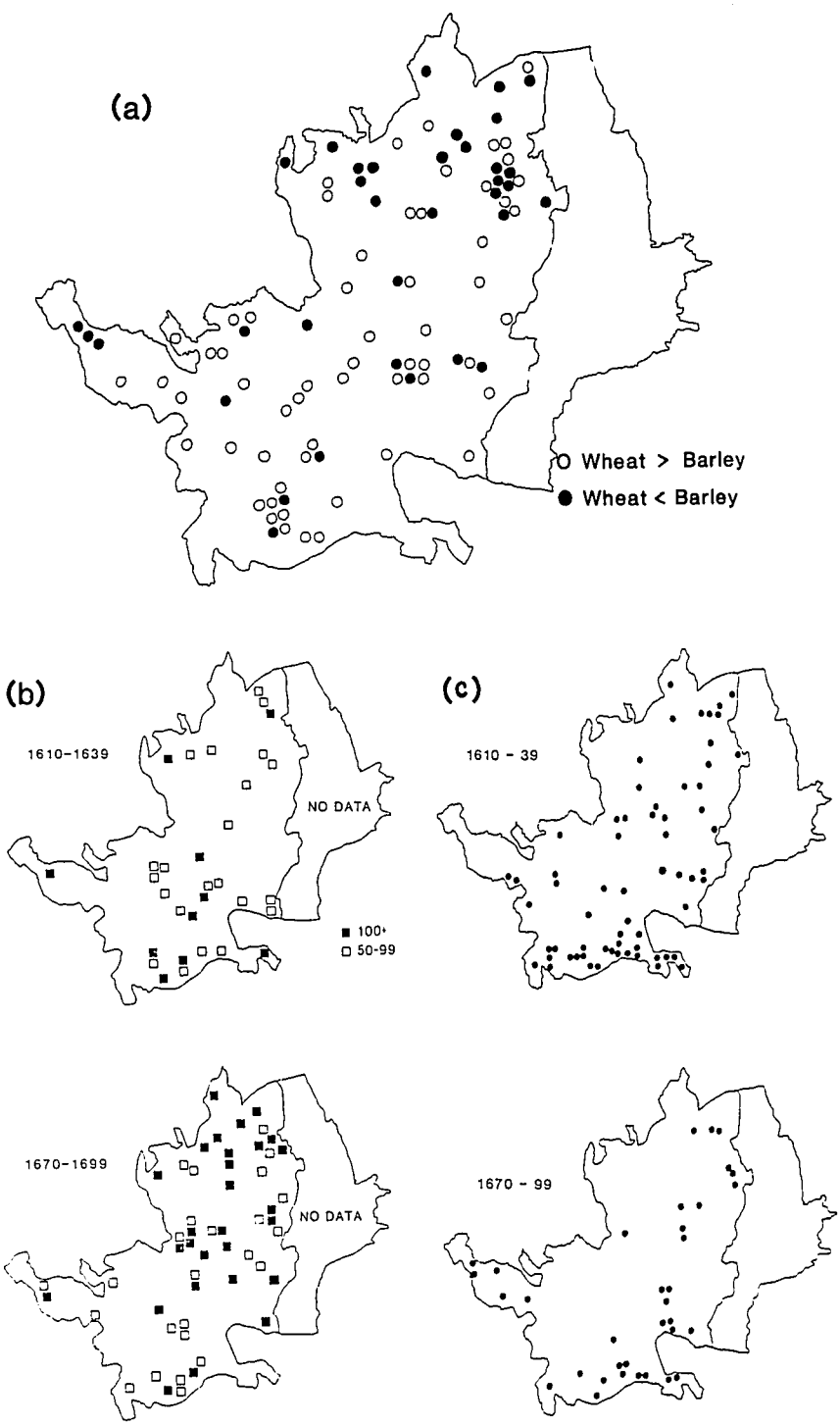


FIGURE 6
Distribution of selected specializations. (a) Farms with major concentration on wheat or barley, 1660–1699; (b) Location of farms with large sheep flocks specified in inventories; (c) Location of farms with major cattle holdings specified in inventories

north and in the extreme west barley acreages increased at the expense of both rye and wheat. Fig 6a shows how, by 1660–99, the acreage under barley exceeded that under wheat in much of northern Hertfordshire. Thus any marked differential improvement in barley or wheat yields would have affected farmers in some areas much more than others.

Secondly, and turning to livestock, the substantial late seventeenth-century increase in the mean size of sheep flocks also had a very uneven impact across the county. Like the relative importance of barley, large sheep flocks were increasingly a feature of northern Hertfordshire. In comparing the distribution of large sheep flocks in 1610–39 and 1670–99 (Fig 6b), the shift from a slight southern concentration to a marked northern and central concentration is very striking, especially taking account of the largest flocks of 100 or more sheep, shown here by the solid symbols. The broad regional association of sheep and barley is hardly surprising of course, but the chronology of their concentration in northern Hertfordshire is noteworthy. The emergence of the classic downland sheep-corn economies in the Hertfordshire Chilterns emerges as very much a late seventeenth-century phenomenon, half a century later than was suggested by Dr Thirsk in her pioneering survey of regional agrarian economies twenty years ago.

Finally, the substantial decline in the number of farms on which cattle or cattle and fodder accounted for a high proportion of the farm valuation, had an even clearer geographical impact. Fig 6c plots the location of such farms for the periods 1610–39 and 1660–99. Their geographical distribution underwent a sharp contraction during the seventeenth century. Moreover, this contraction was associated with much clearer regional specialization: with cattle breeding and rearing in the west around Tring, and a heavy concentration on dairying in the south from Rickmansworth eastwards to Hatfield.

These three examples illustrate the emergence of new, or more sharply defined, regional specializations in farm output. However they are by no means typical, in that several other changes exhibited no such clear geographical patterns. These three examples illustrate what *sometimes* happened to the geography of particular aspects of production as individual farms became more specialized. It should not be supposed that increased geographical differentiation at a regional level was an inevitable outcome of agricultural changes on early-modern farms. We should not always expect clearer *regional* patterns of production just because *individual* enterprises were becoming more specialized.

IV

One of the difficulties of large-scale inventory studies is that it is much easier to generalize about single aspects of farms than about the overall characteristics of individual farms. Only simple techniques are required to investigate the balance of crops and stock, the relative importance of different grains or of different types of livestock, or what proportion of inventories mention particular innovations or items of equipment. On the other hand, many discussions of agrarian change are couched mainly in terms of the overall character of farms as productive units, being at least as much concerned with changes in how the components of a farm interrelated with one another, as with the growing or diminishing importance of individual elements of production.

Thus the production of meaningful explanations of agricultural change requires us to situate aggregate changes in crop and livestock production within patterns of the changing importance of different types of farms. For example, if an area

containing a mixture of grain-oriented, mixed, and stock-oriented farms experienced a decrease in the mean number of cattle per farmer, this could have arisen in a number of ways. It might be part of a general shift from stock farming to mixed farming or from mixed farming to grain farming or both of these; or it might be due to a shift from cattle to other livestock types within a stable overall pattern of grain, mixed and stock farming.

The need to analyse several aspects of farms simultaneously has prompted several agricultural geographers in Britain to explore various methods of cluster analysis.[28] This is a statistical technique which can be used to group together similar types of farms into 'natural groups' such that the objects (in this case farms) in each group have similar characteristics to one another and the average characteristics of the groups are as different from one another as possible.[29] In this study, the farm characteristics used were the proportion of combined crop and stock valuations on each farm made up by fodder, grain, horses, cattle, and sheep. A total of 501 farmers' inventories from the summer months in the periods 1610–39 and 1660–99 (with valuations standardized by price indices to maintain comparability) were classified in this way. Farms valued at below £10 have been excluded to prevent 'farms' of, say, half an acre of crops and one cow from masking the pattern of substantial farm enterprises.

The characteristics of seventeen groups identified during the cluster analysis are shown in Fig 7. Examination of the number of farms in each cluster provides a preliminary identification of which were the major types of farm enterprise. Although some of the farm type clusters were very small, all of the cluster groups contained farms from both early in the century and later.

The cluster groups can be classified according to the mix of elements in their valuations. This has been done in Table 2, in which the frequencies of farm types from 1610 to 1639 (237 farms) and from 1660 to 1699 (264 farms) are compared in order to identify changes in the importance of different farm types. It is immediately apparent that there were many similarities between the two periods. Such stability suggests some significant continuities in the types of farming enterprise present in Hertfordshire during the seventeenth century.

Of the changes that occurred, the most significant was a shift to more grain-dominated farms, despite the movement of price

TABLE 2
Frequency of Occurence of Farm Types Identified in Fig 7

Group	*Number in 1610–39*	*Number in 1660–99*
A	5	11
B	28	19
C	36	49
D	33	56
E	6	14
F	21	30
G	5	7
H	13	7
I	30	24
J	5	11
K	13	6
L	5	9
M	12	8
N	7	2
O	14	2
P	1	5
Q	3	4
Grain farms	1610–39 43% of farms	Average £110
	1660–99 51%	£203
Mixed farms	1610–39 32% of farms	Average £ 71
	1660–99 31%	£ 73
Stock farms	1610–39 25% of farms	Average £ 29
	1660–99 18%	£ 29

28 Overton, 'Reconstructing agricultural landscapes'.

29 D Wishart, *CLUSTAN User Manual*, 3rd edition, Edinburgh, 1978: using iterative relocation, which produces tight 'minimum variance' clusters, and was preferred to hierarchical algorithms which cannot reallocate cases among clusters as the cluster groups become larger.

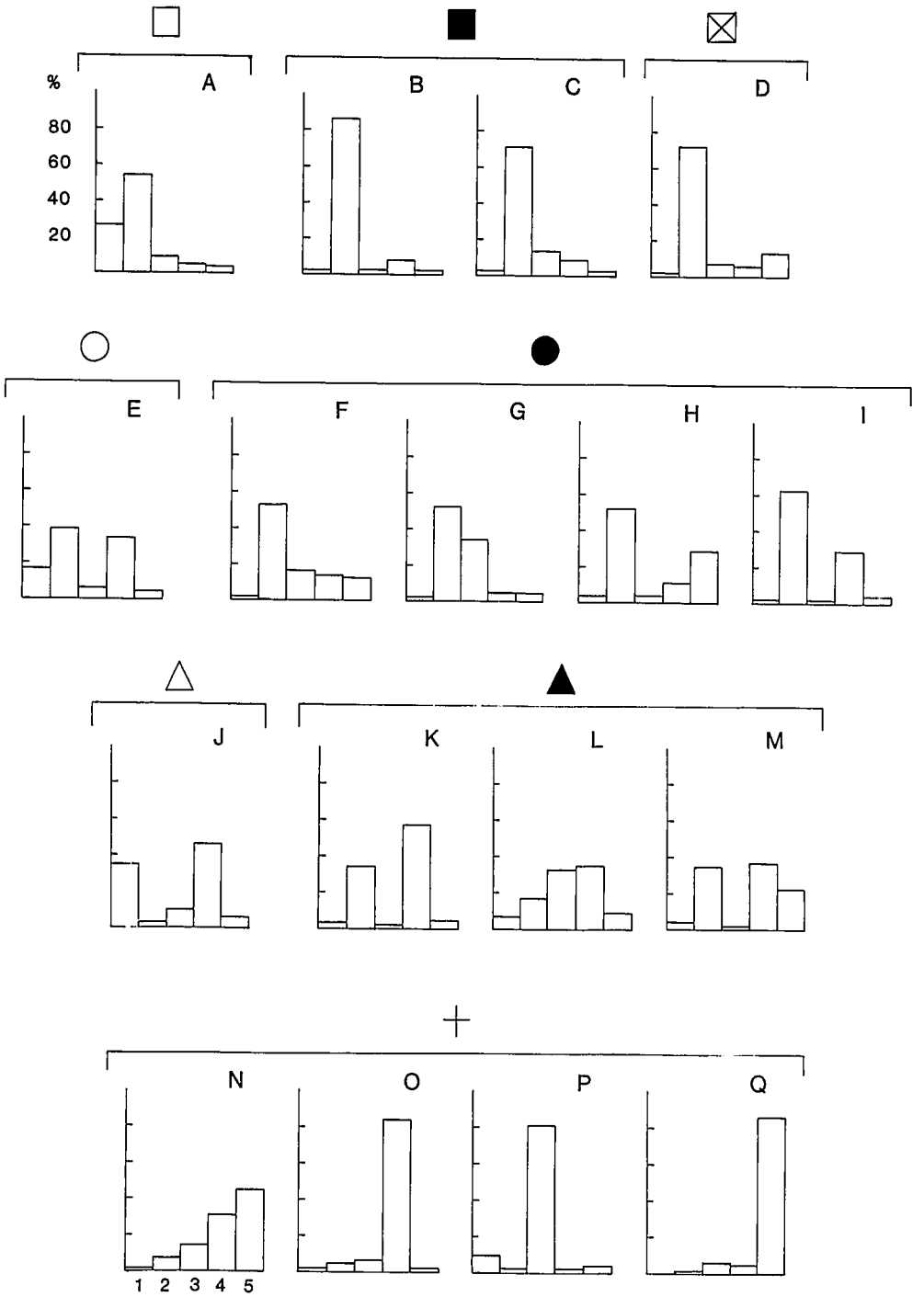


FIGURE 7

Characteristics of 'farm type' groups produced by cluster analysis. Grain specialists are indicated by a square symbol, mixed farms by circles, and stock farms by triangles or crosses. These symbols are used in the mapping of farm types in Fig 8.

Column 1 = fodder, column 2 = corn, column 3 = horses, column 4 = cattle, column 5 = sheep

relatives to favour the producers of pastoral products. Whereas 43 per cent of farms from 1610 to 1639 fell into the grain-oriented groups (A through D), the equivalent figure for 1660–99 was 51 per cent. This increase was not due to the scaling of crop valuations for inflation: indeed the results using unscaled valuation figures show a larger shift (42 per cent to 54 per cent). Most of this increase was due to a rise in the number of farms on which substantial grain acreages were found in conjunction with considerable numbers of sheep (type D).

In aggregate terms, the increase of grain-oriented farms was at the expense of stock farms, and particularly of specialist cattle farms. The decline in cattle ownership suggested in the discussion to Fig 3 was squarely concentrated amongst specialized stock farms, rather than mixed farms. Other than in group D (sheep-corn) farms, the number of farms on which sheep were a significant component of total farm valuation fell. This accords with the suggestion made above that, despite growing sheep flocks per farmer, there was no major increase in the number of farmers with flocks.

Within the framework of the cluster analysis groups, other characteristics of farms, such as wealth or the presence of certain innovations, may easily be analysed. This reveals that the trend towards larger farms was much more pronounced for some types of grain-oriented enterprises than for farms with a mixed or stock emphasis. Among inventories compiled between 1610 and 1639, the mean farm valuations were £110 for grain-oriented farms, £71 for mixed farms, and £29 for stock-oriented farms. For the period from 1660 to 1699 the equivalent figures were £203, £73, and £29. Thus the capital value of crops and livestock for the three groups of farms changed respectively by +103 per cent, +3 per cent and not at all. Likely changes in the exact representativeness of the inventory sample mean that these figures are very approximate, but the general pattern is undeniably that considerable capital intensification had occurred on grain-oriented farms.

The main settings for the appearance of much larger farms can be specified more precisely by disaggregating the farm valuations of different types of grain-oriented farm. The major area for growth undoubtedly concerned the sheep-corn farms of cluster group D. Not only did this group greatly increase in size (from thirty-three to fifty-six farms), but it also had easily the highest farm valuations: £169 in 1610–39, and £290 in 1660–99. The comparable figures for other grain-oriented farm types were £82 in 1610–39 and £141 in 1670–99. This is consistent with the notion, discussed in section II, that the intensification of the classic downland barley-sheep husbandry was a late seventeenth-century development.

The innovation of new fodder crops[30] was reflected in an increase in the proportion of farms in groups to which fodder contributed a significant component of total farm value (A, E, J). There were sixteen farms from 1610 to 1639 in these groups, but thirty-six from 1660 to 1699. It is also revealing to compare the relative importance of cattle farms (I, K, L, M, N, O) and cattle-fodder farms (E, J). The former totalled eighty-seven in 1610–39 and fifty-six in 1660–99, while the latter groups contained eleven farms in 1610–39 and twenty-five in 1660–99. The majority of farmers growing new fodder crops were mixed or stock-oriented, with fewer fodder innovators amongst grain specialists. In 1610–39 5 per cent of grain specialists and 10 per cent of mixed farmers or stock specialists appear in 'high fodder' categories (A, E, J). For 1660–99 the equivalent figures are 8 per cent and 20 per cent. Such a pattern lends weight to the arguments of

30 Discussed in section II above.

those who suggest that new fodder crops were not primarily introduced to raise arable yields.

V

The results of the cluster analysis identification of farm types are also of considerable use in reconstructing changes in the geography of early modern agriculture. The mapping of different types of farms provides a perspective on the accuracy both of contemporary accounts of regional farming practice, and of the regionalization schemes put forward by agricultural historians. Unfortunately, the large number of cluster groups produced means that many different symbols are needed if the distinctiveness of different farm types in terms of all five component characteristics is to be preserved. This of course produces maps that are difficult to interpret quickly. For Fig 8, therefore, the seventeen cluster groups have been amalgamated into eight larger groups as shown on Fig 7.[31] Similar shaped symbols identify farms according to grain/mixed/livestock emphases, and sheep-corn farms and those on which fodder was an important component of valuations have been distinguished by differences in internal shading.

The patterns resulting from the mapping of farm types can be compared with the regionalization schemes suggested over the last twenty years by Thirsk, Kerridge, and Richardson (Fig 5). As with the earlier maps of single aspects of agricultural production, these maps provide a combination of confirmation and modification (in terms both of patterns and of the chronology of change) of proposed regionalizations. The most prominent feature is the delimitation of the approximate extent of southern stock-fodder systems, although we cannot draw precise boundaries because of uncertainty over exactly where farms lay in large parishes such as Watford and Hatfield. The pattern of livestock specialization, measured here by relative values, parallels that of the largest flocks and herds (Fig 6) showing that the regional changes identified above are not an artefact of mapping large herds/flocks, but a more general feature of the composition of farm capital.

Obviously it is possible to use many more variables in the cluster analysis (for example by including the value of different types of crop or cattle separately), but this is unrewarding in the present case because fewer inventories provide all this extra information in sufficient detail, and because the number of cluster groups would become very large, with few farms in each group. Even in the present case though, with five variables per farm, a quite detailed picture of the geography of farm types can be built up, and this provides a starting point for discussion of the possible dependence of changes in the pattern on institutional changes such as enclosure, or the types of farm enterprises on which particular farming innovations were made. These are both questions on which intensive local work based on other sources should provide detailed answers.

VI

Elements of both continuity and change characterized agricultural production and its geography in Hertfordshire during the sixteenth and seventeenth centuries. The principal characteristics of agriculture and the broad outlines of agricultural change in the county conform with the generalizations made by agrarian historians on the basis of contemporary accounts, and anecdotal use of probate inventories and estate documents. However, these accounts do not accurately represent either the chronology of agricultural changes or their geographical pattern at more than a very general level. Unsurprisingly, the syste-

31 Maps distinguishing all of the groups shown in Fig 7 can be obtained from the author.

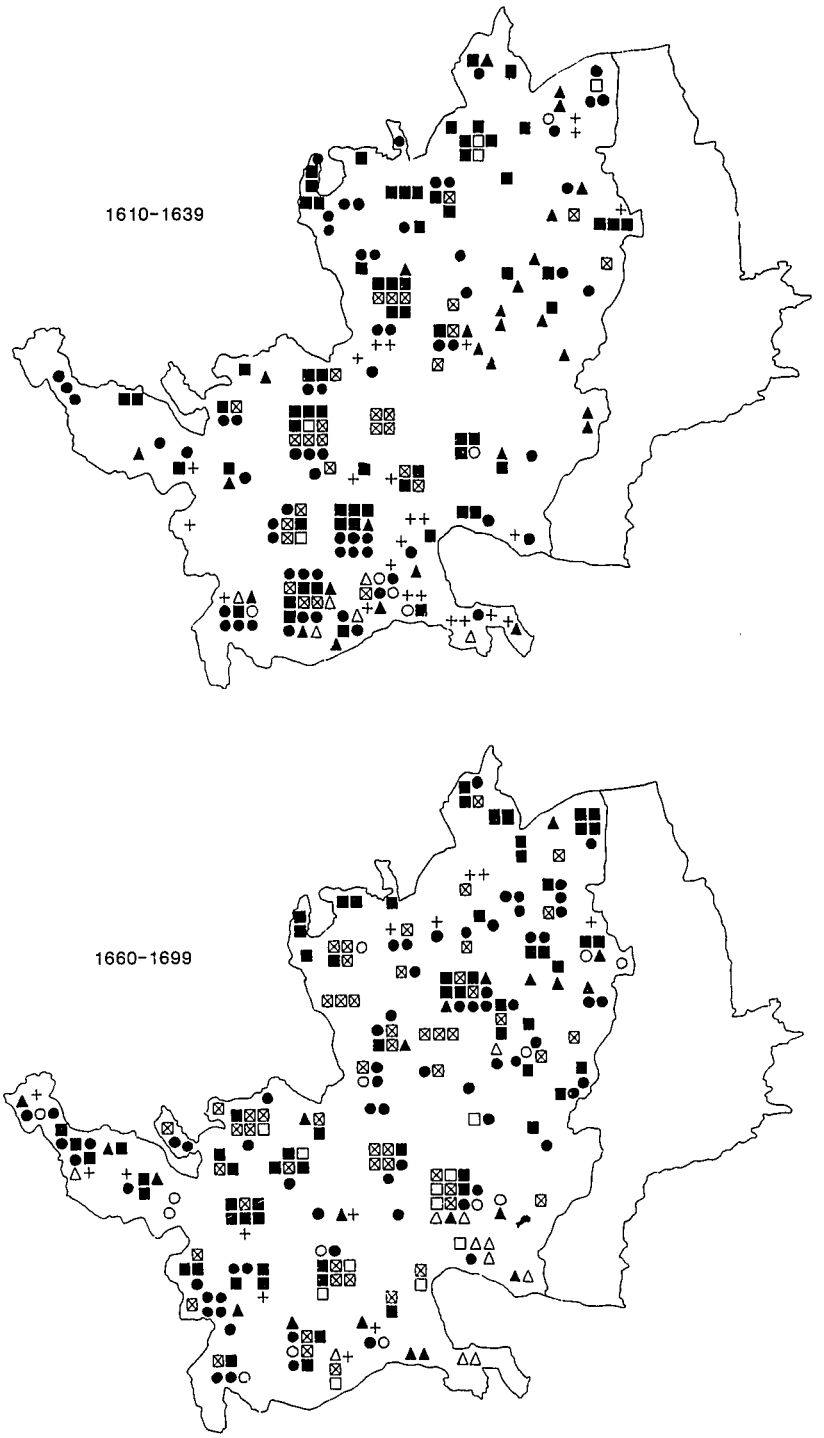


FIGURE 8
Distribution of farm types in seventeenth-century Hertfordshire. The symbols refer to single farm types or groups of farm types, as indicated in Fig 7. Farm types where fodder was significant are shown hollow, sheep corn farms (group D) are indicated by an internal cross

matic analysis of many hundred inventories suggests that both temporal and geographical variability in farming practices was considerable.

To recognize this temporal and geographical variation is important because it is more than a simple reflection of profuse documentation. It highlights some of the problems inherent in using 'the agrarian region' as the fundamental unit of analysis in discussions of the geography of early modern agriculture. Only sometimes were there areas over which husbandry practices and farming products were relatively uniform, even though it is true that broad features, like arable concentration, characterized wide areas. Some 'agrarian regions' thus defined were relatively ephemeral, which makes it difficult to incorporate them into a longer-term picture of the processes of change. In addition, clearer patterns of specialization at the level of the individual farm did not necessarily produce clearer patterns of specialization at a regional level, but could result in the coexistence of different types of specialization within an area which had hitherto contained a relatively homogeneous population of less specialized farms.

Several of the most notable changes in patterns of production can, as earlier historians have suggested, plausibly be seen as part of the growing commercialization of agricultural systems in south-east England. The clearest examples of this are provided by the large sheep-corn farms of northern and central districts, and by the contraction of cattle rearing and fattening with its replacement in the south-west of the county by dairying, sometimes on a large scale. Not that commercial agriculture was a novelty of the early modern period. The huge growth of London's population in the sixteenth century intensified the capital's influence on its hinterland, but this area had probably been involved in the supply of grain, malt, livestock and animal products for several centuries. Residual areas of isolated 'primitive' farming were rare and disappeared rapidly. During the 1550s and 1560s, for example, most farmers in the southern parish of Northaw, a wooded, hilly area of very heavy soils, kept goats. Although extremely rare elsewhere in the county, goats in Northaw were numerous, and comprised a significant portion of total farm values.[32] By the 1590s, however, goats had all but disappeared even here, and farmers in Northaw had expanded and diversified their arable cultivation which had hitherto consisted almost entirely of small areas of oats. Although the stock/fodder emphasis of the area remained, it was no longer as distinctive as in the mid-sixteenth century.

Inventory-based discussions of changing patterns of agriculture clearly raise questions about the processes of change. In the case of arable production, at least three topics require elaboration. First, there is the question of how changes in cropping were related to changes in crop rotations. Rotational changes would have important implications where the farming calendar was being modified. Thus where spring-sown crops replaced winter-sown crops, or vice versa, or where new roots such as turnips were grown as post-harvest catch crops, the availability of land for grazing might be affected. Whilst estate/farm accounts can reveal such changes in practice, very few survive for the range of farm sizes covered by archdeaconry court inventories.

Second, there is the crucial question of the role of enclosure, and the intensification of private property rights, in facilitating changes in land-use, cropping, or livestock husbandry. The configuration of both physical and organizational constraints on farmers was modified by either piecemeal or wholesale enclosures, but

32 Good examples are HCRO ASA25/28, ASA25/863, ASA25/1158, ASA25/1247.

even the broad chronology of enclosure is disputed. Recent suggestions that the seventeenth century saw the peak of English enclosure[33] clearly have important implications for views which stress organizational and structural changes in property rights as prerequisites for agricultural transformation. Here too, detailed work on other documentary sources is required, to build up place-specific 'biographies' of agrarian organization.

Finally, the importance of changes in production patterns for aggregate trends in the agrarian economy depends partly on changes in productivity. Output increases could, to a certain extent, be produced by shifts between crop and stock types, and by geographical specialization, but in the absence of productivity increases, such output increases would be limited. But changes in the emphasis of agriculture combined with productivity improvements would have a much greater impact. Estimating the productivity of either crops or livestock has proved extremely difficult, and is likely to remain so. However, Overton has recently developed statistical means of estimating trends in crop yields from probate inventory data, and this method is applied and extended in the companion paper.

33 J R Wordie, 'The chronology of English enclosure, 1500–1914', *Econ Hist Rev*, 2nd ser, XXXVI, 1983, pp 483–505; J Chapman, 'The chronology of English enclosure' and J R Wordie, 'The chronology of English enclosure: a reply', *Econ Hist Rev*, 2nd series, XXXVII, 1984, pp 557–9 and pp 560–2. For a very different view see J E Martin, *Feudalism to Capitalism: Peasant and landlord in English agrarian development*, 1983, pp 128–40.

Notes and Comments

(continued from page 54)

demographic data as well as stories and traditions relating to localities which date back to the eighteenth century and before. Subject searches can be made through retrieving documents or sentences from documents with descriptive fields. The information from the Memoirs can be made accessible both in printed transcriptions and on-line, both in text and index form.

Funding has been made available through the ESRC (HOO 23 2035, HOO 23 2079), the DoENI, PRONI and the Esme Mitchell trust. To date, counties Antrim, Armagh, Fermanagh, Tyrone, and Monaghan have been transcribed and indexed (representing 10,000 ms sheets or 80 megabytes of information). Counties Down, Londonderry and Donegal will be worked on in the next eighteen months (Nov 1987 to April 1989). For information and listings contact Angelique Day, Institute of Irish Studies, 8 Fitzwilliam Street, Queen's University of Belfast, BT9 5AW.

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Science and the Farmer: the Development of the Agricultural Advisory Service in England and Wales, 1900–1939*

By COLIN J HOLMES

IN 1890 public funds first became available for agricultural education in England and Wales. Over the next ten years only a few county councils started to provide facilities for farm advisory work, usually in conjunction with local agricultural colleges or universities. Five rare and successful examples of such ventures in the 1890s are provided by the county authorities in Cambridge, Essex, Kent, Northumberland, and Yorkshire; these were very much the exception and not the rule. By the early years of the twentieth century about thirty of the sixty county authorities in England and Wales were involving themselves in agricultural education and advisory work. On a country-wide basis, however, the public provision of advisory services for Edwardian farmers was uneven, inadequate, and unco-ordinated.[1]

I

A state-financed network of agricultural research centres was created in 1910, and a collateral Provincial Advisory Service was introduced in 1912. The functions of the advisory service were to speed into farming practice the introduction of proven, useful research results, and to provide special technical advice to farmers. For this purpose England and Wales were divided into twelve advisory 'provinces' each with its own centre located at an existing agricultural college or university department. As indicated in Table 1 below, nine of the provincial centres were functioning by the outbreak of war in 1914, and six more were added by 1924. In 1932 Oxford University was removed from the system, as an economy measure in the wake of a government financial crisis.[2] In its final form, the Provincial Advisory Service contained thirteen districts served by fourteen centres.

The number of advisory officers in post increased from sixteen in 1914 to sixty-eight in 1928. The figures in Table 2 below show that there were only four veterinary advisers in the service by 1928. Their number increased to nine by 1939 but, in the meantime, the zoologists disappeared. The advisory economists were appointed on a temporary basis in 1923, but their services proved to be so valuable that they were made permanent in 1929.[3]

There were two aspects to the work of individual advisory officers. First, they had to provide specialist advice in response to local farmers' problems referred to them by the county advisory services. Second, they had to decide which local farming

*Earlier versions of this paper were seen by W M Stern and E H Hunt, and heard by BAHS members at the 1986 Spring Conference. I am very grateful to them, and to the *Agricultural History Review*'s two anonymous referees, for the helpful comments and constructive criticisms received.

1 J A Hanley, 'Agricultural Education in College and County', in H E Dale et al, *Agriculture in the Twentieth Century: Essays on Research, Practice, and Organization, Presented to Sir Daniel Hall*, Oxford, 1939, pp 86–97; E J Russell, *A History of Agricultural Science in Great Britain*, 1966, pp 191–231, 232–67, 255–6; Board of Agriculture and Fisheries, Report of the Departmental Committee on Agricultural Education, Cd 4206, *BPP* XXI, 1908, pp 36–8.

2 Development Commission, Tenth Annual Report for 1919/20 [hereafter – DC 1919–20], *BPP* XIII, 1920, p 3; DC 1911/12, *BPP* XVII, 1912/13, p 8; DC 1932/33, *BPP* XI, 1932/33, p 49.

3 DC 1929/30, *BPP*, IX, 1929/30, p 20.

Ag Hist Rev, 36, I, pp 77–86

TABLE 1
The Provincial Advisory Service 1912/13–1945/46

Centre	*Province*	*Centre established*
Dept of Agriculture, University College of Wales, Aberystwyth	*Mid-Wales* Brecknockshire, Cardiganshire, Carmarthenshire, Merionethshire, Montgomeryshire, Pembrokeshire	1913–14
Dept of Agriculture, University College of North Wales, Bangor	*North Wales* Anglesey, Caernarvonshire, Denbighshire, Flintshire	1913–14
Agricultural Advisory Dept, University of Bristol	*West* Gloucestershire, Herefordshire, Somersetshire, Wiltshire, Worcestershire	1913–14
School of Agriculture, University of Cambridge	*East* Bedfordshire, Cambridgeshire, Essex, Hertford, Huntingdon, Norfolk, Suffolk, Isle of Ely, Lincolnshire – Holland Division	1913–14
Dept of Agriculture, University of Leeds	*Yorkshire*	1913–14
The Midlands Agricultural College, Sutton Bonnington, Loughborough	*Midlands* Derbyshire, Leicestershire, Nottinghamshire, Rutland, Lincolnshire – Lindsey & Kesteven Divisions	1913–14
Dept of Agriculture, King's College, Newcastle-upon-Tyne	*North* Cumberland, Durham, Northumberland, Westmorland	1913–14
Faculty of Agriculture and Horticulture, University of Reading	*South* Berkshire, Buckinghamshire, Dorset, Hampshire, Isle of Wight, Middlesex After 1932 – Northamptonshire, Oxfordshire	1913–14
South Eastern Agricultural College, Wye, Kent	*South-East* Kent, Surrey, Sussex	1913–14
Seale-Hayne Agricultural College, Newton Abbot, Devon	*South-West* Cornwall, Devon, Scilly Isles	1914–15
The Harper Adams Agricultural College, Newport, Shropshire	*West Midlands* Shropshire, Staffordshire, Warwickshire	1918–19
Agricultural Advisory Dept, University College of South Wales & Monmouthshire, Cardiff	*South Wales* Glamorganshire, Monmouthshire	1922–23
(i) Agricultural Advisory Dept, University of Manchester (ii) Dept of Veterinary Pathology, University of Liverpool	*North-West* Cheshire, Lancashire	1922–23
School of Rural Economy, Oxford University	*South Midlands* Oxfordshire, Northamptonshire. Transferred to the Southern Province in 1932, and thereafter served by Reading University	1923–24 (Ceased to exist as an advisory centre in 1932)

Source: Development Commission, Annual Reports 1911/12–1932/33, *BPP* (1912/13–1932/33).

questions required investigation, and then begin the necessary field work with the cooperation of local farmers. These local investigations rapidly became important; very often they provided the field work that was necessary to follow up laboratory-based studies in progress at the research institutes. The entomologists in the Pro-

TABLE 2
Provincial Advisory Oficers – Number in Post and Subjects Represented; 1914, 1928 and 1938

Subject area	*1914*	*1928*	*1938*
Agricultural chemistry	5	13	12
Zoology	2	4	—
Mycology	1	11	13
Dairy bacteriology	—	10	9
Veterinary science	—	4	9
Botany	4	2	1[c]
Entomology	1[b]	10	13
Plant pathology	2	2	—
Economics	—	12	11
Other[a]	1	—	—
TOTAL	16	68	68

Notes:
[a] An 'agricultural biologist';
[b] Classified here as an entomologist but listed as 'agricultural zoologist and entomologist';
[c] A grassland specialist.

Sources: DC 1927/28, *BPP*, VII, 1928, pp 103–20; Political and Economic Planning, *Report on Agricultural Research in Great Britain*, 1938, pp 34–6; PRO, MAF 33/390, TPB 9173, Minute Sheet Reference TPY 587, 1938–44, J A Hanley, 'History of the Advisory Services', typescript, *c*1939.

vincial Advisory Service made detailed investigations of insect damage to crops, in conjunction with Rothamsted Experimental Station and the Ministry of Agriculture (MAF). The advisory mycologists did similar work with fungus infections in crops. The information thereby gained was used as the basis for subsequent preventive and remedial measures. By 1926, a large amount of the mycological and entomological research in England and Wales was being done in the Provincial Advisory Service. Similarly, most of the soil survey work under way in the late twenties was in the hands of the advisory chemists. The salient point here is that one should not make an unduly sharp distinction between much of the work being done at the research institutes and in the Provincial Advisory Service. Advisory officers conducting their own local research projects often were able to gather information that scientists at the research institutes could not otherwise obtain. Incidentally, by the late 1920s staff at the research institutes were undertaking a significant amount of direct advisory work themselves.[4]

The Provincial Service was almost wholly state-financed, and some basic details are summarized in Table 3 below. Average annual expenditure increased from £4700 in 1911/12–1915/16 to £105,000 by 1936/37–1940/41. The greater part of that sum consisted of salaries and collateral expenses. If the figures are deflated by an index of civil service pay, then the 'real' level of expenditure by the late 1930s may be estimated at approximately £65,000 per annum. Expenditure on the Provincial Advisory Service as a proportion of the total agricultural research budget rose from *c*9 per cent in 1911/12–1915/16 to *c*24 per cent by 1936/37–1940/41.

II

Valuable though its work was, the effec-

4 DC 1919/20, *BPP* XIII, 1920, pp 96–7; DC 1923/24, *BPP* VIII, 1924, pp 72–5; DC 1925/26, *BPP* IX, 1926, pp 89–90; DC 1926/27, *BPP* VIII, 1927, pp 91–2.

TABLE 3
State Expenditure on the Provincial Advisory Service in England and Wales, in Five-year Annual Averages from 1911/12–1915/16 to 1936/37–1940/41

Five-year period	*1911/12–1915/16*	*1916/17–1920/21*	*1921/22–1925/26*	*1926/27–1930/31*	*1931/32–1935/36*	*1936/37–1940/41*
(i) Total state expenditure on Agricultural Research	£50,100	£78,500	£217,900	£333,400	£319,900	£431,900
(ii) State expenditure on the Provincial Advisory Service	£4,700	£10,500	£33,000	£64,900	£73,300	£105,100
(iii) ii as % of i	9.4	13.4	15.1	19.5	22.9	24.3
(iv) 'Real' expenditure on the Provincial Service, in constant 1911–13 prices	£4,700	£7,300	£18,600	£38,400	£46,000	£64,700

Sources: UK Government, Civil Services and Revenue Departments, Appropriation Accounts 1911/12–1940/41, *BPP* 1911/12–1941/42; Development Commission, Annual Reports, 1911/12–1938/39, *BPP* (1911/12–1939/40): G Routh, 'Civil Service Pay 1875 to 1950', *Economica*, new series, XXI, 1954, p 16.

tiveness of the Provincial Service in the inter-war period was impaired by six discernible weaknesses; three of them were general in nature and three were specific to certain subject areas. One important general weakness was that the range of specializations covered did not encompass the whole range of agricultural science: the omission of animal feeding, crop nutrition, and agricultural engineering is conspicuous. In these important subjects farmers' problems were referred directly to the appropriate research institute. The underlying difficulty was that many of the problems raised by farmers did not fit comfortably into the conventional academic delineations of subject used by the Provincial Service. Advisory chemists, for example, were required to deal with all chemical problems relating to fertilizers and feeding stuffs, and all soil problems. But by the 1930s soil science was as much concerned with physics and bacteriology as with chemistry, and the provision of informed advice on feeding stuffs required some considerable knowledge of animal nutrition and physiology.[5] Provincial staff were trained and recruited too much on the basis of academic specialization, and too little on the basis of husbandry topic or problem.

A second general weakness was the severe understaffing which so detracted from the effectiveness of the Provincial Service. In the 1930s, with sixty-eight staff in post and 248,000 farmers in England and Wales, the overall provincial advisory officer:farmer ratio was 1:3647. It is little wonder that many provincial officers were often insufficiently familiar with local farming conditions to win the confidence of the farmers they served. The third problem was that at some provincial centres advisory work was made more difficult by the inadequacy of the accommodation provided by the university or college concerned. Whilst the MAF paid salaries and general expenses, it made no provision for accommodating advisory staff. This illustrates the small degree of overall direction and control exercised by the MAF over the provincial centres. For provincial advisory officers there existed a real danger of divided loyalties between the work of the advisory service, and that of the academic institution which housed their provincial centre.[6]

5 Report of the Committee on Post-war Agricultural Education in England and Wales, Cmd 6433, 1943, *BPP* IV, 1942/43, p 43; V C Fishwick, *Dairy Farming: Theory and Practice*, 1947, pp 39–60: Political and Economic Planning (PEP), *Report* on *Agricultural Research in Great Britain*, 1938, p 58.

6 Cmd 6433, *op cit*, p 43.

It is evident that such a conflict of loyalties was felt amongst the advisory economists in the 1930s, as they struggled to divide their time between providing advice for farmers, supplying the MAF with statistical data, and producing independent academic research. But the agricultural economists also had problems endemic in their subject: no agreement existed as to uniformity of methods in data collection, or the usefulness of different types of survey methodology. So, some pursued cost-accounting studies using the whole farm as the unit of enterprise; some preferred to concentrate on particular areas of husbandry within the farm's total activities; and others concentrated on straight advisory work.[7]

The dairy bacteriologists also had problems. The staple item of their work was routine analysis of milk samples performed on a fee-paying basis. Any research or local investigations had to be financed from the income earned in this way. If they analysed sufficient milk samples to pay for their research they had little time in which to do it, but if they devoted time to their research they could not earn the money necessary to sustain it.[8]

The third subject-based problem concerns veterinary advisers. The etiquette of the veterinary profession did not allow advisers to lecture to farmers on the cure of animal diseases, and their advisory responsiblities were carefully defined to exclude matters that impinged on private practice. Thus their work was limited to investigating the causes of disease, and they could only advise in the most general terms about preventive measures. Their ability to disseminate the results of veterinary research was thereby impaired.[9]

7 K A H Murray, 'Agricultural Economics in Retrospect', *J Agric Econ* XIII, 1960, pp 374–82; E H Whetham, 'The Search for the Cost of Production, 1914–30', *Jnl Agric Econ*, XXIII, 1972, pp 201–11; J P Maxton, 'Professional Stock-Taking', *Jnl Agric Econ*, VI, 1940, pp 142–80.

8 PEP, *op cit*, pp 59–60.

9 Cmd 6433, *op cit*, p 27; PEP, *op cit*, p 60.

III

The Provincial and County Advisory Services were administered quite separately before 1939. Co-ordination was supposed to be secured by periodic conferences but, in reality, relations between the two services often reflected a lack of co-ordination and even a lack of communication. In theory, provincial officers were only supposed to deal with cases referred to them by advisory staff in the county services; in practice, the provincial centres often received and acted upon requests for advice directly from farmers.[10]

As noted above, approximately half of the county authorities in England and Wales were engaged in agricultural education and, to a lesser extent, advisory work by 1914. A more systematic organization developed after 1920 when the County War Agricultural Committees were reconstituted as permanent sub-committees of the county councils. By 1939, fifty-five of the sixty counties in England and Wales had appointed an Agricultural Organizer, and the total county agricultural staff numbered 468. Their functions were to provide education and advice: instruction in basic farming methods, and a general advisory service to deal with the routine problems encountered in everyday farming practice. County agricultural authorities were empowered to make small grants for research, but only half-a-dozen of them had their own experimental stations in the 1930s (East Suffolk, Norfolk, Hampshire, Monmouth, Northumberland, and Warwickshire). Usually at the county level research was a residual activity which depended upon the limited spare time of an overworked county officer.[11]

The power conferred on local authorities to provide an advisory service was permissive, they were not compelled to do so. In

10 Cmd 6433, *op cit*, pp 42, 55; PEP, *op cit*, p 61.

11 Cmd 6433, *op cit*, pp 17, 25; PEP, *op cit*, pp 36, 60, 129; E H Whetham, *The Agrarian History of England and Wales*, VIII, 1914–1919, Cambridge, 1978, pp 122–3.

consequence, county expenditure on advisory work was often reduced in times of financial stringency, and the level of service offered varied enormously from one authority to another. The disparity in facilities provided also reflects, to some extent, differences in size and wealth between county authorities. Administrative areas ranged from 1,661,000 acres (Devon) to 52,000 (the Soke of Peterborough), and populations from 1,780,000 (Lancashire) to 17,000 (Rutland). Counties which were predominantly agricultural had the greatest need of a good advisory service, but were usually the least able to afford one because their rates produced a much smaller income than those of less rural, more prosperous counties. Shortage of funds in the county agricultural service frequently resulted in gross understaffing and exceedingly heavy workloads. The demands of other duties seriously reduced the amount of time available for 'front-line' advisory work, and made it very difficult for the county adviser to keep up with innovations in modern farming practice. The effectiveness of the county service was further impaired by the poor quality of much of the training given to new staff.[12]

As a result of these deficiencies the county service was unable to maintain contact with more than a small proportion of all farmers. According to an independent report published in 1938, '. . . the majority of farmers never consult the County Organizer, and . . . if they did he would not have enough time to attend to them'. In a wartime Social Survey carried out in 1944, only 17 per cent of the 1968 farmers questioned said that they had consulted their County Organizer in the years before 1939; 68 per cent said they had not; and a further 9 per cent claimed not to have known of his existence.[13] The Luxmoore Committee on Agricultural Education, which reported in 1943, could find '. . . no definite channel whereby the results of the work done by the advisory officers or the research institutes can be transmitted to the farmers'.[14] But the task of providing such a channel had clearly been the prime responsibility of the pre-1939 advisory services.

IV

Before the Second World War little use was made of films, radio, and publications in agricultural advisory work in Britain. Astor and Rowntree's classic enquiry into the state of British agriculture referred to the radio in 1938 as a development 'which might become important' – if only farming programmes could be broadcast at times which were not inconvenient during the working day.[15] Probably four-fifths of all farmers read the agricultural articles in their local newspapers; but before 1939 the advisory services largely neglected this outlet which offered contact with a far larger audience than could be reached through farm visits, lectures, films, or classes. From an early stage in the twentieth century the MAF published for farmers a series of more than 300 advisory leaflets and pamphlets. They were inexpensive, clearly written, practically orientated, and covered a wide range of husbandry topics. However, this literature was not always readily available and methods of distribution were deficient. Not all advisory literature was as readable as the MAF's leaflets.[16]

12 Cmd 6433, *op cit*, p 41; PEP, *op cit*, pp 53, 61; 'Agricultural Education', *The Times*, 29 April 1935, p 19; Report of the Committee on Agricultural Higher Education, Cmd 6728, 1945, *BPP*, X, 1945/46, p 32.

13 D Chapman, *Agricultural Information and the Farmer*, An inquiry made for the MAF, new series, no 38, May 1944, pp 1, 34; PEP, *op cit*, p 112.

14 Cmd 6433, *op cit*, p 43.

15 Viscount Astor and B Seebohm Rowntree, *British Agriculture: the Principles of Future Policy*, 1938, p 419.

16 'Farming Research', *The Times*, 18 May 1921, p 5; 'Agricultural Education', *The Times*, 8 July 1935, p 20; R G Stapledon (ed), *Farming and Mechanized Agriculture*, 4th ed, 1950, pp 366–71; PEP, *op cit*, pp 63–4; Astor & Rowntree, *op cit*, p 419; Chapman, *op cit*, p 11; Board of Agriculture & Fisheries, *Leaflets: Numbers 1 to 300*, 3 volumes, 1919.

Of the national newspapers and agricultural journals, the *Journal of the Ministry of Agriculture* and *The Times* invariably contained much useful, clearly-written information; but neither of them was read by more than around 3 per cent of the country's farmers. The *Farmer's Guide to Agricultural Research*, published annually from 1926 by the Royal Agricultural Society, must have been far more useful for scientists, advisers, lecturers and undergraduates than it ever was for farmers. In spite of its title, it was uncompromisingly academic in style and content. A wartime Social Survey showed that the two most widely read periodicals were *Farmer's Weekly* (43 per cent of respondents) and *The Farmer and Stockbreeder* (51 per cent). Although 87 per cent of the 1968 farmers questioned read some farming magazine regularly, only 49 per cent of them admitted to actually having tried any of the suggestions made in the articles.[17]

By the late 1930s, farmers were probably receiving more information from the sales and technical staff of the large feed and fertilizer manufacturers than from the advisory services. The reputable companies, such as ICI and Spillers, usually provided reliable information based on genuine field trials and objective testing of their products. But the advice given about particular products would not always be impartial, and that which emanated from the less scrupulous firms was downright unreliable.[18]

V

The lack of contact between farmers and the advisory service was not entirely the fault of the latter. Undoubtedly, a great many farmers were hostile and unreceptive to new methods. A survey of farmers' letters to *The Times* from 1918 to 1938, whilst not a sufficiently large or representative sample to warrant confident generalization, suggests four main objections to the work of the advisory service. Many farmers upheld in all circumstances the value of practical experience over theory, and were suspicious of any scientist or 'expert' who had never had to earn his own living as a practising farmer. Some exhortations to improve methods, were rejected by farmers who detected, and resented, the implication that they were guilty of ignoring easily-rectifiable faults in their husbandry. Some farmers were antagonized by the callow over-zealousness of young, college-trained advisers. Others regarded all advisers as unwelcome evidence of a proliferating, expensive, and unnecessary bureaucracy.[19] These attitudes were not confined to ill-educated or poor farmers: they were displayed by some who moved in the highest social circles of the agricultural world.[20] The farmers' scepticism was not always unreasoned prejudice: some rejected new methods which seemed to them to be based on insufficient evidence of practical success.[21]

The low general level of education amongst farmers has been identified as an important reason for their resistance to innovation. The wartime Social Survey cited above found that 72 per cent of farmers questioned had no more than an

17 Chapman, *op cit*, pp 11–12.

18 A D Hall, *Reconstruction and the Land*, 1941, p 78; W Gavin, *Jealotts Hill: The Agricultural Research Station of ICI Ltd*, ICI, 1953; PEP, *op cit*, pp 65, 68, 70: Astor & Rowntree, *op cit*, pp 226, 417; personal communication from the late Dr J B M Coppock, former Director of Research, Spillers Limited, Summer 1972; personal communication from Mr G L Beveridge, Agricultural Engineer of Barrowford, Lancashire, Summer 1972; C J Holmes, 'Spillers, 1829–1969: The Company's History', unpublished essay, 1971, pp 29–30.

19 'The Land and the Nation', *The Times*, 10 Jan 1922, p 6; 'Rural Education', *The Times*, 29 May 1925, p 20; 'The Test of Knowledge', *The Times*, 13 Jan 1930, p 18; 'Bureaucracy and Farming', *The Times*, 5 May 1930, p 20; 'Science and the Farm', *The Times*, 1 Dec 1930, p 20; 'Science and the Farm', *The Times*, 6 Dec 1930, p 8; 'Farmers and Science', *The Times*, 13 June 1938, p 20.

20 J Wentworth Day, *Farming Adventure*, 1943, pp 118–19, 134–6, 142–3; H J Massingham (ed), *England and the Farmer*, 1941, pp 1–70.

21 'Farmers and the Government', *The Times*, 2 Feb 1918, p 7; 'Science and Farming', *The Times*, 20 April 1925, p 20; 'The Farmer and his Advisers', *The Times*, 3 Aug 1925, p 13.

TABLE 4
The Terms of Trade for Farmers. Indices of Agricultural Product Prices and the Price of Farm Inputs, England and Wales 1911–1940 (1911–13 = 100)

Year	*Product prices*	*Input prices*	*Ratio of product: input price*	*Year*	*Product prices*	*Input prices*	*Ratio of product: input price*
1911	96	98	98	1926	151	158	96
1912	102	100	102	1927	144	155	93
1913	102	102	100	1928	148	155	95
1914	101	103	98	1929	144	153	94
1915	127	113	112	1930	132	148	89
1916	160	131	122	1931	122	144	85
1917	201	156	129	1932	117	139	84
1918	232	178	130	1933	112	135	83
1919	258	197	131	1934	113	135	84
1920	292	232	126	1935	119	136	88
1921	219	213	103	1936	120	138	87
1922	169	171	99	1937	132	146	90
1923	157	155	101	1938	131	148	89
1924	161	157	103	1939	132	151	87
1925	159	159	100	1940	183	183	100

Notes:
(a) The input price index is based upon the prices of seven items, and is weighted according to farmers' estimated annual purchases of them: animal feed, fertilizers, store cattle, seeds, machinery, rent, and labour.
(b) The product price:input price ratio stands at 100 when prices are at the same relative level as in 1911–13. It is greater than 100 when product prices are high relative to input prices, and less than 100 when product prices are low relative to input prices.

Sources: MAFF, *A Century of Agricultural Statistics: Great Britain 1866–1966*, 1968; MAF, *Annual Agricultural Statistics* 1911–1940; E M Ojala, *Agriculture and Economic Progress*, Oxford, 1952.

elementary school education; but it also showed that the farmers questioned had a substantive appreciation of the value of education, and largely approved of agricultural colleges.[22] Four years of wartime farming may well have caused a marked change in attitudes; but a distinguished agricultural scientist, Sir Daniel Hall, argued in 1941 that it would be wrong to condemn British farmers for their ignorance of science or lack of technical training in the inter-war period, notwithstanding their low level of general education. 'But neither education nor scientific advice could have turned the typical British smaller farms . . . into economic propositions during the last thirty years . . . for science and discovery can find little scope in businesses of that size . . . It is not so much the farmers as the system that has been at fault.'[23]

The scope that farmers had for incorporating the results of scientific research into farming practice was determined to a significant extent by the financial condition of agriculture. High costs of production and low product prices were a substantial impediment to the widespread adoption of new methods. The price data in Table 4 above show how the internal terms of trade were adverse for farmers after 1925. The small farmer was particularly affected by these unfavourable price trends: cost records show that value of output per capita was lower, and the unit cost of equipment higher, on farms of less than

22 MAF, *Agricultural Improvement Council for England and Wales: First Report*, 1942, p 7; Chapman, *op cit*, pp 7, 10, 61–3.

23 Hall, *op cit*, pp xi, 78–9.

100 acres. In 1925, holdings between 5 and 100 acres accounted for *c*30 per cent of the total acreage of crops and grass (excluding rough grazings), and constituted 76 per cent of all holdings over 5 acres in England and Wales.[24] Clearly, the large majority of farmers in England and Wales between the wars came into the 'small' category, and at this point it is appropriate to note that the dissemination of much agricultural research was criticized in the 1930s for being geared to the needs of large rather than small farmers.[25]

It must be made clear that the farming community was by no means totally indifferent to research and advisory work. The experience of the 1914–18 war showed many farmers the benefits to be gained from the application of science to husbandry. In the inter-war period, contemporary reports indicate that a growing minority of farmers – especially horticulturists – had an increasing appreciation of the work of the research and advisory services.[26] This evidence is corroborated by the first-hand observations of four leading agricultural scientists and a former Minister of Agriculture.[27]

VI

In spite of all the difficulties, some solid successes were achieved by the pre-1939 advisory services. Activities at the county level helped greatly in the local implementation of MAF improvement campaigns for clean milk and better grassland in the 1930s. The success of the 1937 Land Fertility Scheme, which stimulated greater use of lime and basic slag by offering a subsidy on farmers' purchases of them, was based upon the enormous amount of soil sampling and advisory work performed by chemists in both the provincial and county services. A few county centres undoubtedly rendered great assistance to their local farmers. Wiltshire was successful in starting several original schemes: an Agricultural Accounting Society (1925); a Wild White Clover Certification Scheme (1929); a County Register of Accredited Milk Producers (1929); and a Pig Recording Scheme (1930). The work of the Norfolk county authority was notable, too. It maintained its own experimental station and two well-equipped demonstration plots, and published its own agricultural journal. Altogether in the 1930s, thirty-six of the sixty counties in England and Wales maintained farm institutes, demonstration centres, or similar establishments.[28]

In the Provincial Advisory Service, as noted above, valuable work was done by the advisory mycologists and entomologists in crop protection and disease control. Provincial advisers in the west midlands and the west of England collaborated with the British Sugar Research Organization in an investigation which clearly demonstrated the agricultural value of by-product lime from the beet-sugar factories. By the late thirties advisory economists were making valuable contributions to national investigations into farm management, sugar-beet cultivation, and milk production.[29]

In spite of continued staff shortages and

24 C S Orwin, 'The Farmer's Business', in Dale, *op cit*, p 144; MAFF, *A Century of Agricultural Statistics: Great Britain 1866–1966*, 1968, pp 19–20.

25 PEP, *op cit*, pp 69–70.

26 DC, 1919/20, BPP, XIII, 1920, pp 21, 96; 'Farmers and Research', *The Times*, 1 Feb 1921, p 11; 'Farmers and Research', *The Times*, 23 May 1921, p 17; 'Future of Agriculture', *The Times*, 4 Dec 1922, p 13; 'Science and Farm Practice', *The Times*, 3 Jan 1927, p 18; 'Farmers and Research', *The Times*, 23 Jan 1928, p 18; 'Farmers and Education', *The Times*, 22 Oct 1928, p 20; 'Farming Research in Norfolk', *The Times*, 14 Oct 1929, p 20; 'Farmers and Science', *The Times*, 6 June 1938, p 15; 'Science and the Farmer', *The Times*, 21 Aug 1939, p 16; 'Cheshunt Research Station', *The Times*, 19 June 1925, p 14.

27 Hanley, *loc cit*, pp 120–1; R G Stapledon, *The Land Now and Tomorrow*, 1935, p 230; Hall, *op cit*, pp 77–9; Lord Addison, *A Policy for British Agriculture*, 1939, pp 37–40; E J Russell, 'Work of the Rothamsted Experimental Station from 1914 to 1919', *Journal of the Ministry of Agriculture*, XXVI, 1919/20, pp 497–507.

28 PEP, *op cit*, pp 60, 129; Hanley, *loc cit*, pp 104–7, 113.

29 'Science and the Farmer', *The Times*, 21 Aug 1939, p 16; Committee of the Privy Council for the Organization and Development of Agricultural Research, *Agricultural Research in Great Britain*, 1943, pp 86–8.

a lack of financial resources, the advisory service available to farmers by 1939 was a marked improvement on the scattered and rudimentary facilities of 1900. One important aspect of this improvement was the vastly superior means of transport afforded by the motor cycle and motor car. Before the First World War, reliance on local railways and the horse and trap had meant that an advisory visit to just one farm could take up a whole working day.[30] Although there were palpable deficiencies in the relationship between agricultural advisers and farmers, the advisers' achievements were substantive, and their work was appreciated by a growing minority of farmers. The antipathy or indifference of the majority must not be regarded as wilful: the farmer's ability to innovate was constrained by adverse financial circumstances, especially from 1925 onwards. To conclude that the shortcomings of the pre-1939 advisory service are as conspicuous as its achievements, is not to disparage the efforts of a body of hard-working people who were feeling their way in a new and difficult profession.

30 Addison, *op cit*, pp 37–8; Hanley, *loc cit*, p 102.

Towards an Agricultural Geography of Medieval England

By BRUCE M S CAMPBELL

[A review article of John Langdon, *Horses, Oxen and Technological Innovation: The Use of Draught Animals in English Farming from 1066–1500*, CUP, 1986. xvi + 331 pp. 42 figures. £30.]

Abstract

Horses, Oxen and Technological Innovation is shown to make a major substantive and methodological contribution to the agrarian history of medieval England. Langdon's findings, derived in part from a national sample of manorial accounts, lend further support to the view that a more specialized and integrated pattern of food production and supply began to evolve during the thirteenth century. Horse haulage, although costly, increased the speed and range of market transactions; whilst horse traction allowed the emergence of more intensive forms of arable husbandry and greater specialization in livestock production. To illustrate the last point results are presented from a national survey of demesne livestock. These developments are expressed in the form of greatly increased spatial differentiation and can be related to the effect upon economic rent of the contemporary growth of several major urban markets.

Horses, Oxen and Technological Innovation makes a major contribution to the study of a period whose basic economic outlines are progressively changing. In establishing an appropriate data-base for his chosen subject, Dr Langdon draws upon an impressive and imaginatively assembled array of published and unpublished sources, and uses them to obtain significant new insights into the husbandry and economy of this period.[1] With the publication of this book there can be little doubt that medieval agricultural history has at last come of age. Not that considerable scholarly endeavour in this field has been absent during the past thirty years. But the valuable crop of individual and estate studies which have been produced, though they have added greatly to existing knowledge, have afforded few radical new insights and have tended to reinforce traditional assessments of the agriculture of the period.[2] Moreover, the picture of medieval agriculture that has emerged has been patchy and unsystematic, a function of the adherence to an estate-orientated methodology. Most of what has been written continues to relate almost exclusively to the demesne rather than the peasant sector and is disproportionately concerned with those leading ecclesiastical estates for which there are

1 Over 30 years ago R H Hilton drew attention to the wide range of sources relating to medieval agriculture: 'The Content and Sources of English Agrarian History before 1500', *Ag Hist Rev*, III, 1955, pp 3–19. Significantly, Dr Langdon was trained in Hilton's own Birmingham stable, where his supervisor was Dr C C Dyer.

2 Notable examples include J A Raftis, *The Estates of Ramsey Abbey*, Toronto, 1957; E M Halcrow, 'The Administration and Agrarian Policy of the Manors of Durham Cathedral Priory', unpublished BLitt thesis, University of Oxford, 1959; J Z Titow, 'Land and Population on the Bishop of Winchester's Estates 1209–1350', unpublished PhD thesis, University of Cambridge, 1962; I Keil, 'The estates of the Abbey of Glastonbury in the Later Middle Ages', unpublished PhD thesis, University of Bristol, 1964; I Kershaw, *Bolton Priory*, Oxford, 1973; E Searle, *Lordship and Community: Battle Abbey and its Banlieu*, Toronto, 1974; B F Harvey, *Westminster Abbey and its Estates in the Middle Ages*, Oxford, 1977; C C Dyer, *Lords and Peasants in a Changing Society: The Estates of the Bishopric of Worcester, 680–1540*, Cambridge, 1980. Current orthodoxy largely derives from the writings of M M Postan, most notably 'Medieval Agrarian Society in its Prime: England', pp 548–632 of M M Postan (ed), *The Cambridge Economic History of Europe*, I, Cambridge, 2nd edition, 1966. See also J Z Titow, *English Rural Society 1200–1350*, London, 1969; and E Miller and J Hatcher, *Medieval England: Rural Society and Economic Change 1086–1348*, London, 1978. For an alternative view see H E Hallam, *Rural England 1066–1348*, London, 1981.

Ag Hist Rev, 36, I, pp 87–98

well-preserved archives.[3] Some parts of the country have been well served in this respect, but geographically the coverage has been uneven. The forthcoming volumes II and III of the *Agrarian History of England and Wales* – conceived as long ago as 1956 – should eventually go a long way towards rectifying this, but may well suffer from having been too long in the making.[4]

I

The methodological challenge confronting all analyses of estate or regional farming systems is to reconcile the individual case study with the creation of a consistent and systematic picture of the country as a whole. Without some national frame of reference no full evaluation is possible of what is typical or unusual about individual farms or regions. There is an obvious limitation to any national picture of agriculture which is built up piecemeal from independent regional studies. Dr J Thirsk makes explicit acknowledgement of this in her introduction to Volume V, Part I, of *The Agrarian History of England and Wales*, when she states (of the national map of farming types):

> some boundaries which separate farming types are also the boundaries between chapters; in other words, authors on either side of a county boundary have not always agreed in their identification of the dominant local farming type.[5]

This problem is compounded when, as in these volumes, the picture is built up qualitatively rather than quantitatively. It is here that Langdon's study breaks important new ground, and not just in a medieval context. He takes as his unit of analysis the country as a whole and establishes regional variations in the technology of haulage and traction by a process of disaggregation.[6] Since the labour required in such an exercise is considerable – the PhD thesis upon which the book is based took almost six years – sampling and quantification provide two of his most essential tools.[7] This applies particularly to one of the most original achievements of the book: the creation of a national data-base from information contained in manorial accounts.

The rich store of agricultural information contained in the annual accounts drawn up each Michaelmas by the reeve or bailiff of a manor has long been extensively used by historians.[8] What is not so fully appreciated is the fact that these accounts survive in their thousands. The small number of estates, like those of the bishops of Winchester and abbots of Westminster, with long and relatively complete runs of accounts, have tended to divert attention away from the much more typical situation in which an individual demesne is represented by perhaps just one or two stray *compoti*. For Norfolk alone almost 2000 accounts are extant for the period 1238–1450, representing some 219 different

3 Exceptions are F J Davenport, *The Economic Development of a Norfolk Manor, 1086–1565*, Cambridge, 1906; K Ugawa, *Lay Estates in Medieval England*, Tokyo, 1966; D Postles, 'Problems in the Administration of Small Manors: Three Oxfordshire Glebe-Demesnes, 1278–1345', *Midland History*, IV, 1977, pp 1–14; R R Davies, *Lordship and Society in the March of Wales 1282–1400*, Oxford, 1978; R H Britnell, 'Minor Landlords in England and Medieval Agrarian Capitalism', *Past & Pres*, 89, 1980, pp 3–22; M Mate, 'Profit and Productivity on the Estates of Isabella de Forz (1260–92)', *Econ Hist Rev*, 2nd ser, XXXIII, 1980, pp 326–34.

4 Publication of Volume II, edited by H E Hallam, is imminent: it deals with the period 1066–1350. Contributions to Volume III, which deals with the period 1350–1500, are currently being finalized. Its publication may be anticipated in 1988 or 1989.

5 J Thirsk (ed), *The Agrarian History of England and Wales, V, 1640–1750. I. Regional Farming Systems*, Cambridge, 1984, p xxi.

6 Regional farming systems have attracted increasing attention in recent years, although they have hitherto lacked any wider frame of reference. Examples include: D Roden, 'Demesne Farming in the Chiltern Hills', *Ag Hist Rev*, XVII, 1969, pp 9–23; P F Brandon, 'Demesne Arable Farming in Coastal Sussex during the Later Middle Ages', *Ag Hist Rev*, XIX, 1971, pp 113–34; B M S Campbell, 'Agricultural Progress in Medieval England: Some Evidence from Eastern Norfolk', *Econ Hist Rev*, 2nd ser, XXXVI, 1983, pp 26–46; M Mate, 'Medieval Agrarian Practices: The Determining Factors', *Ag Hist Rev*, XXXIII, 1985, pp 22–31.

7 J Langdon, 'Horses, Oxen, and Technological Innovation: The Use of Draught Animals in English Farming from 1066 to 1500', unpublished PhD thesis, University of Birmingham, 1983.

8 For a discussion of manorial accounts etc see P D A Harvey, 'Agricultural Treatises and Manorial Accounting in Medieval England', *Ag Hist Rev*, XX, 1972, pp 170–82, and especially his editor's introduction to *Manorial Records of Cuxham, Oxfordshire circa 1200–1359*, Oxfordshire Records Society, 50, 1976.

demesnes, 60 per cent of them with fewer than five *compoti*.[9] Not all counties are as well documented as this, and in the remote north-west and south-west of the country it takes much hard work in the archives to turn up any account rolls at all. But for England as a whole the total number of extant grange accounts is possibly in excess of 20,000. These are scattered through numerous public and private archives and it is from these Langdon has drawn his sample of 1565 accounts (including several which are available in print), providing him with information on 637 demesnes for the period 1250–1320 and 399 demesnes for the period 1350–1420. With more diligent searching and a larger sample size the geographical coverage of both these data-sets could undoubtedly have been improved.[10] Yet it is unfair to quibble, for the achievement is considerable and the samples do yield a clear and consistent picture with the regional detail sketched in bold but simple strokes. More rigorously researched local and regional studies will no doubt refine this picture and add much detail, but it is unlikely that they will alter its basic outlines. In the long term the potential of this kind of approach is considerable, especially when harnessed to modern methods of data storage and analysis, for it is capable of transforming the scale and sophistication of analysis.[11] On the one hand, even the smallest and most miscellaneous scraps of evidence become usable; on the other, the opportunity exists to obtain a real insight into the organization and development of the demesne economy at large.

Just as significant as the transformation of scale and method employed in this study is the equal attention which is bestowed upon both lords and peasants. Many researchers would have been tempted by the abundance of explicit and relatively straightforward information available for seignorial husbandry to shirk the responsibility of investigating that of the peasantry, for which available evidence is altogether more haphazard, equivocal, and limited. Instead, Langdon puts this documentary imbalance to advantage by using the strength of seignorial documentation to establish a comparative framework, within which the more scrappy and miscellaneous evidence available for the peasantry can be evaluated. As is plain, the trends thus established for the peasantry can never be as clear as those identified for the demesnes, but considerable confidence does attach to the relative relationship between them. Moreover, sources do exist which cast at least some light on peasant agriculture: inventories, lay subsidies, heriots, maintenance agreements, surveys, tithe returns, and extents. Langdon displays considerable resourcefulness in seeking out these data and thereby demonstrates the very real potential which exists for learning more about the husbandry of this neglected but crucial group.[12]

9 There is no official listing of these Norfolk accounts, although a handlist is available on application to the author. The accounts themselves are dispersed among twenty-five public and private archives.

10 A summary register of manorial records may be consulted at the National Register of Archives, Quality House, Quality Court, Chancery Lane, London. A search of this register showed that Langdon's sample could be considerably improved in such counties as Staffordshire, Shropshire, and Herefordshire. In Cornwall, Cheshire, Lancashire, Cumberland, Westmorland, and Northumberland, on the other hand, there is a genuine paucity of records.

11 A computer analysis of seignorial agriculture in England 1250–1450 is currently in hand based upon data partly supplied by Dr Langdon. The results of this analysis will appear in my forthcoming book.

12 Studies of the social and economic relations of the peasantry, by contrast, proliferate. Recent examples include Z Razi, *Life, Marriage and Death in a Medieval Parish: Economy, Society and Demography in Halesowen, 1270–1400*, Cambridge, 1980; R M Smith (ed), *Land, Kinship, and Life-cycle*, Cambridge, 1984; B A Hanawalt, *The Ties that Bound: Peasant Families in Medieval England*, Oxford, 1986; J M Bennett, *Women in the Medieval English Countryside: Gender and Household in Brigstock before the Plague*, Oxford, 1987; M K McIntosh, *Autonomy and Community: The Royal Manor of Havering, 1200–1500*, Cambridge Studies in Medieval Life and Thought, 5, 1987; A R DeWindt, 'Redefining the Peasant Community in Medieval England: The Regional Perspective', *Jnl Brit Stud*, 26, 1987, pp 163–207. Agricultural production on peasant holdings has received rather more attention on the continent, for instance: E Le Roy Ladurie and J Goy, *Tithe and Agrarian History from the Fourteenth to the Nineteenth Centuries: An Essay in Comparative History*, Cambridge, 1982; G Bois, *The Crisis of Feudalism: Economy and Society in Eastern Normandy c1300–1550*, Cambridge, 1984.

II

That methods of investigating medieval agriculture are now being transformed is timely, for there is a mounting body of evidence which suggests that the performance of the agrarian sector is itself due for reassessment. Until now there has been a strong tendency to regard the medieval rural economy as relatively undeveloped and undifferentiated. Insofar as different farming regions existed it is thought that they derived less from a process of economic differentiation arising from interaction with the market, than from the influence of ecological, cultural, and institutional features. They were formal rather than functional regions and reflected such things as natural resource endowment, field systems, culture and ethnicity, and the degree of manorialization.[13] This view of the medieval rural economy tends to be most fully articulated by those who view it from the perspective of the sixteenth century. For instance, according to Dr J Langton:

> the spatial system of medieval times, one of almost discrete local economies loosely linked through London, was transformed [after 1500] by the greater cohesion imposed by London's growth and by the inter-position of hierarchical steps and whole regional economies between the two old levels.[14]

Yet such a verdict sits increasingly uncomfortably with the available evidence, which suggests that the economy of *circa* 1300 had certain very important things in common with that of *circa* 1600.

In the first place, historical opinion increasingly favours a medieval population at peak – *circa* 1300 – equal to or greater than the early seventeenth-century demographic maximum of 5.5 millions.[15] This shift in opinion stems from a reassessment of the accuracy of the 1377 Poll Tax returns coupled with the steady accumulation of comparatively small pieces of evidence, all of which point to extremely high rural population densities in much of the country by the end of the thirteenth century.[16] Scholars of the period have long been familiar with the notion that it was experiencing conditions of relative over-population, but that the population may have been absolutely so large raises obvious questions about the organization of the agricultural sector and, in particular, the extent to which it was geared towards exchange rather than self-sufficiency. The thirteenth century is now known to have experienced a tremendous proliferation of trading institutions, and in certain localities it has been shown that all members of rural society were deeply involved in the market nexus, with all that this implies about market specialization.[17] The possibility that a more specialized and integrated pattern of food production and supply may have been evolving during the thirteenth century is lent further credibility by the revised population estimates which have recently been made of several of the larger medieval towns at this time. London, in particular, has been shown by Dr D Keene to have attained a maximum *circa* 1300 of at least 90–100,000 – twice the conventionally accepted estimate.[18] The task of provisioning such a city, plus the other leading cities of the realm (whose accepted population

13 Studies which lay stress on these factors include H L Gray, *English Field Systems*, Cambridge, Mass, 1915; D C Douglas, *The Social Structure of Medieval East Anglia*, Oxford Studies in Social and Legal History, IX, 1927; G C Homans, *English Villagers of the Thirteenth Century*, Cambridge, Mass, 1941; W G Hoskins, 'Regional Farming in England', *Ag Hist Rev*, II, 1954, pp 3–11; J C Jackson, 'Regional Variations in Agriculture in Medieval England', *Northern Universities' Geographical Journal*, I, 1960, pp 41–53.

14 J Langton, 'Industry and Towns 1500–1730', Chapter 7 in R A Dodgshon and R Butlin (eds), *An Historical Geography of England and Wales*, 1978, p 194.

15 M M Postan, *The Medieval Economy and Society: An Economic History of Britain in the Middle Ages*, 1972, p 30; Miller and Hatcher, *op cit*, p 29; Hallam, *op cit*, pp 246–7; E A Wrigley and R S Schofield, *The Population History of England 1541–1871: A Reconstruction*, 1981.

16 For an up-to-date review of this evidence see: R M Smith, 'Human Resources in Rural England', Chapter 3 of G Astill and A Grant (eds), *The Medieval Countryside*, Oxford, forthcoming.

17 R H Britnell, 'The Proliferation of Markets in England, 1200–1349', *Econ Hist Rev*, 2nd ser, XXXIV, 1981, pp 209–221; K Biddick, 'Medieval English Peasants and Market Involvement', *Jnl Econ Hist*, XLV, 1985, pp 823–31.

18 D Keene, *Cheapside before the Great Fire*, London, 1985.

estimates must all now be open to doubt), cannot but have exercised an influence over a very extensive area.[19] Certainly, the lure of such large-scale urban demand would help to account for the highly specialized and intensive demesne farming systems which are now known to have developed in certain parts of the country, systems which were more complex and technologically advanced than was previously thought possible at this date.[20]

III

Langdon's work lends further support to the notion that English agriculture underwent important organizational changes during the course of the twelth and thirteenth centuries, over and above the general expansion in production which it has long been accepted took place over this period. In the first place, a significant transformation was effected in the technology of traction and, more particularly, of haulage. At the time of Domesday horses provided little more than 5 per cent of total animal draught force on the demesne, and no more than 10 per cent in any of the regions for which there are figures. There are signs that the level of horses was already higher among peasant draught stock, but this cannot be quantified. In contrast, by the beginning of the fourteenth century horses accounted for at least 20 per cent of the animal draught force on demesnes and almost 50 per cent on peasant farms, and these figures exceeded 50 per cent and 75 per cent respectively in certain regions. The changeover from oxen to horses was greatest for hauling, to the extent that horses easily dominated the carriage of goods by vehicle by the end of the thirteenth century.[21] The horse's adoption into ploughing was less spectacular: mixed teams gained in popularity and some all-horse farms emerged, with progress being most pronounced on the smallest holdings. As Langdon acknowledges, the pace of innovation was comparatively slow, and must to some extent have been conditioned by the supply of animals, but the scale of the eventual transformation was no less considerable for that.

Substitution of the horse for the ox made particular progress in certain regions and played an important part in establishing regional variations in agriculture. This extended to more than just the adoption of horses *per se*, for it tended to encourage a shift from natural to produced fodder, and had an important influence upon the number and type of other animals kept. Among all regions it was East Anglia which stood in the van of progress. Here, a shift towards a greater use of horses was already taking place by the first half of the twelfth century and it was only towards the end of that century that horses began to be employed in increasing numbers in the Home Counties and the east midlands. The spread of horses was very much a diffusion process and in Norfolk – one of the counties where they appeared earliest and in which their adoption eventually proceeded furthest – account rolls are numerous enough, and survive from a sufficiently early date, to allow the process to be reconstructed in some detail. Table 1 and Figure 1 illustrate the changing ratio of oxen to horses in this county over the 200-year period 1250–1449 (these trends are derived from a survey of all extant Norfolk grange accounts).[22] As Langdon

19 Norwich may have had a population of at least 18,000: T H Hollingsworth, *Historical Demography*, 1969, pp 363–4. The population of Winchester circa 1300 (approximately the 17th ranking town in the urban hierarchy) has been estimated at 10–12,000: D Keene, *Winchester Studies, 2, Survey of Medieval Winchester*, I, part 1, 1985, pp 366–70.

20 P F Brandon, 'Cereal Yields on the Sussex Estates of Battle Abbey during the Later Middle Ages', *Econ Hist Rev*, 2nd ser, XXV, 1972, pp 403–20; Campbell, *op cit*; Mate, *op cit*, 1985.

21 J Langdon, 'Horse Hauling: A Revolution in Vehicle Transport in Twelfth- and Thirteenth-Century England?', *Past & Pres*, 103, 1984, pp 37–66.

22 These results comprise part of a comprehensive analysis of Norfolk demesne farming which will be presented in full in my forthcoming book. I am grateful to J Orr for research assistance.

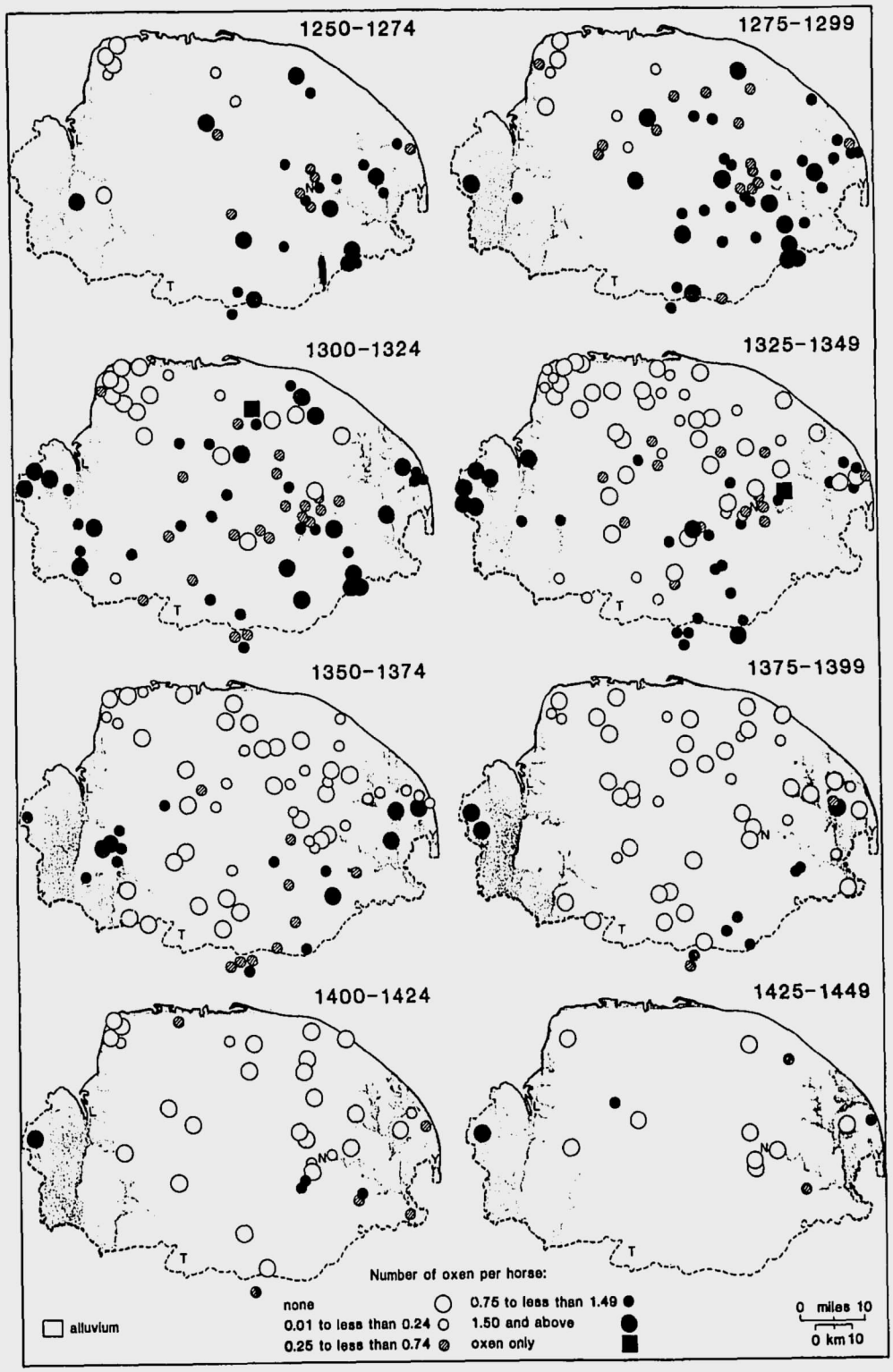


FIGURE 1
Norfolk: the changing ratio of oxen to horses, 1250–1449

TABLE 1
Mean Number of Oxen per Horse on Demesnes in Norfolk and England, 1250–1449[23]

Years	*Norfolk*	*England*
1250–1299	0.84	4.98
1275–1324	0.88	4.48
1300–1349	0.64	4.04
1325–1374	0.45	3.96
1350–1399	0.41	4.35
1375–1424	0.34	4.20
1400–1449	0.27	4.89

observes, horses seem first to have been utilized for farm traction on the light, dry soils of the extreme north-west of Norfolk. They are recorded in significant numbers here in the reign of Henry I on the Ramsey Abbey demesnes of Brancaster with Deepdale, Ringstead, and Holme-next-the-Sea.[24] As early as the mid-thirteenth century demesnes in this locality had converted to all-horse teams and in the county as a whole horses already significantly outnumbered oxen. In this respect Norfolk was far ahead of the rest of the country. At a national level oxen consistently outnumbered horses by at least four to one, and although horses steadily gained in relative numbers down to the mid-fourteenth century, they lost ground thereafter. In Norfolk, however, the advance of the horse experienced no such setback: demesnes converted first from all-ox teams to mixed teams, and then from mixed teams to all-horse teams. By the middle of the fifteenth century it was horses which outnumbered oxen by almost four to one. The stages by which this was achieved are shown in Figure 1; the areas which were most resistant to change tending to be those which were remotest from the initial source of innovation, especially where forage was abundant and soils were relatively heavy. Thus oxen remained in a majority on the demesnes of the Norfolk fenland throughout this two-hundred-year period, and they long retained an important role on the heavy soils of the south-east of the county, where mixed teams persisted throughout. Elsewhere, however, the horse was consistently in the ascendant and as its use spread so plough-teams got smaller. Towards the end of the fourteenth century, when demesne profits began to be squeezed by rising wage rates and depressed corn prices, small two-horse and one-man teams began to become a common sight on demesnes in all the lighter soil districts. It is probably no coincidence that in the mid 1390s Chaucer chose to sit Oswald, the reeve of Bawdeswell:

> upon a ful good stot, that was all pomely grey and highte Scot.[25]

The figure of the reeve reminds us, as Langdon demonstrates quite emphatically, that the horse was much more a peasant than a demesne animal. Indeed, it is the medieval peasant, for long regarded as too backward and under-capitalized a creature to have made much contribution to the development of agriculture and the raising of its productivity, who emerges from this study as technologically the most active member of medieval society. Some recent research has suggested that this might have been the case but until now the necessary hard evidence has been lacking.[26] Patently, the economics of peasant small-holdings were very different from those of seignorial demesnes, hence the differential which is apparent from the very beginning in the respective rates at which the work horse was adopted. Whether or not the same applied to other aspects of contemporary

23 The results for England have been recalculated from Langdon's original, unpublished data. I am very grateful to him for supplying these to me. These figures indicate a proportion of working horses *circa* 1300 lower than that calculated by Langdon and, contrary to his impression, some reduction in work-horse levels after 1350.

24 *Horses, Oxen and Technological Innovation*, p 43.

25 J Winny (ed), *The General Prologue to the Canterbury Tales*, Cambridge, 1966, p 70, lines 617–18.

26 Campbell, *op cit*, pp 39–41. The view that output per acre on peasant holdings was less than that obtained by a well-managed demesne in the same locality, is stated most explicitly in Postan, *op cit*, 1966, p 602.

technology now becomes an open question and it is time that it was addressed. Certainly, a more innovative, dynamic, and productive peasant sector would go a long way towards explaining how medieval demographic and urban growth managed to proceed as far as they did; for it was peasant cultivators who tilled the greater part of the land in medieval England.

For Langdon, all of these developments – technological change, the emergence of regional variation, and the greater innovativeness of the peasantry – are ultimately explicable in terms of changes in the market economy. Lords and peasants were both increasingly drawn into this economy during the twelfth and thirteenth centuries and this seems to have been the incentive which promoted the substitution of the quicker but costlier horse for the cheaper but slower ox. The rise of horse-hauling proceeded concurrently with the rise of the market economy, since horse haulage increased the speed and range of market transactions. The resultant increased circulation of goods should have been a direct stimulant to the economy and undoubtedly helped to sustain the urban growth which is such a conspicuous feature of the period. In the case of horse traction, this was associated with increasing regional differentiation and the evolution of farming systems of differing degrees of intensity. This is symptomatic of a market system of growing sophistication in which land use and its intensity are increasingly a function of economic rent. The progressive diffusion of the horse, therefore, derived not just from the expansion of the economy but from the fact that the economy was also becoming more integrated and complex.

IV

The problem is to establish the precise contribution which greater use of horses made to this general economic process of expansion and elaboration. On the face of it the economic benefits of horse haulage seem clear enough. Other things being equal the more rapid transit of goods should have reduced transport costs, extended the sphere of the market, and increased the rate of circulation. The only problem is that the heavy, oat-fed cart horse favoured on many demesnes was extremely costly to maintain. On the estates of Peterborough Abbey, for instance, Dr Biddick has calculated that in the opening decade of the fourteenth century more was invested in cart horses and transport (fodder, shoeing, maintenance of carts, wages of carters etc) than was made in wool sales – the abbey's principal cash crop – from its flock of 4000–9000 sheep.[27] Of course, on many demesnes and virtually all peasant holdings ordinary working horses served the dual function of traction and haulage, and this would have helped to keep transport costs down, but the fact remains that improved haulage was frequently only obtained at a high financial price.

When it comes to the advantages of horse traction Langdon is at something of a loss, since he can find little evidence that greater use of horses led to an improvement in agricultural productivity. Improved speeds of ploughing (the horse could work up to 50 per cent faster than the ox) may have led to some reduction in costs and hence an improvement in profit margins, since the same amount of work could be done by fewer animals, but there is no evidence that higher yields were ever a significant outcome. Of itself this is hardly surprising, since the method of traction had no direct bearing upon the fertility of the soil. Had Langdon considered the issue of productivity in all its aspects, however, he would have realized that one of the main benefits of replacing oxen with horses was the greater intensity

27 K Biddick, *The Economy which was not One: Pastoral Husbandry on the Estate of Peterborough Abbey*, forthcoming.

of cultivation which it allowed. One of the most effective ways of expanding arable output was not to raise yields but to crop the land more frequently.[28] This meant reducing fallows to a bare minimum and utilizing them solely as a means of cleansing the land of weed growth (by means of repeated summer ploughings). Since fallows no longer supplied forage the cultivation of fodder crops became unavoidable. Because this imposed a significantly increased workload on the labour force it became important to convert that fodder into traction with the maximum degree of efficiency; hence the substitution of the horse for the ox.[29] Such a changeover was also encouraged by the fact that the greater intensity of cropping meant a much more demanding ploughing schedule with, often, a major seasonal imbalance between autumn and spring. Intensive arable regimes such as these had evolved in both Norfolk and Kent by the end of the thirteenth century and in both areas demesnes employed either mixed or all-horse teams.[30]

Furthermore, grain output is not the only element in agricultural productivity, and it is important not to overlook the gains which may have accrued to the livestock sector from greater use of the horse. Most medieval farms were mixed farms. Except on the very smallest holdings animals were essential to provide haulage and traction and resources accordingly had to be devoted to their upkeep as well as to the maintenance of breeding stock to supply replacements. Only after these needs had been satisfied could additional animals be kept exclusively for their meat, dairy produce, fleeces or hides. Since horses worked faster than oxen fewer resources therefore needed to be reserved exclusively for the maintenance of the plough. Fodder and especially forage could be diverted to the use of other stock, allowing higher stocking densities (with consequent benefits for the arable in terms of increased manure supplies) and the development of much more specialized forms of livestock production. Langdon, it is true, recognizes this possibility and speculates that it may well account for the prominence of horses in Essex, whose heavy soils might otherwise have led oxen to be preferred.[31] As he points out, London's voracious demand for meat may have encouraged farmers in the Home Counties and East Anglia to sell their ploughing and hauling oxen as meat cattle and to replace them with horses instead. Thereafter, female cattle would have been retained as breeding and milking stock and the unwanted bullocks used to supply the meat demands of the metropolis. This explanation works very well and can be applied to a much more extensive geographical area, as is borne out by a general analysis of the demesne livestock population in the country as a whole.

Figure 2 illustrates the broad regional variations which existed in the composition of demesne livestock during the period 1250–1349, on the basis of a national sample of 741 demesnes. Much of the relevant data was supplied by Langdon himself and this has been supplemented by additional material drawn from various published and unpublished sources (including original account-roll information relating to 126 demesnes in Norfolk).[32] Map A shows the number of oxen per horse whilst

28 M Overton, 'Agricultural Revolution? Development of the Agrarian Economy in Early Modern England', Chapter 4 in A R H Baker and D Gregory (eds), *Explorations in Historical Geography: Interpretative Essays*, Cambridge, 1984, pp 125–7; B M S Campbell, 'Arable Productivity in Medieval England: Some Evidence from Norfolk', *Jnl Econ Hist*, XLIII, 1983, pp 379–404.

29 For an elaboration of this point see E Boserup, *The Conditions of Agricultural Growth*, London, 1965, pp 35–39.

30 Campbell, *op cit*, 1983 ('Agricultural Progress'); R A L Smith, *Canterbury Cathedral Priory*, Cambridge, 1943; Mate, *op cit*, 1985.

31 *Horses, Oxen and Technological Innovation*, pp 261–2; for the involvement of one Essex community in livestock production for the metropolitan market see McIntosh, *op cit*.

32 Again, I am grateful to Dr Langdon for making his original research notes available and to G Alexander, J Orr, and J Power for research assistance. A fuller discussion of these and other results will appear in my forthcoming book.

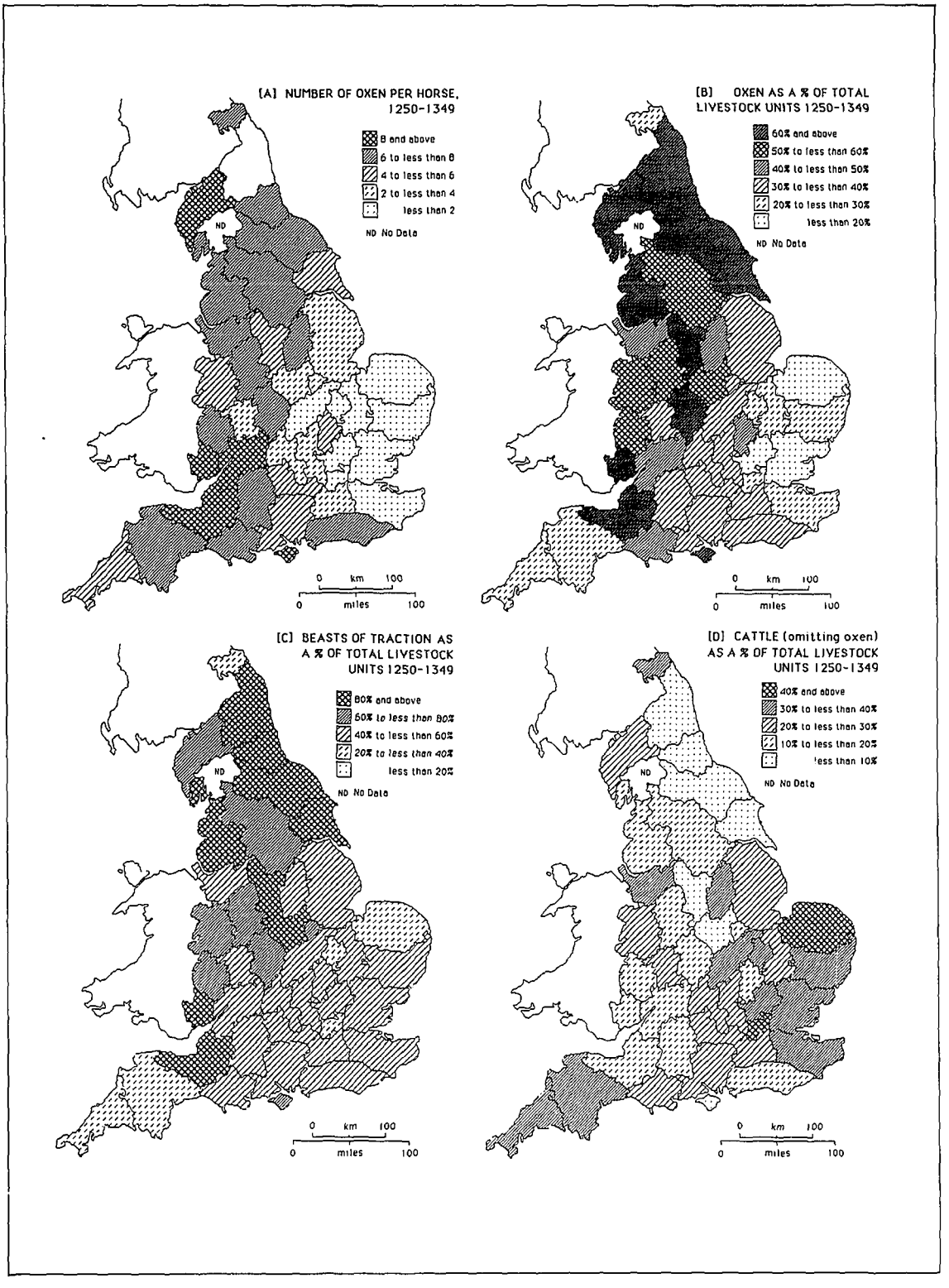

(A) NUMBER OF OXEN PER HORSE, 1250-1349
8 and above
6 to less than 8
4 to less than 6
2 to less than 4
less than 2
ND No Data
ND
0 km 100
0 miles 100
(B) OXEN AS A % OF TOTAL LIVESTOCK UNITS 1250-1349
60% and above
50% to less than 60%
40% to less than 50%
30% to less than 40%
20% to less than 30%
less than 20%
ND No Data
ND
0 km 100
0 miles 100
(C) BEASTS OF TRACTION AS A % OF TOTAL LIVESTOCK UNITS 1250-1349
80% and above
60% to less than 80%
40% to less than 60%
20% to less than 40%
less than 20%
ND No Data
ND
0 km 100
0 miles 100
(D) CATTLE (omitting oxen) AS A % OF TOTAL LIVESTOCK UNITS 1250-1349
40% and above
30% to less than 40%
20% to less than 30%
10% to less than 20%
less than 10%
ND No Data
ND
0 km 100
0 miles 100

FIGURE 2

Maps B, C, and D show, respectively, oxen, beasts of traction, and cattle (omitting oxen), as a percentage of total livestock units (the latter calculated using a weighting of 1.0 for horses, oxen, and cattle, and 0.1 for sheep and swine).[33] The patterns thus revealed should not be regarded as definitive, but they do suggest a number of highly significant relationships. In particular, it was in the most horse-dominated counties – notably Norfolk, Essex, and Hertfordshire – that oxen were least in evidence and beasts of traction (ie horses plus oxen) accounted for the smallest proportion of total livestock. Non-working animals made up over 60 per cent of all demesne livestock in these counties, with breeding and dairying herds especially to the fore.[34] There were other parts of the country where the ratio of livestock to crops was higher, but very few where non-working animals assumed such relative importance. East Anglia and the Home Counties are popularly perceived as arable districts *par excellence*, yet at the beginning of the fourteenth century they supported highly intensive mixed farming systems in which cattle assumed a unique prominence. In this respect, the outstanding position of cattle in the livestock economies of Middlesex and Norfolk speaks eloquently of the influence of urban demand from London and Norwich.[35] The ox may have dominated in the north and west, but the south and east was the preserve of the horse and cow. Indeed, this regional pattern suggests that the more pastoral counties of the extreme north-west and south-west were serving as reservoirs of working animals for those counties further south and east which could not satisfy their own breeding requirements.[36]

Contrary to Langdon's conclusion, adoption of the horse does therefore seem to have allowed the evolution of more intensive and productive mixed husbandry systems, with consequent benefits for the economy. Such systems naturally incurred considerable costs; hence they only developed when justified by the prevailing level of economic rent.[37] This helps to explain why they were so clearly orientated towards the main centres of urban demand, as well as why diffusion of the horse remained so geographically circumscribed. Nor did the productivity benefits of horse traction necessarily end there, for at least as important as the physical productivity of the land was the relative productivity of labour.

In all pre-industrial economies the limits to economic growth were set by the productivity of labour in agriculture. It was output per person rather than output per acre that determined the release of resources – food supplies, raw materials, labour, and capital – to other sectors of the economy. Direct measures of labour productivity are hard to obtain (although demesne accounts contain much of the necessary information); hence indirect measures are normally preferred. Of these, the level of urbanization is the one most

33 These weightings are based on those used by J T Coppock, *An Agricultural Atlas of England and Wales*, 1964, p 213; J A Yelling, 'Probate Inventories and the Geography of Livestock Farming: A Study of East Worcestershire, 1540–1750', *Trans Inst Brit Geog*, 51, 1970, p 115; an equivalent method is used in R C Allen, *The 'Capital Intensive Farmer' and the English Agricultural Revolution: A Reassessment*, Department of Economics, University of British Columbia, Discussion Paper No 87–11, 1987, pp 27–33. For alternative weightings see J Z Titow, *Winchester Yields*, Cambridge, 1972.

34 An analysis of herd demography in these counties reveals a strong bias towards female, adult animals (Campbell, forthcoming).

35 In Norfolk demesnes with well-developed cattle herds were especially prominent in a belt of country approximately 5–15 miles north of Norwich. Examples include Alderford, Attlebridge, Hainford, Haveringland, Hevingham, Kerdiston, Marsham, and Wroxham.

36 C Skeel, 'The Cattle Trade between Wales and England from the Fifteenth to the Nineteenth Century', *Trans Roy Hist Soc*, 4th ser, IX, 1926, pp 137–8; R Cunliffe Shaw, *The Royal Forest of Lancaster*, Preston, 1956; Davies, *op cit*, pp 115–16. The presence of surplus oxen, reared for trade, may lead Langdon to over-estimate mean plough-team size in some of the counties of the extreme north and west.

37 On the effect of economic rent upon land-use and farming intensity see M Chisholm, *Rural Settlement and Land-use: An Essay on Location*, London, 1962, especially Chapter 2, 'Johann Heinrich von Thunen', pp 20–32.

commonly used. It is on this basis that E A Wrigley has recently demonstrated that English agriculture experienced a marked increase in labour productivity during the late seventeenth and eighteenth centuries, with the result that the urban population rose from 8.0 per cent of the total in 1600 to 27.5 per cent in 1801. No such estimates have yet been made for the Middle Ages, and the uncertainty surrounding all population estimates for this period may mean that they are never possible. Yet the twelfth and thirteenth centuries do afford clear evidence of urban growth and there can be little doubt that society was more urbanized by the end of this period than it had been at the beginning. This is certainly a development to which more widespread use of the horse may have made an indirect contribution. Regardless of whether yields rose, labour productivity in agriculture should have risen, simply because adoption of the horse would have enabled existing tasks to be performed faster. This effect was even more pronounced when the number of ploughmen was reduced from two to one, a development which was already taking place in a few localities at this time and which can be presumed to have been especially characteristic of peasant holdings.

V

The technology of haulage and traction is, for even more reasons that those advanced by Langdon, a subject of central importance to our understanding of the medieval economy. This book tells us much about how that economy developed and affords new insights into the process of medieval technological change. Along the way it also has a lot of useful things to say about such secondary matters as the incidence of coaration, the size of plough teams, types of plough, and the various forms of farm vehicle and their distributions. It represents a major new methodological departure and draws attention to several major areas where further research is needed. Obviously, the whole question of livestock productivity should be high on future research agendas.[39] So, too, should urban food supply in general and interregional trade in animals in particular, since there is a very real possibility that certain aspects of livestock production were organized at a national level, with the major centres of urban demand the ultimate focus. Moreover, much more needs to be known about regional farming systems and the place of haulage and traction within them. Several technical mysteries also remain, notably whether reductions in plough-team size and the eventual introduction of one-man ploughs were contingent upon further refinements in plough design and the breeding of stronger animals. Finally, Langdon's data are tantalizingly thin for the later Middle Ages, a period which may have witnessed significant changes in the use of horses and oxen. During the fifteenth century some farms, he believes, went over completely to horses whereas others bolstered the use of oxen. Since this runs counter to expectations, and to the trend implied by the ox:horse ratio given in Table 1, it would clearly repay closer investigation. The potential for further research is therefore considerable and it is a tribute to the scholarship of this book that this should emerge so clearly.

38 E A Wrigley, 'Urban Growth and Agricultural Change: England and the Continent in the Early Modern Period', *Jnl Interdisciplinary Hist*, XV, 1985, pp 683–728. Also, R C Allen, *The Growth of Labour Productivity in Early Modern English Agriculture*, Department of Economics, University of British Columbia, Discussion Paper No 86–40, 1986.

39 The only systematic treatment of medieval livestock husbandry remains R Trow Smith, *A History of British Livestock Husbandry to 1700*, London, 1957.

Annual List and Brief Review of Articles on Agrarian History, 1986*

By RAINE MORGAN

AGAIN, few articles of interest to agricultural prehistorians were published during the year. Craddock *et al* (39) describe the uses of phosphate analysis as a means of locating and interpreting archaeological sites and show how the technique can be successfully integrated with other methods such as aerial photography, magnometer surveys, field-walking and soil magnetism to give maximum information retrieval from the soil. Burleigh (26) draws attention to new advances arising from the analysis of stable isotopes in skeletal remains which indicate, for instance, retrospective contributions of marine or terrestial sources of food. Using the more conventional pollen diagrams Hirons and Edwards (95) explore the possible causes of the first and second elm decline at two sites in Northern Ireland. They believe that the initial one may have been due to disease and that this reduction was superimposed upon a background of small-scale clearances which continued after a gradual elm regeneration. The frontier zone dividing foraging from farming in Europe is examined by Zvelebil (237). He argues that farming was not necessarily advantageous since foraging was capable of supporting high densities of population. Indeed agriculture was often adopted only where resources were failing. Pryor (173) uses the standard cross-cultural samples to explore why agriculture has been adopted in some societies and not in others. He finds that agriculture is only weakly related to the richness of the environment but more highly related to population density. The absence of agriculture in certain contemporary societies where conditions are appropriate however, remains unexplained. The wealth of evidence which can be studied within the intertidal zone is drawn to our attention by Wilkinson and Murphy (229). Due to almost constant waterlogging prehistoric wooden structures, artifacts and sometimes even whole landscapes have been well preserved and findings from a survey area on the Crouch estuary are outlined. Boyed (16) offers an overview of rye and ergot in ancient Scottish history and Ehenreich (55) demonstrates the sophistication of iron age blacksmithing by subjecting a variety of artifacts from southern Britain to detailed metallurgical examination.

The medieval period has been more heavily researched and Domesday book has received particular attention by scholars in the year of its nine hundredth anniversary. Boyden and Frearson (15, 67) look at why and how Domesday was compiled while Harvey (89) considers the accuracy of its evidence on wealth. The sheer volume of data it contains has inhibited full exploitation by historians but the Domesday Unit at the University of Hull is producing a computer version of the text and Palmer (158) describes the methods employed and the value of the database, including its mapping facilities. Difficulties of using and interpreting Anglo-Saxon charters are considered by Bailey (4) and the usefulness of lay subsidies for demonstrating medieval prosperity is debated by Rigby, Bridbury and Hadwin (181, 21,

* Publications are dated 1986 unless otherwise noted. References to articles or off-prints should be sent to the Bibliographical Unit, Institute of Agricultural History, University of Reading.

Ag Hist Rev, 36, I, pp 99–110

81). The accuracy of radio carbon dating is confirmed in a study by Manley *et al* (130) in which readings from charred plant remains gave the same date as the known historical fire which all but destroyed them. On rural settlement Jones (103) reports on the result of detailed investigations into medieval landholding in Gwynedd and its relationship to associated settlement patterns, and for Ireland Empey (56) examines factors which determined the shape of Anglo-Norman settlement in Munster and South Leinster. An investigation of relict landscapes in Essex and East Anglia by Williamson (232) suggests that parish boundaries are relatively recent features. The author argues however, that this does not imply any major discontinuity in settlement or land use during the post-Roman period. Historians have proposed a military origin for Roman-British small towns but Burham (27) sets urban development in a wider context and attempts to show that there were two overlapping and competing systems; one was focused upon pre-existing Iron Age sites and the other upon a new communications network. Dyer (50) argues that the complexity and quality of medieval buildings have been underestimated and demonstrates that there were significant changes in construction long before the 'Great Rebuildings' of the sixteenth and seventeenth centuries. There is fresh debate over the origins of capitalism, and Robert Brenner's view that conflict between different social classes was the primary source of feudal structural change is challenged by Lachmann (108). It is his belief that internal conflict between the ruling élites including the Crown, clergy and lay landlords was key in permitting the emergence of a new market organization of production. And in a test case-study of the Brenner thesis Searle (192) uses Cumbrian evidence to argue that economic development was more the result of swings in commodity markets and the unintended effects of inheritance practices than of class struggles. The short- and long-term consequences of war are calculated by Hicks (93) in his study of the Moleyns ransom and its impact upon the Hungerford estate in southern England. As a result the family here suffered financial and political eclipse for a generation. On the law and individualism Poos and Bonfield (168) question how far medieval peasants were constrained from selling land. Although some enjoyed freedom of alienation (*pace* Alan Macfarlane), peasants also employed sophisticated legal devices and inheritance strategies to circumscribe their successors' freedom to dispose of property. On women, Smith (201) traces developments of the late thirteenth and fourteenth centuries in English customary law which permitted them a greater freedom of action in land transactions, and Goldberg (76) highlights the important economic functions that women performed in the urban sector until recession in the mid-fifteenth century reduced opportunities for work. The idea that peasant widows were either unable or unwilling to take over their husbands' responsibilities is denied by Franklin (66). He maintains that they often argued their own cases in court, hired labour, and managed and cultivated their holdings successfully. The complexity of manorial structure is examined by Campbell (28), who uses a rare multi-manorial township survey of 1279, the Nomina Villarum of 1316 and other documents in his study of Norfolk. In past discussions of the decision to lease demesne land we have relied on the historians' own interpretations of profit and loss. However, in a new investigation of manorial accounting Postles (171) throws fresh light on the subject by exploring the Lords' perception of profitability and the nature of calculations which underpinned it. The close link between investment and profitability in medieval agriculture is illustrated by Stacey's account (204) of an experiment

in the management of southern royal properties during the thirteenth century. By raising investment to five times the medieval average, net manorial profits were increased by 70 per cent in only four years. Much of the investment was in marling, the purchase of new stock, seed, ploughs and buildings. The commonly held view that there was a widespread movement from a two field to a three field system in England during the thirteenth and fourteenth centuries is challenged by Fox (65). Although the transition could raise production quite cheaply it also reduced fallow grazing and rendered the three field layout unattractive where alternative fodder resources were in short supply. On cultivation techniques Lerche (116) records the results of experiments with a reconstructed medieval wheel-plough which demonstrate that within a few seasons of ploughing it is possible to create measurable ridges which can be related to evidence in medieval fossil fields. Allen (3) combines geology with documentary evidence to trace the human and natural forces which have shaped the alluvial flats bordering the Severn estuary since late prehistoric times. Medieval enbankment and reclamation of salt marsh for arable cultivation can still be detected in the present day landscape here. Historians have been bedevilled by a lack of sound evidence on medieval demography. The fifteenth century for example is too early for parish registers and too late for the poll tax. But manor court rolls, although a difficult source, can provide insights and Moss (138) shows how they can contribute to our knowledge. Similarly, Hatcher (90) has scrutinized a mass of accurate data on mortality and disease in the records of the Benedictine Priory of Christ Church at Canterbury. The high mortality is most striking and Hatcher considers how far their experience would have been typical of the fifteenth-century population at large. It has been assumed that the Black Rat (*Rattus rattus*) was responsible for the Black Death. However, Davis (41) presents material to show that the creature was rare or absent from most of Europe where plague spread, and hence was not responsible. Household formation systems at the close of the middle ages in different European countries including England are analysed by Poos (167). He concludes that the broad regional variations evident on the eve of industrialization now seem discernible from a much earlier era. The early modern period is somewhat under-represented. On sources Cox and Cox (38) disprove the widely held belief that valuations in probate inventories bore little relation to market prices and Whyte and Whyte (226) describe the Scotish equivalent of the inventory – the Commissary Court testaments. These record moveable possessions and households of the deceased as well as debts owing by and to them, and although they have received little attention they contain a wealth of detail on social and economic conditions. Long held assumptions about the legal nature of strict settlement are questioned by Bonfield (12). He argues that the aim of this seventeenth-century conveyancing device was to distribute wealth amongst competing family members rather than merely to prevent fragmentation of estates. Lindert (120) uses newly processed data on probated property debts and occupations to construct an overall size distribution of wealth between the late seventeenth century and 1911. Findings show that wealth rose fastest for owners and capitalists but the shift from land was also having a levelling influence. The original Scottish clan system, with its communal holding ideals expressed through marriage, kinship and land tenure practices is described by Ommer (151), and Porter (169) looks at the destruction of property during the English civil wars. In an important article Outhwaite (153) casts a critical eye upon the claims that have been made for agricultural progress between the late medieval period

and 1650. It is his opinion that Malthusian pressures at this time caused reduced efficiency due to an intensified use of marginal land, a rise in the precarious small holding sector and a fall in dunging rates as corn growing expanded at the expense of grazing. A detailed picture of the European cattle trade between 1400 and 1600 is drawn by Blanchard (11) who shows how revolutionary changes in marketing boosted meat consumption. Canny (29) concentrates on the flow of migrants to Ireland during the sixteenth and seventeenth centuries and uses a wide range of official documents and estate records to examine the origins and subsequent economic roles of the settlers. On demography Riley (182) argues that insect control, achieved unwittingly by drainage, lavation, ventilation and other means, was a significant factor in the European mortality decline of the post seventeenth-century era, and Thomas (210) enquires whether there was an energy crisis in the early 1600s. He finds clear evidence of timber and fuel being in critically short supply and maintains that the increase in Britain's naval power at this time was made possible only by energy imports from abroad.

For the modern period Kirkman (107) demonstrates how the computer file can help provide fresh insights into socio-economic change in rural communities through an analysis of census enumerators' books, and Sill (198) describes evidence that can be obtained from tithe files in his account of Durham farming. Mackinnon (127) focuses on the later nineteenth century and argues that the poor law statistics of this period are a valuable guide to the changing income levels and employment possibilities of the very poor. Another new source is highlighted by Short (196) who describes the data relating to land-ownership and occupation of property in 1910 which arose out of the Finance Act of the same year. On the subject of rural settlement Gant (72) shows how an effective marriage between oral testimony and archival material can be used to locate individual dwellings and the period of their abandonment. A calculation of the impact of climatic variations on British economic development between 1856 and 1913 is attempted by Solomou (203) who emphasizes the important growth implications of the agricultural sector, even after 1890. In a detailed investigation of élite position holders, Rubinstein (190) disputes the tacit association in historical writing between public schools and Oxbridge on the one hand and wealth holders on the other. Research has revealed that there was not much correlation between family wealth and public school attendance and even less between family wealth and a university education. The impact of late nineteenth-century agricultural depression on Lancashire's landed interest is assessed by Rogers (187). Although rents did not decline as rapidly as elsewhere, their fall followed a period of heavy investment in farming and mounting financial burdens which forced dispirited owners to sell land and consolidate their estates. Also on the landed interest Proudfoot (172) traces the management and fortunes of the Devonshire estate in Ireland from 1816 to the end of the century and Porter (169) examines the provisions of the Ground Game Act of 1880. He shows that contrary to previous claims they provided no remedy for the depredations of vermin. Rather, prosecutions under the Act were witness to continuing social tensions in the countryside. On English open fields and enclosure Turner (218) focuses upon the important issue of relative productivity. Although the change to severalty did not automatically lead to higher output, Turner demonstrates that usually there were significant gains due to reduction in fallow and a more efficient cropping regime which boosted the production of livestock and therefore manure. The extent of under-drainage in the past has been uncertain and Robinson (183)

presents new independent estimates based upon recent records of the Ministry of Agriculture, Fisheries and Food. These indicate that a startling 14 million acres or 52 per cent of agricultural land in England has been affected, and that the amount of drainage undertaken in the nineteenth century was considerably greater than formerly believed. On livestock Walton (223) looks at the history of pedigree and argues that whatever the merits of Shorthorn and other breeds, the endeavours of pedigree cattle breeding during the eighteenth and nineteenth centuries were substantially unhelpful in the long term. On Ireland O'Connor and Guiomard (149) present new estimates of changes which took place in the volume and composition of agricultural output prior to and after the formation of the Irish Free State, and Solar (202) provides a valuable survey of materials available for the study of Irish external trade between the Union and the First World War. On rural society Boyer (17) applies cross sectional regression analysis to data considered by the Royal Commission on the Poor Laws in 1832 in conjunction with occupational data in the 1831 Census in order to assess the causes of rising expenditure on poor relief. Findings argue that contrary to the Royal Commission's conclusions that abuse of the payment system was to blame, more likely causes were long-term changes in crop mix, employment opportunities, the political power of local hiring farmers and costs of migration. In a separate article on the Poor Law Boyer (18) refutes the hypothesis that relief payments to able-bodied labourers slowed rural–urban migration and hence economic growth. The extent of regional wage inequality in Britain between 1760 and 1914 is investigated by Hunt (100) who demonstrates the strongly positive effect of industrialization on income and living standards. The case for the tardy decline of the Lakeland yeoman is re-examined by Walton (222) who concludes no such decline in fact took place. Indeed, between 1700 and 1900 only nomenclature changed in the face of an enduring social structure. Aalen (1) describes the first major public housing enterprise in the British Isles, which was undertaken by Irish local authorities at the end of the nineteenth century. The demolition of primitive one roomed cabins and erection of some 50,000 new cottages had their origin in the Irish land acts, decline of laissez-faire and the 'back to the land' movement. In his re-examination of the English population surge Goldstone (77) finds that the crucial factor in the eighteenth century was the decline of the age at first marriage, probably linked to growth of employment opportunities. There has been a resurgence of interest in Scottish migration in recent years. Lockhart (121) presents the results of a national survey of the movement of labour to planned estate villages and Whyte and Whyte (227) trace the patterns of migration of apprentices into Aberdeen and Inverness. In one of the few articles on the normally popular topic of agrarian violence Murphy (140) rejects the claim that the Irish Ribbon societies of the post-Famine era made a significant contribution to the success of nationalist politics. Ribbonism, he argues, was an illusion created by the authorities when they failed to maintain law and order in the countryside. On policy Dodd (43) considers the opposition to the collection of agricultural statistics and shows that the Agricultural Protection Society was a prime and effective influence. Marrison (132) explores the efforts of Chamberlain's Tariff Commission to devise an agricultural policy and explains how division and a sense of hopelessness sapped the resolve of the protectionist lobby. It is a commonplace that the decontrol of agriculture after the First World War was a betrayal of the farming interest. However, Cooper's close study (36) of events leading up to and the subsequent

repeal of the Agriculture Act of 1921 leads him to conclude that on the contrary, its repeal was met with widespread and genuine relief in the farming sector. The early development of British ecology is surveyed by Sheail (194) who demonstrates its close links with the work of R G Stapledon and a concern with grassland management generally. The state of the countryside is of growing concern and in a separate article Sheail (195) illustrates how the agricultural historian can deepen understanding on a number of topics currently preoccupying conservationists. Thus he may help set current environmental changes in an historical perspective and assist restoring species-rich wildlife communities.

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Book Reviews

A STEENSBERG, *Man the Manipulator*, The National Museum of Denmark, Copenhagen, 1986, 199 pp; 62 illus. DKr 250.

Professor Axel Steensberg got to know Papua New Guinea only after he retired as first holder of the Chair of European Ethnology in the University of Copenhagen. The way of life he saw there fused with his previous upbringing as a farmer, and his training as a geographer, archaeologist and museum man (he had also been head of the Danish Folk Museum). It sparked off a flood of mental activity which, in spite of other sustained work in writing up the results of archaeological investigations, led to a stimulating work on *New Guinea Gardens: A Study of Husbandry with Parallels in Prehistoric Europe* (1980) and then to the present more generalized study, which is subtitled 'an ethno-archaeological basis for reconstructing the past'. It is a distillation of the writer's eighty-year long experience and thinking, full of lively points of view and pointers to further areas of research. Painstaking and accurate observation of tools and working-processes have in many instances led to fresh interpretations that throw light not only on the history and development of harvesting implements and of the plough in its inter-relationships with the traction spade, but also deeper thinking on the possible origins of civilization.

In nine short chapters, he outlines his belief that archaeology is an extension of history and demonstrates how it may be made so. The examples chosen are indicated by the chapter headings: arrow, fire and digging stick; early exploitation of plants; the axe and the forest; land occupation and fire husbandry; paddle spades; intensive cultivation with hand tools; the origins of the ard and the plough. There is in this sequence an implicit comment on the growth of organized human cultural systems with a basis on the produce of the soil and the development of forms of control of man's natural aggressiveness.

For Steensberg, the growing and storing of hard grains and their use as a medium of exchange is a major step in high civilization, leading to the need for accounting systems and for writing. He observes that root crops that cannot readily be stored or used in similar ways, or that were, as in New Guinea, in a cycle of planting and ripening all the year round, did not lead to the forms of central administration that wheat brought in its train. The viewpoint may be queried, but it provokes thought.

A second throughrunning thought is that comparable cultural phenomena occurring in different places should not be simply explained away as resulting from diffusion. He considers it better and safer to focus on working-processes in relation to environments, and not so much on typology. Double-headed paddle spades from Danish bogs are surely not the source of these found in Papua New Guinea, nor vice versa.

The final chapter, on reconstructing the past by experiments and demonstrations, is the third major theme. He has inspired and carried out numerous experiments with sickles, stone axes, traction spades and ards, in attempts to get at the 'mental template' of the past. His range of skills and knowledge, including knowledge of ethnographic parallels, allow him to go deeper than most.

Man the Manipulator is a book to be read slowly, and to savour. It can stimulate, and inspire.

ALEXANDER FENTON

CHARLES PHYTHIAN-ADAMS, *Re-thinking English Local History*, Leicester UP, Department of English Local History, Occasional Papers, 4th series, 1, 1987, vi + 58 pp. £5.95.

Historically the Department of English Local History at the University of Leicester has functioned as the great think-tank of the subject since its foundation in 1948. There are times in the history of any academic discipline when it is desirable to consider a 'fresh theoretical framework' (p 17). This happened in 1952 when Professor H P R Finberg recommended the local historian 'to re-enact in his own mind, and to portray for his readers, the Origins, Growth, Decline, and Fall of a local community'. Into being came a distinctly Leicester approach to the subject, studying local history in its own right and for its own sake, or local history *per se*. This was quite distinct from 'national history localized' or a traditional exploration of 'national' themes at local levels (pp 1–2), and represented in effect 'a resounding theoretical declaration of unilateral independence for a wholly fresh historical approach' (p 3).

One of the declared purposes of this publication is 'to pause and take stock of the subject from within' (p v). Highlighted over thirty-five years is an extraordinary fertility of ideas and research. Offered here is a useful reminder of how local history has developed and widened in scope since the 1950s.

Of more significance than mere stock-taking is the need to re-think local history's present and future, while remembering that most of England still remains unexplored in terms of recording the development of rural and urban communities, *pays*, regions, or historic landscapes (pp 25–6). The author

identifies several matters of concern respecting local history today, including tacit tensions and uneasy relationships between 'national' history and 'local' history, an academic need for a wider definition of the subject and how to overcome constraints of purpose and horizon. For the future the reader is invited to think of local history as 'societal history' (p 17), before being introduced to new possibilities in approaching the subject in Chapters 3 and 4 (pp 19–42).

This, the Department's thirty-third Occasional Paper, is both timely and scholarly. Achievements from the past are used as pointers to the future, so that local history may continue to be regarded both as an academic discipline and 'a form of local history *per se* after all' (p 49). If in addition this paper opens up a wider debate on the academic scope of English local history it will have served a dual purpose.

JOHN WHYMAN

DAVID HEY, *A Regional History of England: Yorkshire from AD 1000*, Longman, 1986. xv + 343 pp. 27 figures, 26 plates, 13 tables. £10.95 (pbk); £19.95 (hbk).

Longman's new Regional History of England series, edited by Barry Cunliffe and David Hey, is scheduled to appear in 21 parts – two volumes dividing at the year 1000 for each of nine regions, and three volumes for the combined West Midlands and Welsh Border region. In any such enterprise the chief problem lies in the identification of regions. No scheme will please all readers, but where the intention is to cover the whole country it makes a lot of sense to regard groups of counties as regions, rather than create regions based on topographical characteristics. For other volumes at least two counties will be covered, but David Hey has had the good fortune of being able to take the history of a single county. This makes a lot of sense: Yorkshire was the largest of the ancient counties occupying about an eighth of the whole country, and 'the West Riding alone was bigger than any other English county, and the North Riding came fourth in size'. But Yorkshire's chief claim to being regarded as a region in its own right lies in its people:

> Yorkshire people have acquired a belief in themselves as a breed set apart from the rest, and this sentiment has proved more powerful than . . . differences in ways of life. Those living beyond the county boundary have long acknowledged this separate Yorkshire identity, though they have usually done so in phrases far removed from the eulogies that Yorkshiremen have bestowed upon themselves.
>
> A world bereft of the characteristic charm, humour and forthright honesty of Yorkshire folk would be a poorer place, and David Hey has written an excellent history of his fellow Tykes. Much of the material incorporated in the volume has been used in courses he has taught for many years for the University of Sheffield's Division of Continuing Education and he pays due tribute to the stimulus and challenge provided by his students.

David Hey's text is extremely well balanced: nearly as much attention – over a third of the space – is devoted to the Middle Ages as to the period from the accession of Henry Tudor to that of Victoria. In five major chapters, each of more than fifty pages, he skilfully charts developments in town and country, in agriculture and industry, in architecture, in religious beliefs, and in a host of other subjects, often seen against the background of the changing national pattern. Inevitably given David Hey's *locus* and interests his account occasionally reflects its 'made in Sheffield' origin, but it suffers little on this score and I particularly enjoyed being reminded of the disastrous flood of 1864 'when the Dale Dyke reservoir burst its banks, drowning 258 people and causing £500,000 worth of damage'. Hull people often say 'once a Sheffield flood' rather than 'once in a blue moon'. With very few exceptions David Hey's account is well written and it should be read by anyone interested in the history of England's premier county. Undergraduates will find many valuable local examples to flesh out their over-generalized statements and all Yorkshiremen with a feel for history will derive many hours of enjoyment from these pages.

DONALD WOODWARD

J H BETTEY, *A Regional History of England. Wessex from AD 1000*, Longman, 1986, xiv + 320 pp, 30 plates, 9 figures, 31 tables. £10.95 (pbk); £19.95 (hbk).

Regional history must be one of the most difficult modes of historical writing. First, there is the region itself and its changing meaning and relevance through time. There is a compelling logic to the Wessex of this book (almost the whole of southern England with the precise boundary drawn to respect the integrity of county boundaries) in the eleventh century at which point this book opens, but the coherence in the nineteenth and twentieth centuries of a region which includes both Exmoor and the South Downs is much more difficult to sustain. Fortunately, the author has long experience of both the methods and practice of resolving history at this scale of enquiry and also a deep familiarity with the localities about which he writes. A second difficulty is that of identifying and discussing genuinely *regional* issues rather than reviewing either collections of local circumstances, or, of providing some place

specificity to what are really national issues. Some essentially regional matters, particularly concerning industry and society, are explicitly identified and discussed in this book for the earlier centuries but in times closer to the present more recourse is made to statements such as 'above all the years 1914–1939 were marked by the development of new industries and new commercial ventures and developments' (p 290) followed by a list of these activities and some locations where they were to be found. In part this is a consequence of the uneven treatment of time periods. Only ten pages are devoted to the twentieth century compared to more than eighty for the sixteenth and seventeenth centuries. It is unlikely that the readers of this review would come easily to a consensus of a date at which matters historical interdigitate with the present but the pace and radical nature of much change in the twentieth century warrants at least equal if not arguably greater treatment of the recent compared with the distant past. Notwithstanding these comments addressed mainly to the *genre*, there is quite a lot in this book for agricultural historians. Not least are a discussion of that most distinctive and really regional practice: the creation and management of water meadows, and also the regional experience of Swing Riots which gave birth to some of the region's most celebrated folk heroes: the Tolpuddle Martyrs.

R J P KAIN

PHILIP RIDEN, *Record Sources for Local History*, Batsford, 1987, 253 pp, £9.95.

The recent decline in the popularity of history in schools and universities has been matched by a remarkable and continuing expansion in the number of local historians, genealogists and family historians, and by the increasing sophistication of the local studies which are being produced by such groups and individuals. It is to such local historians and to anyone who is pursuing a systematic search for material on a particular place or local community that Philip Riden's book is addressed, following in the footsteps of his previous introductory handbook on the study of local history. The task he has now undertaken is formidable, since his purpose is to guide such researchers through the complexities of the major sources for local history in the Public Record Office, and to provide 'a guide to classes of the public records which can be searched reasonably expeditiously and profitably for local studies'.

Most researchers have felt overwhelmed by their initial attempts to use the material in the Public Record Office, and many beginners will find that this book provides a valuable introduction. It is written in a clear, lively style, and shows an impressive familiarity with a great range of documentary sources for both England and Wales from the Middle Ages to the twentieth century. There is no disguising the complexity of the subject, however, and the reader may still be left reeling beneath the weight of information, but this is a helpful attempt to provide practical guidance and advice on which classes are worth searching for local references. As well as suggesting the major sources among the central records which will yield local information, Riden also usefully draws attention to numerous classes of records which are under-appreciated and little used by local historians, and the records in the custody of bodies as diverse as the Duchy of Cornwall, the archdiocese of York, the College of Arms or the various water authorities for England and Wales.

The inevitably brief account of each class of records does not allow space for many examples of what may be found, and occasionally over-simplifies the difficulties inherent in some sources and the fact that useful local material often lies buried within vast quantities of repetitive legal argument, 'money matters', or uninformative disputes and depositions, although attention is drawn to the limitations and deficiencies as well as to the potential of each class of records. There is a good Index and a very full bibliography, as well as a helpful section of notes listing numerous published works. A brief glossary of some of the main technical terms might have been a useful addition for those attempting for the first time to use the records of central government, but in each section the reader is given an extensive list of references, suggestions and examples of published editions, as well as useful recommendations on the sort of local material which may be found, the purposes for which it was originally collected and the institutions which produced it. Most useful of all, the book provides valuable hints for using the unpublished search-room handlists, topographical indexes, finding-aids and guides to locate material on particular places or individuals. It is a commendable achievement to have provided such good brief introductions to so many classes of records, and the book will undoubtedly prove of the greatest use to serious local historians as the essential starting point for any attempt to find their way through the material for local studies in the PRO.

J H BETTEY

DAVID HEY, *Family History and Local History in England*, Longman, 1987, xvi + 276 pp, 5 tables and 4 pedigrees; 5 maps; 40 plates. £7.95.

In recent years record offices which hold bishops' transcripts of parish registers have filled with people working their way through them box by box. Many university historians will have been asked to lecture

to family history societies, and in so doing may have tried to take the genealogists beyond their pedigrees and into wider issues in the history of the family. David Hey's aim in this book is to introduce the family historian, whose interest is but his own pedigree, to wider issues of family history, such as the structure of the family, as well as to an understanding of the local history of the community in which the family lived.

In the brief introduction there are interesting reminders (besides the author's work on Myddle) that in the past it was not only the gentry that concerned themselves with genealogy. Then come three chronological chapters. That on the middle ages suggests this period has the most problems for the amateur, but goes on briefly to look at how some case studies, of Wigston, or (more controversially) of Halesowen, have broadened our understanding of the medieval family in the community. The chapter on the early modern period begins with a discussion of the main sources (parish registers, probate records and the Hearth Tax) for both genealogists and local historians, with reference to expert comment on pitfalls and difficulties. The complicated example given of a parish register is slightly spoilt by a printing error (p 49). Probate records and the Hearth Tax returns are shown to provide insights into the occupation of the deceased, or the geographical distribution of a family through a county, as well as basic genealogical information. Then follows an historiographical section introducing recent work on demography, village studies, industrial communities and towns. Amongst other places, we learn about Willingham via Margaret Spufford or, with Mary Prior, about Fisher Row in Oxford. The same basic format: sources; historiographical guide; and a (wider) range of case studies, follows for the late Georgian and Victorian period, with Hey's own relatives woven in as examples. Chapter four concentrates on two of the families involved in the Hey pedigree. There is a guide to further reading for each chapter.

This is a lively book, one is there with the writer in St Catherine's House as he struggles to find a nineteenth-century ancestor. If it leads genealogists to ask questions about the community evolving before their eyes as they search a parish register, then it will have succeeded.

C B PHILLIPS

TOM WILLIAMSON and LIZ BELLAMY, *Property and Landscape: a Social History of Land Ownership and the English Countryside*, George Philip, 1987. 240 pp. Illus. £17.95.

Just who is responsible for our landscape? All too often we take what we see for granted, accepting that with the passage of time and the passing of the generations the landscape has acquired the characteristic features with which we are so familiar. As Williamson and Bellamy remind us, however, this is a complacent view since it is man who makes the landscape, and what we see today is the product of centuries of manipulation by generations of men with more or less interest in what they saw around them. In this interestingly written and illustrated book they argue that the fabric of the landscape offers a particular insight into the communities that have lived and worked within it, and that it embodies a history of power in the land. Starting from this premise they proceed to argue that in Medieval society the landscape was the product of decision making at the local level, but with the growth through time of large, privately-owned estates it has increasingly been shaped according to the interests of a smaller, more powerful élite. In Medieval England it was the monastic foundations which 'used their power to intervene directly in the established patterns of land use . . . trying to alter the basic fabric of the landscape, and to impose innovations and specializations over the heads of the local communities' (p 53). By the sixteenth century the gradual privatization of the landscape, and then from the seventeenth century the growth of great estates and widespread enclosure opened the way for a small élite to transform the landscape. Whether for parks or model villages, this élite deliberately and extensively reshaped the landscape for social and aesthetic purposes, while they themselves retreated behind park walls into houses designed to protect their privacy. These same owners manipulated the landscape to protect their interests, either to maintain their shooting and foxhunting, or to ensure that railway lines were sited out of sight and earshot. In the twentieth century the great estate system has slowly crumbled, but this has not been beneficial to the landscape since many of the new owners tend to look upon their acquisition as merely an economic resource for the production of food. As a result, 'the farming of the present is almost exclusively destructive . . . both ecologically and aesthetically its consequences have been almost exclusively negative' (p 215).

This is a profoundly disturbing picture if it is correct, but Williamson and Bellamy present one side of an ongoing debate about the role of private property in modern society, in mustering past evidence to support their case there is at least the suspicion that they have cut some of the more difficult corners. Enclosure is found to have 'represented the concentration of ownership in the hands of the few' (p 115), a view which does scant justice to the labours of Michael Turner and others in trying to explain the motives behind, and results of,

enclosure. Landowners apparently fought tooth and nail to keep the railway out of sight of their parks, but this reactionary attitude to perceivable commercial advantages seems potentially at odds with Williamson and Bellamy's assertion that in many instances landowners persuaded railway companies to build a station within a short distance of their house. The book ends with two pictures, one of a busy haymaking scene set against the backdrop of a tree-lined Oxfordshire landscape in 1905, and the other of a modern agricultural prairie in Cambridgeshire, bereft of hedges and trees, a picture, in their view, of the shape of things to come while land remains in private hands. It is a sombre contrast, but the rights and wrongs of private landownership have been debated for more than a century, and while this book is likely to give a further twist to the argument through its concentration on the landscape, it is unlikely to disturb the equilibrium of Britain's remaining landed interest, at least in a decade during which private property ownership is so clearly lauded.

J V BECKETT

REX C RUSSELL, *Cottagers & Cows 1800–1892: The Cow Clubs in Lincolnshire, Charity, Self-help, Self-interest*, Barton on Humber WEA, 1987. 52 pp. Illus. £2 (incl. p & p).

The virtues of cow-keeping by cottagers in the eighteenth and nineteenth centuries have received much attention from both contemporaries and recent historians. However, one element, the formation and growth of cow clubs, has attracted no more than an occasional passing reference. Rex Russell in this booklet partly redresses the imbalance. As the title suggests, the contents of the book provide some information on several aspects of cow-keeping in Lincolnshire.

The first section of the book offers little new insight for the agricultural historian. It covers the well-trodden ground of the advantages of cow-keeping and uses extensive quotations from Arthur Young, the Enclosure Awards, the Report of the Society for Bettering the Condition of the Poor and the *Stamford Mercury*. The later sections, however, provide interesting examples of the establishment and growth of cow clubs in many parts of Lincolnshire. The main source used here is the *Stamford Mercury*. The earliest known cow club in the area was established in 1834 and the idea spread rapidly with many clubs being formed throughout the country. The movement reached a peak in both number of clubs and number of members in the second part of the nineteenth century. The cow clubs embodied the Victorian ideal of self-help and provided cow-keeping cottagers with a useful insurance against the death of their cows. Russell identifies over twenty cow clubs in Lincolnshire and the extant records of several are reproduced in the text. In addition, there is mention of the existence of pig clubs though little further detail is given. The author uses oral evidence to attest to the continuance of some of the cow clubs into the twentieth century – a few survived as late as the 1970s.

Most of the booklet is devoted to primary source extracts with little commentary. The main use of the publication, therefore, is to provide an indication of the type of evidence available on cow clubs. Where there is analysis of the material, it is primarily in the form of helpful tabulations of club records covering the latter years of the nineteenth century. Unfortunately some of the primary material used is not fully referenced and there is no bibliography to aid the potential researcher.

Overall, the booklet provides a useful glimpse into an interesting subject which merits further research.

C S HALLAS

PETER KRIEDTE, *Peasants, Landlords and Merchant Capitalists: Europe and the World Economy, 1500–1800*. Berg Publishers, Leamington Spa, 1983, 191 pp. £14.

Any author who attempts to discuss the economic development of Europe in relation to the rest of the world in the three centuries of the early modern period in 161 pages cannot be said to be lacking in ambition. The approach adopted is set out not in the text but in a section (pp 165–6) of the wide-ranging bibliography, which includes books not only in English but also in a number of other European languages. Peter Kriedte holds that the controversy of the 1950s between Maurice Dobb and Paul Sweezy – the one emphasizing the increasing exploitation of the peasantry, the other commerce as the main force which brought about the dissolution of the feudal system – continues to define discussion to this day. Kriedte rejects the more recent arguments of S R Brenner, set out in a series of articles in *Past and Present*, vols 70, 78–80, 85, and I A Wallerstein, in *The Modern World System* (2 vols, 1974 and 1980), which he believes have led discussion in the wrong direction. This study, he states, 'tries to restructure the problem of transition in a way which is inspired by the concept of proto-industrialization [on which by now there is a considerable literature], on the one hand, and by G Bois's attempt [in *Crise du féodalisme: economie rurale et démographie en Normandie orientale du début du 14e siècle au milieu du 16e siècle* (Paris, 1976)] to incorporate the theory of agrarian crisis into a theory of the feudal mode of production on the other' (pp 165–

6). Flanked by an Introduction and Conclusion, the main body of the text is divided, like Gaul, into three parts, by century: the age of the price revolution, the crisis of the seventeenth century and the upswing of the eighteenth century. Each chapter is then divided into four sections, the second of which in every case is devoted to agriculture: expansion in the sixteenth century, crisis and resurgence in the seventeenth and expansion or revolution in the eighteenth. Here there are no surprises. Peter Kriedte presents a straightforward account contrasting the development of west European agriculture with the refeudalization of east European agriculture. To support his case, he selects readily available statistics, sometimes for quite small areas such as seven seigneurial areas in the French Hurepoix region, the Korczyn district of Poland or the estates of the Lordship of Boitzenburg whose location, without maps, is not easily identified. Originally published in German, the translation is not always felicitous – one table is headed 'Volume of oxen drift over land to Frisia and the Netherlands, 1491–1700 (ten-year averages of animals registered by Gottorf customs post)' (p 31). German terms, like Hufe, Schwarzbrache, Kaufsystem, Vorwerk, etc, not always adequately explained, pepper the text. Another table headed 'Imports into Europe' (p 41) has three lines, one of which is labelled 'Grain from the Baltic'! The annual average import (weight in tons) is given with remarkable precision as 'ca 126 109.4'. Kriedte, too, could have been better served by his publishers: there are no maps and no list of tables or charts and the index is poor. This book provides an attempt to present an overall explanation of the European economy in the early modern period inspired by notions of proto-industrialization which will appeal to those who support that thesis. Others will find the overall thesis less compelling while the available detailed information to support the general argument remains so fragmentary and unsatisfactory.

WALTER MINCHINTON

Shorter Notice

JOHN WELLER, *Medieval Investment: Demesne Buildings within Christ Church Priory, Canterbury, 1285–1322: Fixed Equipment and Agricultural Productivity Based on Prior Henry of Eastry's Memorandum*, Bildeston Booklets, 1986. 38 pp, illus. £4.50 (+ £0.50 p & p).

The improving medieval landlord: fact or fiction? The question stands or falls by our view of Henry of Eastry, Prior of Christ Church, Canterbury, from 1285 to 1331. R A L Smith's classic exposition, nearly fifty years ago, made a strong case for him, a case that won the rather more cautious support of David Knowles. Now John Weller presents the case anew, drawing also on several important unpublished studies (with their authors' permission? – if so it is not acknowledged). He presents it well: maps, graphs, tables and a succinct and lucid text show clearly the extent and form of investment in the Priory estates in Henry of Eastry's time. He is aware of the risks of applying to the thirteenth century the economic criteria of the twentieth and there is little to question in the factual evidence – though there is a startling throwaway comment that the *Seneschaucy* 'appeared in print' in Henry of Eastry's time, and some or all of the vineyards listed may well have been fishponds (*vivaria*). It is useful to have the evidence put before us so forcefully; anyone who, like this reviewer, finds that his faith in the improving medieval landlord is failing, must at least reconsider his doubts.

P D A HARVEY

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R H BRITNELL

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Clays, *Culturae*, and The Cultivator's Wisdom: Management Efficiency at Fourteenth-Century Wistow

By M PATRICIA HOGAN

It is best to do things systematically, since we are only human, and disorder is our worst enemy. (Hesiod, *Works and Days*, 11. 471-72)

Abstract

This is a study of the decision-making process pertaining to the forty-eight demesne furlongs at Wistow, Hunts. Economically, the manor has been regarded as typical of the almost seventy properties comprising Ramsey Abbey. A useful sequence of account rolls for the 1380s-1390s, a detailed list of the furlongs in a manorial inquest of 1252, and a pre-enclosure estate map of 1617 furnish the chief documentation. Quite exceptionally, the *compoti* indicate sowing patterns parcel by parcel. Hence, the author has been able to trace decision-making with respect to the seeding, rotation, sub-division, and resting of the individual furlongs, and the yields which these choices did and did not facilitate. The analysis brings greater precision, detail, and integration to the topic of cropping strategy.

INVESTIGATIONS of the agrarian economy of medieval England are increasingly pointing to the considerable diversity in production strategy. Geographers, archaeologists, topographers, and historians alike have noted various peculiarities with respect to the furlong, rood, and acre, and indeed the uniqueness of field systems generally.[1] Similarly, P F Brandon, Bruce Campbell and R H Britnell, among others, have detected a range of interest in the technological and labour inputs of crop choices, sowing rates, weeding, folding, marling, liming, drainage measures, and convertible husbandry.[2] Beneath this panoply of influential factors, however, lies a yet more fundamental consideration. What was basic decision-making with respect to the culturae? How were the many cropping units devised, reviewed and if necessary resuscitated, and generally integrated into a balanced and otherwise effective system of husbandry? These complexities and their resolution pre-eminently reflect the 'efficiency of management' and as Bruce Campbell notes, the outcome was not only capable of moderating environmental disadvantages, but would have had a significant impact on remaining technological

[1] For recent reconstitutions of fields, see Cecily Howell, *Land, Family and Inheritance in Transition, Kibworth Harcourt 1280-1700*, Cambridge, 1983, pp. 78-94 95-113, 147-54; David Hall, *Medieval Fields*, Aylesbury, Bucks, 1982; C P Hall and J R Ravensdale, *The West Fields of Cambridge*, Cambridge, 1976; Trevor Rowley, 'Medieval Field Systems' in Leonard Cantor (ed) *The English Medieval Landscape*, 1982, pp. 22-55; Victor Skipp, 'The Evolution of Settlement and Open-Field Topography in North Arden down to 1300' in Trevor Rowley ed. *The Origins of Open-Field Agriculture*, 1981, pp 162-83.

[2] P F Brandon, 'Cereal Yields on the Sussex Estates of Battle Abbey during the Later Middle Ages', *Econ Hist Rev*, 2nd ser, XXV 1972, 402-20; Bruce M S Campbell, 'Agricultural Progress in Medieval England: Some Evidence From Eastern Norfolk', *Econ Hist Rev*, 2nd ser, XXXVII, 1983, 26-46; R H Britnell, 'Agricultural Technology and the Margin of Cultivation in the Fourteenth Century', *Econ His Rev*, 2nd ser XXX, 1977, 53-66; Eleanor Searle, *Lordship and Community: Battle Abbey and Its Banlieu 1066-1538*, Toronto, 1974, esp pp 272-92 (Marley); W Harwood Long, 'The Low Yields of Corn in Medieval England', *Econ Hist Rev*, 2nd ser, XXXII, 1979, 459-69, furnishes a general list of the technological factors to be examined.

initiatives.[3] The following study attempts to explore this cornerstone of the production system.

I

Amongst the hundreds of manors comprising the medieval English countryside were those of Ramsey Abbey in the East Midlands, almost seventy properties extending over eight counties. [4] One of these vills, which Nellie Neilson regarded as typifying production on the abbey's estates in the thirteenth and fourteenth centuries, was Wistow in north-eastern Huntingdonshire,[5] a manor owing a Lenten farm of 2502 bushels of grain[6] and for which several striking perspectives on its fields survive. To begin with, their number, location, size, names and basic site peculiarities are readily ascertainable from an early seventeenth-century estate map (1617).[7] A manorial inquest for 1252 provides the first listing of the demesne *culturae,*[8] and the rich nomenclature together with the detailed seventeenth-century map – sixteen chains to the inch with careful notation of all major landmarks – makes reasonably precise identification of the parcels possible. By the later fourteenth century, Wistow reeves were reckoning seed provisions precisely in terms of the furlong, a quite exceptional practice in estate accounting, and henceforth the survival of a sequence or sequences of rolls, such as, for 1388-89-1390 and for 1393-94-1395, present us with nothing less than the major design and execution features of the production programme.[9] Crop preferences and their rationale, the selection and use of each furlong, and yields, the definitive judgement on these decisions and risks, are all explicit in the data.

Beginning with the basic contours of the land, the various thirteenth-century surveys identify an arable area of 1455 acres, 480 in demesne and 975 in villeinage.[10] The demesne actually consisted of forty-eight furlongs arranged in terms of three and eventually four fields (Fig 1). Berrie Woode (Burywood) lay north-east of the village, a 450-acre almost squarish-shaped plot with its name and inclines fittingly recalling its original forest nature. Its western margin generously flanks the water course.[11] Rookes Grove to the north-west was again extensively hewn from woodlands: crescent-shaped and resting on a north-south axis, it apporoached 340 acres with its inner or concave border closely pursuing the south bank of Wistow brook. Milne Hill dominated southern vistas, a large hilly plateau, 400 acres in extent and fifty feet in elevation that virtually screens the village; the road from Huntingdon carves its way through it and a windmill has been located in the field since at least 1252.[12] Lowe Field lay sharply eastward, a small envelope-like plot of 100 to 110 acres springing upward from the water course. Its name seems to have derived from OE *hlaw, hlāēw,* 'hill',[13] and additional site features, especially seventeenth-century references to stony lands,

[3] 'Arable Productivity in Medieval England: Some Evidence from Norfolk', *Jnl Econ Hist,* XLIII, 1983, p 400

[4] J Ambrose Raftis, *The Estates of Ramsey Abbey: A Study in Economic Growth and Organization,* Toronto, 1957, pp 13-21.

[5] Nellie Neilson, *Economic Conditions on the Manors of Ramsey Abbey,* Philadelphia, 1899.

[6] Raftis, *Estates,* p 181.

[7] BRA 521, Huntingdonshire County Records Office. Also helpful are the Enclosure Map of 1852, CUL, and the Ordnance Survey, Sheet TL 28 SE, Chessington, Surrey, 1959, the latter indicating land contours and heights above sea level in particular.

[8] W H Hart and P A Lyons ed *Cartularium Monasterii de Rameseia,* I 1893, p 353. [Hereafter, *Carts]*

[9] *Compoti* for 1368-1395 are: Public Record Office, Series SC 6, Portfolio 885, no. 33 (1368); British Library Additional Rolls 39900 (1379), 39901 (1388-89), 39902 (1389-90), 39903 (1393-94), 39904 (1394-95.

[10] *Carts,* I, 353; *Rotuli Hundredorum tempore Henrici III et Edwardi I,* W Illingworth and J Caley (ed), 1818, III, 602.

[11] The brook arises in Abbots Ripton and virtually dissects the vill as it winds its way towards Ramsey and the Fen drainage system. Granville Proby and William Page (ed), *The Victoria County History of Huntingdonshire,* 1926, II, 247. [Hereafter *VCH: Hunts]*

[12] *Carts,* I, 354. *VCH: Hunts,* II, 247.

[13] A Mawer, (ed), *The Chief Elements used in English Place-Names,* EPNS, I, pt 2, Cambridge, 1930, pp 36-37; A H Smith, *English Place-Name Elements,* EPNS, XXV, Cambridge, 1970, pp 248-49.

strongly suggest its status as an outfield[14] (Fig 2).

The inquest of 1252 appears to identify the forty-eight demesne *culturae* directly as the surveyor met them in the field. To note only the listing for Burywood, he began in the south-western corner with the parcels abutting the Bridge and the Lowewey and their several neighbours – Clayhille, Pydelehille, *et al.* – immediately inland. Moving north-west identifying a number of meadowside plots, he eventually plunged into the interior acres to re-emerge at Kelneweye (likely Killow Balkes of 1617) in the distant north-east.[15] He completed the inventory and returned homeward via the extreme northern border, nineteen furlongs in all being inscribed.[16] This concreteness of approach certainly furnishes one clue to local production success.

A similar practicality surfaces in the parcel names, many of them reflecting villagers long-standing and well-considered judgement regarding the land. Various contiguous plots in particular, indicate major structural features, soils, irrigation and drainage characteristics, and other principal conditioners of growth. Briefly,

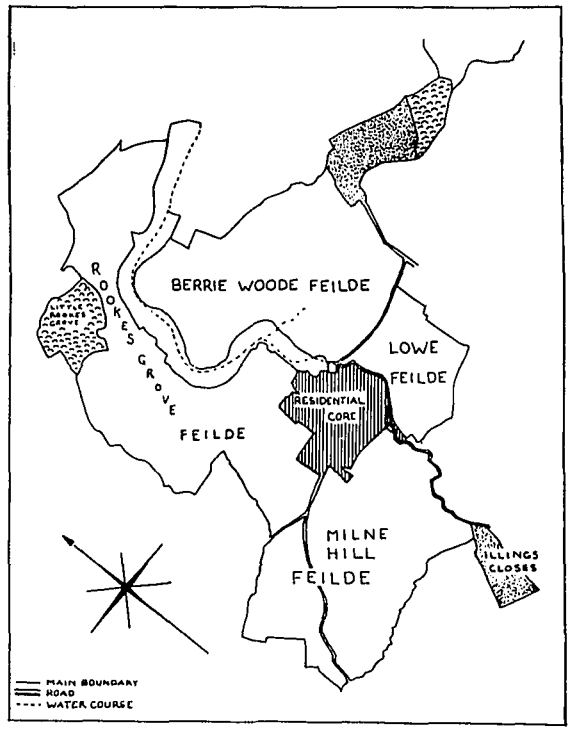


FIGURE 1
The Wistow Fields
(Enclosure Map, 1852)

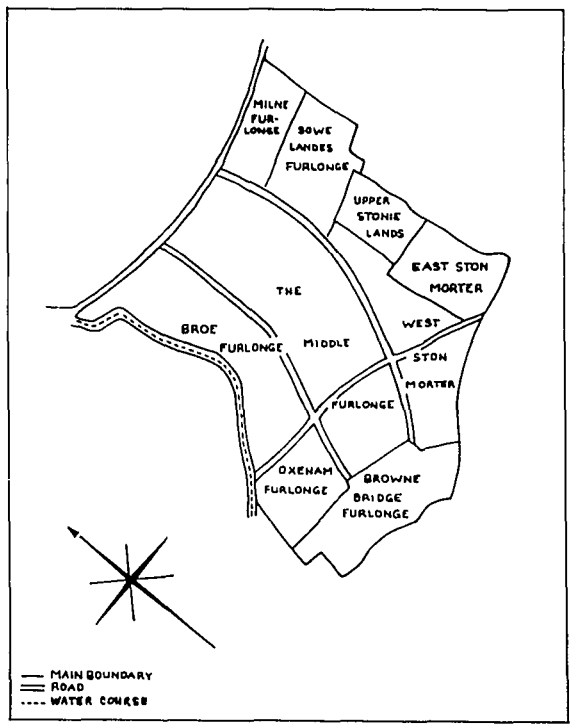


FIGURE 2
The Lowe Field (1617)

[14] Although marginal or outlands were not common on Ramsey estates, the term as Professor Raftis notes is a relative one, geological strctures and cultivation practices alike combining to reduce some Huntingdonshire fields to medium pasture ground even today (*Estates*, p 162) T A M Bishop, 'The Rotation of Crops at Westerham 1290-1350', *Econ Hist Rev*, IX, 1938, 38-44 identified a cleared area here of more than 700 acres but found only 120 of these to be permanent arable or infields.

[15] The remains of a kiln site are today located near Shillhow where the road from Ramsey to St Ives crosses the parish. Seventeenth-century Killow Balkes is a probable conflation of the words 'kiln' and 'Shillow'.

[16] He then crossed into Rookes Grove (seemingly near present Waterloo Bridge) and beginning in the extreme northern corner moved systematically from the woodside (i.e., inward) *culturae* – Walwardescroft, etc. – to the meadowside plots – Fulbrocfurlange, Ailivemade – finally reaching the southern border, a total of eleven parcels. He entered Milne Hill directly from Rookes Grove, immediately considering the border furlongs to the north-west and then to the north -east, Benefurlange to Hydehavedlande. He finally proceeded through the many inner furlongs – Wysewelle to the Littlehylles – so as to end with the meadowside plots in the southern-eastern corner, fifteen furlongs *in toto*. He noted another two plots, Magnum Stokkynge and Novum Stockynge, which constituted separate closes (outlands) lying north-east of Burywood Field.

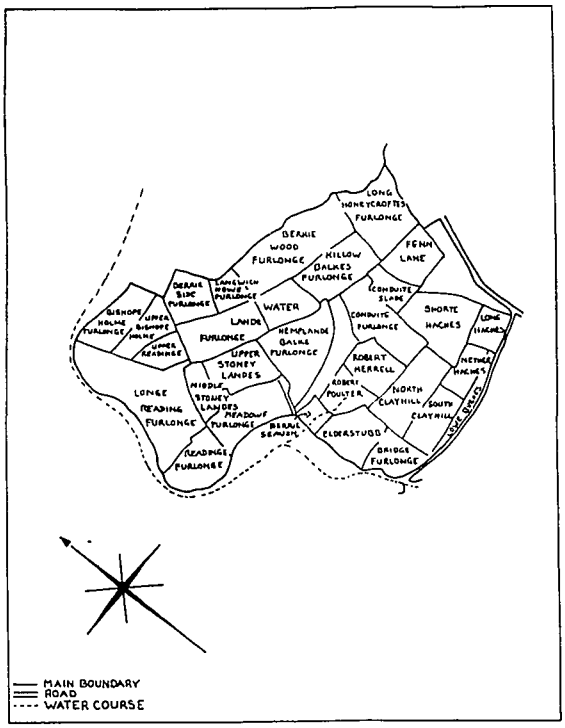


FIGURE 3
Berrie Woode Field (1617)

Briggefurlange, Helrestube'[17], Litelelderstub and Alwyslade[18] in southern Burywood together with the meadowside parcels of Brocfurlange, Aldebyre,[19] Hidaldebury and Bissopswange[20] further westward, and including Bernewelleshalu, suggest the well-irrigated state of approximately one-third of the field. The three Clayhilles speak more directly of the heavy Oxford clay that is widespread throughout Wistow while adjacent Pydelehille sharpens our sense of the rising contours of the inner field. The two 'stonecrofts'[21] lying center field also testify to the more challenging dimensions of Burywood, soils with notable stone deposits, drier lands, and eventual elevations of 100 feet. However, we should by no means exaggerate the difficulties. Kelneweye in the northeast represented the highest ground in the field and indeed the parish, yet, the furnace site alluded to betokens still further the generous and pliable clay soils of the area. There were two brickyards in the parish, this one being closed only towards the end of the nineteenth century.[22] In effect, the Oxford clay of Huntingdonshire is estimated to extend to 400 to 600 feet, actual borings have been made to more than 300 feet. The surface boulder clay ranges to at least eighteen feet, with some flint, boulders and occasional beds of gravel. It is well adapted to cultivation, especially to wheat and cereals.[23] (Fig 3).

Although several of the furlongs comprising Rookes Grove reveal woodland origins-Brache, Kyppingescroft, Haselholt – in fact, eight of the eleven noted in 1252 constituted valley land, only twenty feet above sea level and with all the hydrographic and related benefits of such a landscape. The land of Haselholt speaks as well of the loam constituent noted as conspicuous amidst the Wistow clay.[24] (Fig 4)

[17] John Field, *English Field-Names*, Newton Abbot, 1972, p 3 notes of OE *alor* that alders favour a moist and even marshy habitat.

[18] Mawer, *Chief Elements*, p. 53; Smith *English Place-Name Elements*, XXVI, p 127; and Field, *English Field Names*, p 206 describe OE *slād* as 'low flat valley', 'low flat marshy ground'.

[19] Either Meadows Furlonge or Berrie Seaven of 1617.

[20] Bishope Holme of 1617. A Holm meadow is also noted in the 1252 extent. *(Carts,* I 353.)

[21] Middle and Upper Stoney Landes of 1617.

[22] *VCH: Hunts*, II 247.

[23] *VCH: Hunts*, I, 2, 6-7 characterizes the Oxford clay as *Ammonites cordatus*, i.e., clays with large examples of *Gryphaea dilatata*, also *Ammonites cordatus, A excavatus, A lamberti, A perarmatus, Belemnites hastatus*. The boulder clay is an unstratified tough clay with considerable chalk and flint, and erratic boulders. It achieves depths of 70 feet in places. William MacKreath Noble, *Huntingdonshire* in the series Cambridge County Geographies, F H H Guillemard (ed) Cambridge, 1911, pp 30-32; D W Fryer, *Huntingdonshire*, part 75 in the series *the Land Utilization Survey of Britain*, L Dudley Stamp (ed), 1941, pp 417-19; G. Maxwell, *General View of the Agriculture of the County of Huntingdon*, 1793, pp 7-15; R Parkinson, *General View of the Agriculture of the County of Huntingdon*, 1811, note that a temperate insular climate with mild winters, average temperatures and sunshine, moderate south-westerly winds and below average precipitation combine with the thick clay soils to constitute prime conditions for the cultivation of beans, peas and cereals. In fact, the Oxford clay high grounds of the south-west in giving way to the peaty and marsh soil lowlands (fenlands) of the north-east tend to promote dampness of the atmosphere which compensates for the low rainfall of less than 22 inches per annum.

[24] *VCH: Hunts*, II, 246.

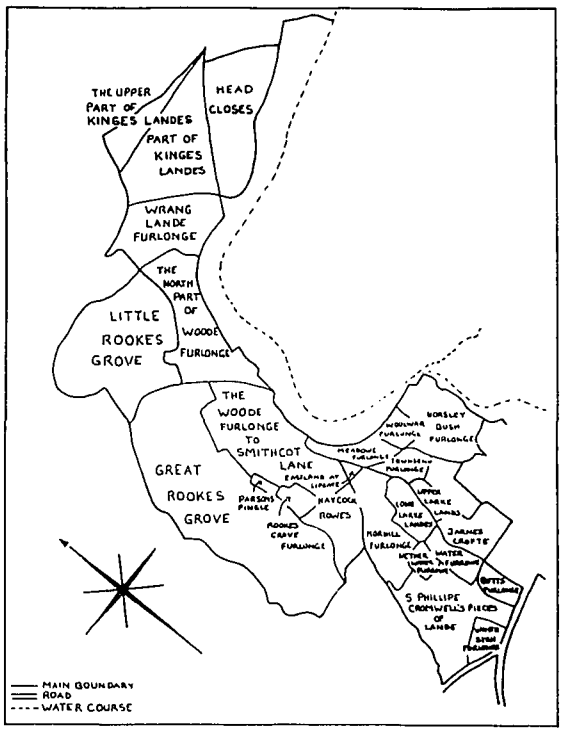


FIGURE 4
Rookes Grove Field (1617)

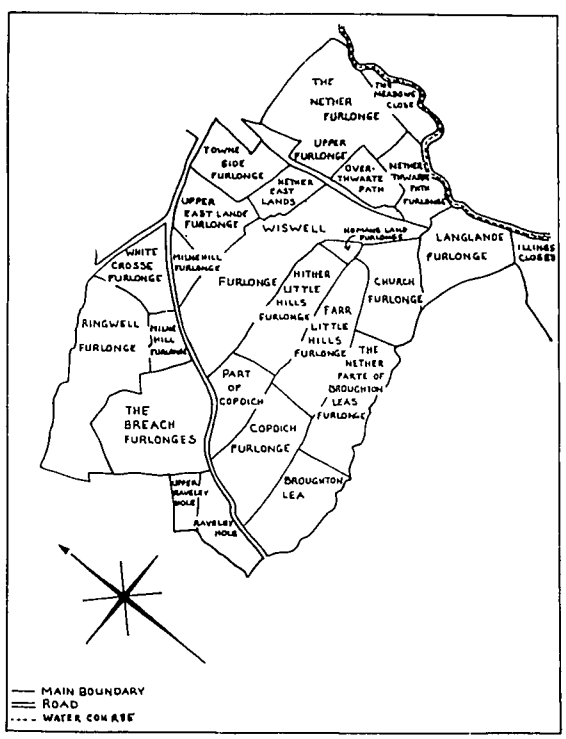


FIGURE 5
Milne Hill Field (1617)

Redelande and Lytelredelande in north-western Milne Hill reaffirm the extensive clay base of the vill while Cheselade, Brocfurlange, and Shoftbrigg in its eastern sector were again meadowside parcels. Several of the interior furlongs – Wysewelle, the Littelhilles, Estlange (Upper and Nether) – unambiguously signal the slopes and hollows of Milne Hill, yet the parcels largely consisted of long straight ploughstrips (Fig 5).

II

From 1247 to 1354 details on the actual use of these acres consist of seed sown and yields only.[25] They reveal a considerable stability in production until 1335, total seed dipping noticeably only in 1297 and 1307 when it fell to 129.4 and 110 quarters respectively from a norm of approximately 150 quarters. The yield ranged from 406 to 656 quarters and perhaps most interestingly, lower sowings did not necessarily have shocking repercussions for yields – indeed, a return of 566 quarters in 1307. Beginning in 1368 the *compoti* become much richer, this particular roll identifying the various furlongs sown. By 1379 the acreage under each crop, the seed per acre, and the yield per bushel of seed sown have been added. And from 1388 the acres, rods, and perches of the individual furlongs are being recorded. Like good pragmatists of any era these Wistow managers wished to extract what they could from the soil yet understood the need to verify their demands. Crop selections, a rotation pattern to achieve them, the abilities and inabilities of the parcels to sustain them — each of these details is clearly in evidence. With increasing meticulousness, they entered the size of furlongs-Wolstonycroft, for example, being listed as seven acres and one rod in 1388 and seven acres, one

[25] Raftis, *Estates*, p 165.

TABLE I
Demesne Crop Acreages, 1379-94

Year	*Wheat*	*Barley*	*Legumes*	*Oats*	*Total*
1379	46a	50a	83½a 1r 5p 4ft	5a	184½ 1r 5p 4ft
1388	47a 22½p	63a 3r 14½p	79a 3r 10p	10a 1r 8p	201a 15p
1389	45a 32½p	60a 3r 3p	78½a 13p	7a ½r 13½p	191½a ½r 22p
1393	47a 1½r 16p	69a 1½ 13p	56a 1r 12p	8a	181a ½r 1p
1394	59a 1½r 4p 15ft	67a 1r 115½p 13ft	69a 3r 14½p	8a	204a 1½r 34p 28ft

rod and eight feet in 1393 – together with their partitioning to allow for mixed cropping, the reconsolidation, and the resting of the plots. The picture emerging from these later details is as follows.

First, the demesne area under seed over the years 1379-1395 ranged from 181^{+} to 204^{+} acres:
Given overall demesne lands of 480 acres, the cultivated sector might seem small; however, by the second half of the fourteenth century, 120 to 140 of these acres were being leased to villagers, leaving approximately 350 of which an anticipated one-third would be at fallow.[26]

Second, the Lowe Field did not figure in production; all three remaining fields, however, are mentioned conspicuously and consistently in the data.

Third, peas, the important soil improvers and the major protein crop of late medieval farming, certainly dominated the cropping scheme, claiming roughly 40 per cent of the land. They were followed closely by barley (32%), wheat (25%), and oats (4%). The legumes had been increasing steadily from 1297 and there seem to have been three critical reasons for this. Most obviously, they were a corollary of the increased numbers of livestock. Manorial cattle had moved upwards from 51 head in 1252 to 93 in 1319 and hogs from 63 aninals in 1247 to 103 in 1351.[27] Pulses were prime forage. They were also an attempt to overcome the very poor oat harvest with its yield *(responsio)* of only 1½ by the early fourteenth century,[28] a return that was especially painful because of the extensive planting with them, 50 per cent of all crops over the decades 1250-1290. By contrast, the yield ratio for legumes was 3^{+} to 4½ $^{-}$; hence, the seed for them was allowed to rise from 3.6 quarters in 1250 to 34 quarters in 1352 while the oat allowance correspondingly dropped from 99 to 7 quarters. Finally, they were an adjunct of the increased use of barley, being sown subsequent to it,[29] and doubtless enhancing the following *fallows*.[30] In sum, they were an effort to redeem and render more efficient the entire rotation system.

Barley gave cultivators even more impressive returns. In effect, it could be the second crop in terms of both seed allowance and acreage and still furnish the greatest yields. In 1368, 31 quarters of peas were sown and produced 104.2 quarters of harvested grain; 30 quarters 3 bushels of barley were planted and returned 207 quarters 5 bushels. The *responsio* was always within the range of 4½ to 9 bushels. Wistow reeves were constantly interested in extending the barley area and by 1393 it

[26] Compoti frequently describe the rented parcels as *forea, placia, hydegorn,* and *butte* usually measuring 5 acres or less; the prices paid were 8d to 10d per acre prior to 1368 and 10d to 16d thereafter.

[27] Raftis, *Estates*, pp 138, 141–42.

[28] In 1297, for example, 62.4 quarters of oats sown returned only 93 quarters.

[29] See also Raftis, *Estates*, pp 184, n. 15 and 186, n 17.

[30] David L Farmer, 'Crop Yields, Prices and Wages in Medieval England', *Stud. in Medieval and Renaissance Hist.*, ns, VI 1983, 133 has suggested that sowing legumes immediately before the fallow served only to nourish the weeds, but it is difficult to see where the pulses might have been more usefully inserted into the schedule. According to Long, 'The Low Yields of Corn', p 463; and Campbell, 'Agricultural Progress', pp 31-32, the land was certainly better for their presence than for the want of them.

reached to more than 69 acres. This impetus, however, came at the expense of the legumes which fell markedly to 56 acres, a 22-acre decline and a decision that also spelled lower yields for both crops. The barley returned only $4\frac{1}{2}^{-}$ bushels as compared to 5^{+} in 1389, and the legumes yielded only slightly over 1 bushel as compared to $3\frac{1}{2}^{-}$. As an immediate corrective, the total arable in 1394 was expanded to 204^{+} acres from 181^{+} acres, allowing for 67^{+} acres of barley and 69^{+} acres of legumes; it also meant a *responsio* of $4\frac{1}{2}^{+}$ bushels for barley and 3^{+} bushels for pulses.

Wheat was usually sown on 46 to 47 acres over the later fourteenth century and seed quantitites for several previous decades suggest an acreage probably double this.[31] It is its traditional pre-eminence as the important cash crop that explains this respect. Moreover, an attempt to extend the wheat sector was as conspicuous a factor in the arable strategy for 1394 as was the greater sowing of legumes: the area rose by almost a quarter, to 59^{+} acres.

By the second half of the fourteenth century the oats here as elsewhere were but a shade of their former selves. Nonetheless, the varying size and rotation of the sector suggest that it was being husbanded no less carefully than was a principal crop. Expanded first from five to ten^{+} acres in 1388, it was then trimmed to seven^{+} and finally stabilized at eight acres for 1393 to 1395.

Crop preferences, however, were only as good as both the seed guarantees and the land use practices identified with them. As already indicated, the quarters and bushels of seed sown are entered in account rolls from an early date, seed-per-acre figures appearing in 1379. Yields obviously provide the major comment on these rates, yet as is well known, in any single account the harvest figures are for the present year and the seed sown for the next. Fortunately, most of the Wistow rolls contain the reeve's calculations of yield (per seed) for crops planted during the previous year. Otherwise, we must compute these figures assuming that seeding rates remained constant from one year to the next, normally a valid assumption according to several authors.[32] Where consecutive rolls are wanting, the yields per acre have been calculated in similar fashion, i.e., assuming that acres sown in any two successive years were constant.[33] The following table aligns as closely as possible these data and reckonings.

The figures are sufficiently impressive. Both *Walter of Henley* and the *Husbandry* advocated sowing rates of 2 to 2½ bushels for wheat, rye, and peas, and 4 bushels for barley, beans, and oats,[34] estimates remarkably similar to modern practice.[35] Wistow acres were being cropped with ½ to 1½ bushels more seed than these recommendations. The yields per seed also compare favourably with a ratio of three for all grains suggested by *Walter of Henley*,[36] exceeding on several occasions the much higher anticipations of the *Husbandry:* 5 for wheat, 8 for barley, 6 for beans and peas, and 4 for oats.[37] Returns for the manors of the Bishopric of Winchester compiled by J Z Titow indicate ratios of 3.9 for wheat, 3.6 for barley, and 2.2 for oats over the years 1300–1349.[38] Taking wheat alone

[31] The wheat sowing between 1247 and 1368 totalled 31.4 quarters to 41.4 quarters per annum; thereafter it was between 16 and 19 quarters.

[32] Campbell, 'Arable Productivity', p 382; Raftis, *Estates*, p 160.

[33] Table 1 challenges this assumption somewhat.

[34] Dorothea Oschinsky, *Walter of Henley and Other Treatises on Estate Management and Accounting*, Oxford, 1971, pp 173, 324, 442 *et passim*. For several estates in Eastern Norfolk, Campbell, 'Arable Productivity', pp 387–88 found mean rates of 2.9 bushels for wheat and legumes, 4.9 for barley, and 5.2 for oats. J Z Titow, *Winchester Yields: A Study in Medieval Agricultural Productivity*, Cambridge, 1972, pp 40–42 noted rates of 2½ to 3 bushels for wheat and 4 to 6 for barley and oats.

[35] J A S Watson and J A More, *Agriculture: The Science and Practice of British Farming*, 11th ed, Edinburgh, 1962, pp 207, 223, 235; H Jackson and J B Page, 'Seed Rates of Spring Barley and Winter Wheat', *Experimental Husbandry*, II, 1957, 1–11.

[36] Oschinsky, *Walter of Henley*, pp 418–19.

[37] *Ibid*, pp 324–25.

[38] Titow, *Winchester Yields*, p 4. With its 20,000 returns for almost 40 estates, the Winchester collection still provides a benchmark for yield studies. For these same estates over the years 1349–1380, David L Farmer, 'Grain Yields on the Winchester Manors in the Later Middle Ages', *Econ Hist Rev*, 2nd ser., XXX, 1977, 560, notes ratios of 3.66 for wheat, 3.53 for barley and 2.43 for oats.

TABLE 2
Seed and Yields at Wistow

Year	*Seed per Acre*	*Total Seed*	*Total Acres*	*Total Yield*	*Yield per Seed*	*Yield per Acre*
			Wheat			
1368	—	11qr 5bu [?]	—	73qr [?]	6^{+}	—
1379	(3bu)	17qr 3bu	46	61qr 2bu [sic]	$8\frac{1}{2}^{+}$[sic]	10.6bu
1388	3bu	18qr 3bu	47^{+}	97qr 6bu	5^{-}	16.6bu
1389	3bu	17qr 6bu	45^{+}	—	—	—
1393	3bu	16qr 1bu	47^{+}	50qr	4^{-}	8.5bu
1394	3bu	18qr 1bu	59^{+}	107qr 8bu	7^{+}[?]	18.3bu
			Barley			
1368	—	30qr 3bu	—	207qr 5bu	(7^{+})	—
1379	(5bu)	31qr 2bu	50	284qr 2bu	9^{+}	45.4bu
1388	5bu	46qr	63^{+}	224qr	$6\frac{1}{2}^{-}$	28.4bu
1389	5bu	41qr 1bu	60^{+}	209qr	5^{+}	26.5bu
1393	5bu	42qr 3½bu	69^{+}	150qr 1bu	$4\frac{1}{2}^{-}$	17.4bu
1394	5bu	39qr½bu	67^{+}	203qr 3bu	$4\frac{1}{2}^{+}$[sic]	23.5bu
			Legumes			
1368	—	31qr	—	(104qr 2bú)	$4\frac{1}{2}^{-}$	—
1379	—	38qr 7bu	$83\frac{1}{2}^{+}$	40qr 1bu	$1\frac{1}{2}^{-}$	3.8bu
1388	3½bu	37qr 7bu	79^{+}	109qr 5bu	3^{+}	11.1bu
1389	3½bu	34qr 7bu	78½	[103qr]	$3\frac{1}{2}^{-}$	[10.4bu]
1393	3½bu	28qr 7½bu	56^{+}	39qr 3bu [?]	(1)	5.6bu
1394	3½bu	25qr 1bu	69^{+}	77qr [?]	(3^{+})	11bu
			Oats			
1368	—	5qr 1bu	—	—	—	—
1379	(5bu)	3qr [?]	5	—	—	—
1388	4bu	4qr 1bu	10^{+}	—	—	—
1389	4bu	4qr(3bu [?])	7^{+}	14qr 3bu [?]	1[?]	11.5bu
1393	4bu	4qr	8	—	—	—
1394	4bu	4qr	8	—	—	—

* The bracketed figures are as calculated rather than as given.

** The tithe payment consisted of the harvest of two acres of wheat, one of barley and one of oats (*Carts.*, I, 352). The deduction was made by the reeve *after* his estimation of harvest returns. (Raftis, *Estates*, p. 160, n. 3).

throughout the country, the *responsio* ranged from a depressingly low 2.84 for various estates of Westminster Abbey (1350-1380) to 5.5 quarters for Billingham, a manor of Durham Cathedral Priory (1328-1338).[39] Recent research has emphasized both the greater realism and precision associated with yield per acre figures[40] and Wistow returns, particularly for the barley, again compare remarkably well, especially with Bruce Campbell's 10.8 to 13.6 bushels for wheat, 14.7 to 15.6 for barley, 12.2 to 13.1 for oats, and 7.2 to 7.5 for legumes for

[39] David L Farmer, 'Grain Yields on Westminster Abbey Manors, 1271-1410', *Can Jnl Hist.*, XVIII, 1983, 355, a study which undertakes a very thorough analysis of the factors influencing the yields as well. N Morimoto, 'Arable Farming of Durham Cathedral Priory in the Fourteenth Century', *Nagoya Gakuin University Review*, 2, 1975, 273-74. Only at Little Humber, a holding of the Countess of Aumale, were harvests substantially higher than those noted here, viz., 7.2 for wheat, 9.4 for barley, and 6.8 for beans. See Mavis Mate, 'Profit and Productivity on the Estates of Isabella de Forz (1260-1292)' *Econ Hist Rev*, 2nd ser, XXXIII, 1980, 326-34.

[40] Campbell, 'Arable Productivity', p 385. Mark Overton 'Estimating Crop Yields from Probate Inventories: An Example from East Anglia, 1585-1735', *Jnl Econ Hist*, XXXIX 1979, 363-78, and more recently 'Agricultural revolution? Development of the agrarian economy in early modern England' in *Explorations in Historical Geography*, Alan R H Baker and Derek Gregory (ed) Cambridge, 1984, esp. pp 128-30 was the first to undertake yield per acre compilations and his work has been a major guide and incentive to medievalists.

an impressive sixty-two manors in eastern Norfolk.[41] These figures in turn surpassed or equalled performance on the most productive demesnes elsewhere.[42]

III

The reasonably successful Wistow returns focus attention ever more deliberately on the rotation schedule - the judgements regarding the parcels. How precise was knowledge about the abilities of *culturae?* How closely were they being examined for deterioration? How carefully were officials attempting to remedy deficiencies yet also to maintain wider cropping objectives? Or, was planting largely a matter of routine? There is no more satisfying way to explore these questions than simply to witness the production schedule, furlong by furlong, crop by crop, and year by year, *compoti* certainly furnishing a rich cinematic image. Various consistencies and innovations in the agenda annonce themselves immediately and we might best proceed from the more conspicuous features to the unique. The individual furlong arrangements in particular, are most aptly assessed in terms of a number of cropping years (demands) and the strength of the parcel relative to each (see Table 3).

Turning first to the overall seeding patterns, they clarify immensely the effective operation of an open-field environment. For any one year, we note a marked tendency to consolidate each sowing: in 1368, for instance, the wheat was concentrated in south-western Burywood; the barley in the north-western sector of the field stretching to Kelneweye; the legumes in middle Rookes Grove; and the oats in southern Rookes Grove. The juxaposition of the latter two sectors is interesting, the pulses increasingly being the replacement crop for the oats. Also, the 1368 pattern meant that Milne Hill was entirely at fallow. 1389 found the barley mainly in middle Rookes Grove but extending to North Bendole in the far south field,[43] and to the Stockyn, a separate close north-east of Burywood; the wheat centred on southern Rookes Grove but also appeared at Wrongland in the north field; the legumes covered sixteen furlongs of Milne Hill; and the oats occupied 7^{+} acres in central Milne Hill, again near the pulses. The exceptions to a full contiguous sowing were really only North Bendole and the Stockyn sown with barley, and Wrongland cropped with wheat. All three were large and readily accessible plots in border areas, and seemingly invited this flexible use. This 'easiness of access' factor whether associated with a road, a meadow fringe or field boundary explains a number of other sowing discrepancies as well: Netherclayhille cropped with wheat in 1388, and Brigdole, Litelelderstub, Aldebury and Kelneweye sown with barley in the same year; Elderstub sown with wheat in 1394 and Litelelderstub and Hemplonde beyond it, sown with barley in this year. The reliable clays of Kelneweye may be an additional explanation of its contribution to the barley sowing of 1388. In other words, although open fields were based on scattered strips and an interspersed villeinage and demesne, there were major efforts to overcome the inherent impracticalities of the system. Visually, the sowings must have been quite striking. In 1388, the peas essentially formed a triangle, stretching from south-western Burywood into the mid-field and

[41] Campbell, 'Arable Productivity', p 388; 'Agricultural Progress', pp 30-31. As he notes, mean figures often mask wide differences, the demesnes east and north of Norwich showing much higher yields – 20^{+} bushels for wheat – than those to the south-east and south-west.

[42] *Ibid,* p 398. They exceeded returns for the Kentish manors of Canterbury Cathedral Priory, the coastal Sussex estates of Battle Abbey, and the Merton College manor of Cuxham, Oxfordshire, all of wich had similarly intensive and flexible rotational schemata and equalled yields for several of the best demesnes of the Countess of Aumale and for Oakington, Cambridgeshire, a manor of Crowland Abbey. See also Farmer, 'Yields on Winchester Manors', p 565.

[43] The Bendole parcel may well have straddled Rookes Grove and Milne Hill, the north and middle sections being in the former field and the south section in the latter.

then absorbing several parcels to the north-west.

There was also tremendous stability in the utilization of the furlongs, a comment itself on the soundness of the cultivation cycle. Only Smethescroftdole, Shoftbrigg, le Stockyn, and le Conyngg',[44] four of forty-five furlongs, emerge marginally (i.e., once) in the lists. Moreover, there was a tendency to partition furlongs so that they might receive two and even three varieties of seed. Hemplonde was subdivided in 1379; Aldebury, Brigdole, Netherclayhille, and '*supra* Lytelhylle' furnished examples in 1388; Bendole in 1389; and so forth. These arrangements clearly reflect a very individualized approach to the parcels and also a solid disquisition at the basis of production judgements. It is basic crop priorities - the desire to have 40% of land under legumes, 25% under wheat, etc. - that ultimately explain the strategies. Accordingly, managers tended to weigh the strengths of the furlongs and the debilitating effects of the various crops on them, the resulting arrangements often being quite intriguing.

Hemplonde, for example, in 1379 was divided between wheat and peas and depicts very clearly the decision to reduce the wheat sowing from 37^{+} quarters (1368) to only 17 quarters 3 bushels, while simultaneously increasing the legumes to 38^{+} quarters 7 bushels from 31^{+} quarters. The 20-acre plot would normally have received a full wheat sowing. Fifteen years later, 1394, one-half of Hemplonde was sown with legumes and the other half with barley, and this directly following a full barley sowing. Customarily, it would have received legumes throughout and it is interesting that the peas were actually being increased by more than 13 acres. That the parcel was nonetheless drawn on substantially for the barley is a tribute to its considerable strength. As previously noted, it lay in mid-Burywood immediately above the three Clayhilles, and with the overall barley yield improving to 23.5 bushels per acre from 17.4 bushels these 10^{+} acres seem indeed to have met the demand made on them.

In analogous fashion, Aldebury, a meadowside parcel in north-western Burywood, and the selions '*supra Lytelhylle*' in central Milne Hill were cropped to assist the 13-acre barley increase of 1388. The Aldebury initiative was a relatively modest one, 2 acres 10 perches of its 13^{+} acres being earmarked for the barley rather than legumes. From 1388 onwards, the lands 'above Litelhille' were always enrolled as a section of 7 selions ($1\frac{1}{2}^{+}$ acres) and another of 14 selions (3^{+} acres); in this particular year the smaller unit was sown with wheat and the larger with barley. Since both were due for a wheat course this was not as demanding a cropping change as was imposed on Aldebury, or on Hemplonde in 1394. Nonetheless, the barley planting certainly assisted the further objective of contiguous sowing, the crop consequently being concentrated in middle Milne Hill to the northern border. With a general yield of 28.4 bushels per acre, both subdivisions seem to have been reasonably successful.

Another two *culturae* bore two crops in 1388, Netherclayhille and Brigdole, and with even more interesting implications. The legume-wheat sowing of the former suggests quite simply that the parcel could not sustain the full wheat crop intended, the peas being intercalated as a palliative. The legumes did not increase this year but actually dropped marginally from 79 to 78 acres; moreover, the whole of Netherclayhille was put at fallow in 1389. Its ailing condition, however, proves somewhat curious, the parcel being well-located, immediately behind the meadow furlongs in south-western Burywood and within a conspicuous and extensive clay belt. That the land had been vigorously

[44] Although Hadlond appears only once, the spelling seems to be a variant of Hidhedlond.

exploited in recent years seems to be the most plausible explanation.[45] Interestingly, alternative acres were found to preserve the normal 46-47 acre wheat sector. Netherclayhille itself had rebounded to strength by 1393, resuming its traditional place in the rotation cycle. There is indeed considerable likelihood that such parcels received special rehabilitative attention. While *opera* statements for 1379-1394 give only seasonal tallies, manuring services were consistently amongst the 1431 to 1604 works performed in the winter season.[46] Also, livestock inventories noting as many as 468 demesne sheep, 93 cattle, 122 hogs, and 40 draught beasts would have meant quite generous supplies of manure.[47]

Brigdole was certainly the most diversely exploited parcel at Wistow. Planted with peas in 1379 when they were being increased from 31 quarters (1368) to 38 quarters 7 bushels, it was cropped with barley and peas in 1388 when there was a corresponding effort to increase the barley from 50 acres to 63^{+} acres yet also to maintain the wheat and legumes sowings. In 1393, it was reconsolidated and planted throughout with barley, this sector being further expanded to 69^{+} acres. Being quintessentially a meadow piece (the most meadowside of the *culturae*) the 10½$^{+}$ acres of Brigdole were constantly relied on to assist crop modifications. In 1394, when it should have received a legumes sowing or possibly even a fallow course, wheat was sown over one-quarter of its acres, this crop currently being expanded by 12 acres; peas were sown over half its area as suited the normal rotation but which also coincided with efforts to increase this course from 56^{+} acres (1393) to 69^{+} acres; and barley was seeded over the remaining one-quarter acres when management was striving to maintain this sector at 67 to 68 acres. Subjected to yeoman service, the furlong again honoured expectations: the wheat ratio rose to 18.5 bushels per acre from the 8.5 bushels of 1393 and the barley to 23.5 bushels from a previous 17.4 bushels, mindful, nonetheless, that the overall cropped land was expanded form 181^{+} to 204^{+} acres.

At over 36 acres Bendole was the largest demesne furlong; it abutted the Huntingdon road and possibly bridged Rookes Grove and Milne Hill fields thus giving easy access and convenience generally for cultivation. Yet it was clearly its fertility that drew the attention of strategists to it. In 1379, the parcel was treated as a single unit and planted with barley. Thereafter, it was conspicuously a tripartite plot consisting of North Bendole (9^{+} acres), Middle Bendole (7½$^{+}$ acres), and South Bendole (19½$^{+}$ acres). In 1388, a banner year for the barley, the entire three sections were sown with this seed. In 1389, when management shrewdly chose to maintain the acreages of the previous year, Bendole was sown with the three major crops: barley in the north, wheat in the middle, and peas in the south. It was unquestionably the excellent yields of 1388 – 16.6 bushels per acre for wheat, 28.4 bushels for barley, and 11.1 bushels for legumes – that led to a re-endorsement of the 1388 schedule. Nonetheless, the triple cropping certainly represented a noteworthy imposition, for following the barley of 1388 the plot ideally should have received pulses. That it supported wheat and barley on almost half its acres and with yields that were again highly satisfactory – 26.5 bushels for the barley – is once more a significant comment on its quality.

In 1393, officials judged Overclayhille, Pidelehill, and Kyppyngescroft as capable

[45] Long 'The Low Yields of Corn', p 463; and M M Postan, *The Medieval Economy and Society*, 1972, p 62, cite inadequate underdrainage as a problem with heavier more fertile soils as well. The slopes of Netherclayhille, however, would seem to have countered this difficulty somewhat. See also, M H R Soper, 'Heavy Land Farming', *Agriculture*, LXVII, 1960. 174-78.

[46] 1379-80 (1454); 1388-89 (1604); 1389-90 (1506); 1393-94 (1503); 1394-95 (1431). As many as 66 manuring works annually and 77 marling works are noted in account rolls for 1335-1352 (B L Add. Rolls 39895, 39896, 39897 and 39898). Also, 100 to 150 weeding *opera* and 200 to 300 harrowing services went to cleansing and conditioning the land.

[47] Raftis, *Estates*, pp 132-33; 138-39; 141-42; 149.

of assisting an additional 9-acre expansion of the barley. Yet, they made a further decision that more than offset this initiative. Half of Overclayhille's 9½+ acres were drawn on for the barley, two-thirds of Pidelehille's 7½+ acres, and four-fifths of Kyppyngescroft's 11½+ acres, the remaining soil being sown with wheat which was being retained at its competitive best, 47+ acres, as well. All three parcels were well-endowed, Pidelehille lying just above Overclayhille and sharing in its rich soil character and Kyppngescroft lying not too distant from the water course in mid-Rookes Grove. In sum, they were being counted on to nurture the two most demanding crops, but at a time when the overall planted area was also being reduced from 191+ acres to 181+ acres. Even more so than Overclayhille or Pidelehille was Kyppyngescroft serving the ambitious agenda. Having supported barley in 1389 it should normally have received legumes in 1393,[48] but as previously noted it was this particular sector that was being so dramatically trimmed, a full 22 acres. Wheat and barley alone seemed to pre-occupy the farmers of 1393, and ironically both yields fell, the wheat to 8.5 bushels per acre and the barley to 17.4 bushels. Nonetheless, the difficulty lay not with the parcels as such but with the general objectives of cultivators: they were attempting to achieve successful yields in the most highly prized crops and to pursue a notable thrift at the same time. Chapelynsbench seems to confirm these aspriations. It was a parcel often reserved for the oat crop (1368, 1393) and by inference, consisted of poorer land. Hence, when radically reducing the peas, officials decided to seed half this parcel with them they were clearly running a major risk. Their worst expectations were realized: the yield was 1 only or 5.6 bushels per acre.

[48] 1389-90: barley; 1390-91: legumes; 1391-92: fallow; 1392-93: wheat; 1393-94: legumes.

On balance, the 1393 programme was one of the few miscalculations of Wistow managers, but this should not utterly detract from the vigorous challenge at the heart of it. The formulation of production strategy was an intricate business involving a macro, medium and micro approach to the soil, a consideration of all parcels, the immediately contiguous plots, and the individual unit. It demanded an eye for specifics and for emerging variations. The various *culturae* could yield gains but within limits, especially the limits of past demand. Deliberations were, with but one or two exceptions, notably responsible and notably successful.

IV

Their highly individualized approach to the arable raises the question of the rotation schema generally. Was there any great predictability to it? We may answer this question as follows. Wheat-sown lands tended to be cropped the following year with legumes, but there were exceptions: a 3-acre section of Netherclayhille which had been sown with wheat in 1388-1389 lay fallow in 1389-1390, and a 2 acre section of Kyppyngescroft was similarly treated in 1393-94-1395; meanwhile, the 10 acres 1 rod 8 perches constituting Stocroft which had been sown with wheat in 1393-1394 were reduced to 8 acres and cropped with oats in 1394-1395. The Netherclayhille fallowing, as we have seen, was prefigured in a 1388 legumes half-cropping; in other words, the parcel had been demonstrating fatigue, the fallowing being a yet more radical prescription for it. Perhaps most importantly, the furlong was once more bearing the wheat course in 1393. In the case of Kyppyngescroft, the fallowing was likewise a corrective or at least a reprieve for a parcel which had been cropped with more than its share of wheat and barley, and with seemingly the ommission of its

fallow in 1391-1392.[49] The oats sown at Stocroft were simply the traditional course to follow the wheat and the crop which the peas were increasingly replacing: in effect, the two were equivalents, although the oats were often confined to poorer land.

Barley-sown furlongs were generally subject to one of two programmes in the succeeding year, a course of legumes or a fallow season, and more usually the former. Seven of twelve furlongs sown with barley in 1388 were cropped with legumes (1389); four were given a fallow; and although the twelfth and very large plot of Bendole was subdivided and cropped quite diversely, nonetheless, half of its acres were sown with the anticipated legumes. For 1393-94-1395, the exceptions to a legumes or fallow sequel were far more numerous. In fact, only three of eight *culturae* were subsequently cropped with peas, and only one was given a fallow. The other four parcels – Elderestub, Litelelderstub, Hemplonde, and Brigdole – were dealt with quite unusually. Elderestub consisting of 9^+ acres was sown with wheat. Litelelderstub, a small allotment of 1^+ acres was cropped again with barley. Hemplonde was precisely halved, 10^+ acres being sown again with barley and the remainder receiving legumes. Brigdole, a single plot of $10\frac{1}{2}^+$ acres in 1393-1394, was divided into three, 2½ acres being sown with wheat, 2½ acres with barley, and 5½ acres 5½ perches with legumes. Affording Hemplonde and Brigdole the partial legume sowing was an effort to keep with standard practice. Otherwise, these rotations surpassed all textbook instruction. In effect, we have notable examples of 'inhoking' and there is little suggestion in terms of yields that the exactions were more than the ground could bear.[50] Management seems to have balanced quite successfully both needed initiative and caution.

Legume-sown lands were, without exception, allowed to rest the following year as likewise the oat sector. Land destined for a wheat crop was usually resuscitated by a fallow as well. Again, however, there were exceptions: Middle Bendole, sown with wheat in 1389-1390, previously carried a barley crop; Elderestub and a 2½-acre section of Brigdole were handled similarly in 1393-94-1395. Again, we are confronting 'inhoking'.

Ultimately, the evidence presents us with something much more complex than a three-course rotation, yet not strictly illustrative of a standard four-course sequence of winter wheat, spring barley, legumes, and fallow detected by Dr Thirsk for a number of other East Midland communities.[51] Instead, we seem to see the three-course rhythm broken as expedient, with furlongs passing freely from one season to another by the omission or intercalation of a course, or passing out of cultivation altogether for a year or two as need be.[52] Some of the patterns, especially the omission of the fallow, were partly possible because of the abundant pasturage otherwise, particularly the fen allotment which today reaches to 700 acres.[53] In fact, these provisions fostered a very high stocking ratio and in turn generous supplies of manure to abet the fairly intensive cropping scheme. It is the ubiquitous legumes

[49] Given its barley sowing in 1389, Kyppyngescroft should normally have expected legumes in 1390-91, fallow in 1391-92, wheat in 1392-93, and legumes in 1393-94.

[50] See Joan Thirsk, 'Field Systems of the East Midlands', in *Studies of Field Systems in the British Isles*, A R H Baker and R A Butlin (ed) Cambridge, 1973, p 261 for 'inhokes' in the region; and Campbell, 'Agricultural Progress', p 31.

[51] Thirsk, *op cit*, pp 257-58. See I Beckwith, 'The Remodelling of a Common Field System', *Ag Hist Rev*, 15 1967, 108-12 as well.

[52] Bishop was one of the first to find such variability in rotations at Westerham. He has been followed by Brandon for Coastal Sussex, Roden for the Chilterns and others.

[53] *Carts*, I, 354; *VCH: Hunts*, II, 246. The village also possessed woodland for pannage measuring one league in length and one-half in breadth at the time of Domesday (*VCH: Hunts*, I, 343a; *Carts*, I, 271, 353), and its hamlet of Little Raveley meant a further allotment of fen, woodland, and pasture measuring one-half league in length and one-half in breadth (*Rotuli Hundredorum*, II, 602).

TABLE 3
The Furlong Rotations*

Parcel	*1368*	*1379*	*1388*	*1389*	*1393*	*1394*
Brigdole (S-W B)	—	P	B(2½a 5½p) P(8a)	—	B(10½a 5½p)	W(2½a) B(2½a) P(5½a 5½p)
[C]layhille (S-W B)	W	P	—	—	—	—
Netherclayhille (S-W B)	—	—	W (3a) P(3a 1r 10½p)	—	W (6a 1r 10½p 4ft)	P (6a 1r 10½p 4ft)
Overclayhille (S-W B)	—	—	P(9½a 1r 1p)	—	W (4a 3r 1p) B (4a 3r)	P (9½a 1r 1p)
Elderestub (S-W B)	W	P	P(9a 1½r 8p)	—	B (9a 1½r 8p)	W (9a 1½r 8p)
Litelelderstub (S-W B)	—	—	B (1a 4p)	—	B (1a 4p)	B (1a 4p)
Stonescroft (Tonestoft, Stocroft) (N-W B, mid-field)	W	O(5a)	O (10a 1r 8p)	—	W (10a 1r 8p 5ft)	O (8a)
Wolstonycroft (N-W B, mid-field)	B	P	P (7a 1r)	—	W (7a 1r 8ft)	P (7a 1r 8ft)
Hemplonde (Mid-B)	B	W P	P (20a 1r 8p)	—	B (20a 1r 8p)	B (10a 1r 8p) P (10a 1r 8p)
Kelneweye (N-E B)	B	P	B (6a 3r 16p)	—	B (6a 3r 16p)	P (6a 3r 16p)
Aldebury (N-W B)	B	P	B (2a 10p) P (11a)	—	W (13a 10p)	P (13a 10p)
Hidaldebury (W to N-W B)	—	—	P (3a 6p)	—	W (3a 6p 5ft)	P (3a 6p 5ft)
Pidelehille (Mid-B)	B	P	P (7½a½r 16½p)	—	W (3r) B(6a 3½r 16½p)	P(7½a½r 16½p)
Kyppyngescroft (Mid-R) (Kipperscroft)	P	—	—	B(11½a 1 5p)	B(9½a 1 5p) W (2a)	—
Haselholt (Mid-R)	P	—	—	B(17½a½r 12p)	P(17½a 3½r 12p)	
Aillevmade (Ailemadole) (Mid-R, meadowside)	P	—	—	B(4½a 1½r 11½p)	P(4½a 1½r 11½p)	—
Smethescroftdole (S-R)	P	—	—	—	—	—
Smethescrofthrine (S-R)	O	—	—	W (8a ½r 10p)	P (8a ½r 10p)	
supra Smethescrofthirne (S-R)	—	—	—	W(2a 1½r 18½p) [11 selions]	P(2a 1½r 18½p)	—
Wonglond (Wronglond) (N-E R)	P	—	—	[W (18a 4p)?]	P (18a 4p)	—
Chapelynsbench (S-R [?])	O	—	—	W(8½a 1½r 16p)	P(4½a 1½r 16p) O (4a)	
Inlond (S-E M)	—	W	W(26½a 4p)	P (26a 4p)	—	W (26½a 4p 3ft)
Shoftbrigg (S-E M)	—	W	—	—	—	—
Stonydole (Stondole) (S-E M?)	—	W	W (4a 1½r 10p)	P 4a 1½r 10p)	—	B (4a 1½r 10p)
supra Lytelhylle (Mid-M)	—	W	W (1½a 1r 11p) [7 selions]	P (1½a 1r 11p)	—	W (1½a 1r 11p)
supra Lytelhylle (Mid-M)		↓	B (3a 1r 9p) [14 selions]	P (3a 1r 9p)	—	W (3a 1r 9p)
Depdole (Depdale) (Mid-M?)	—	W	—	O(7a½r 13½p)	—	W(7a½r 13½p)
North Bendole (R-M Border)	—	B	B(9a 1½r 4½p)	B(9a 1½r 4½p)	—	B(9a 1½r 4½p)
Middle Bendole (R-M Border)		↓	B(7½a 4p)	W(7½a 4p)	—	B(7½a 4p)
South Bendole (N-W M)		↓	B (19½a 1r 3p)	P (19½a 1r 3p)	—	B (19½a 1r 3p 4ft)
Estlong (N-M)	—	B	B(2½a 1½r 8½p)	P(2½a 1½r 8½p)	—	B(2½a 1½r 8½p)
Milledole (N-W M)	—	B	(3a 1½r 7p)	P (3a 1½r 7p)	—	W (3a 1½r 7p 6ft)
Hadlond (N-M?)	—	B	—	—	—	—
Hidhedlond(N-M?)	—	—	B(1½a½r 2p)	P(1½a½r 2p)	—	B(1½a½r 2p)
Coppidheghadlond (S-W M)	—	—	B(½a½r 7p)	P(½a½r 7p)	—	B(½a½r 7p 4ft)
Lytelredlond (N-W M)	—	—	W (2½a 1r 8p)	P (2½a 1r 8p)	—	W (2½a 1r 8p)
Redlondweye (N-W M)	—	—	B(1½a½r)	P 1½a½r)	—	B(1½a½r)
Nomanslond (Mid- to S-E M)	—	—	W(3½r 6p)	P(3½r 6p)	—	W(3½r 6p)
Chesfurlong (*supra* Chesfurlong) (N-E M)	—	—	W (1a 1½r 17p) [6 selions]	P (1a 1½r 17p)	—	W (1a 1½r 17p 4ft)
Chesbriggdole (N—E M)	—	—	W(4a 1½r 10½p)	P(4a 1½r 10½p)	—	B(4a 1½r 10½p)
supra Chesbrigge (N-E M?)	—	—	W(1½a½r 16p) [5 selions]	P(1½a½r 16p)	—	—

TABLE 3

Parcel	*1368*	*1379*	*1388*	*1389*	*1393*	*1394*
Wisewell (mid-M)	—	—	B (1a 14p)	P (1a 14p)	—	B (1a 14p 5ft)
Stockyn (N-E of B) *(parcellus de Stockyn) usque Sabwellesbalke)*	—	—	—	B(13½a½r)	—	—
le Conyngg'	—	—	—	—	O (8a)	—

*S-W B = South-Western Burywood; Mid-R = Middle Rookes Grove; R-M Border = Rookes Grove-Milne Hill Border; W-M = West Milne Hill etc.
W = wheat; B = barley; P = peas; O = oats
a = acre; r = rod; p = perch; ft = foot

that possibly warrant the greatest notice: they were an established sequel not simply to the wheat, but to the barley as well, a pattern suggesting a strong appreciation for their nitrogen-fixing and cleansing properties.[54] In sum, the impression is of a constant interest in planting, of an innovative yet wise use of crops in the interest of both the soil and profits.

V

In conclusion, our various visual and written sources have given us as finely chiselled a glimpse into management decision-making as we are likely to obtain. So much attention centered on the *cultura* – extent lists, sowing *minutiae,* the surveyor's chain; it was the simplest reality yet the principal challenge to the cultivator. Like able technocrats of any age, demesne officials moved their gaze back and forth between their crop objectives and the various means to fulfil them, the schedule being a living and changing reality. Witness the steady and practical initiatives with respect to new crops, the legumes increase, for example, being a focus from the early 1300s. Consider the efficiency with which they moved to correct the 1393 programme with its inordinate preoccupation with barley and its legumes deficiency. There is also the immediacy with which they re-enacted the 1388 agenda with its very successful yields. Perhaps most strikingly there were the various patterns for dividing parcels and the considerable diversity in the crop sequences. A circumspectness and concreteness characterized these decisions but also a boldness of spirit; these managers showed a notable respect for detail and they were patient. The result was a quite complex and usually profitable cropping system – it was as though an echo of Hesiod were whispering in their ears.

[54] See also R H Hilton, *The Economic Development of Some Leicestershire Estates in the Fourteenth and Fifteenth Centuries,* Oxford, 1947, pp 63-66, 136 and Appendix III; Brandon, 'Cereal Yields'; Campbell, 'Agricultural Progress', pp 31-32; Farmer, 'Yields on Westminster Abbey Manors', p 341 for examples of increased sowing of legumes.

The Pastons And Their Norfolk

By R H BRITNELL

Abstract

The *Paston Letters* have two distinctive features as sources of agricultural history. On the one hand they illustrate exceptionally well some organizational features of estate management on a smallish estate, notably the absence of closely structured specialization amongst estate officers and the personal involvement of members of the family in minor matters. At the same time the letters demonstrate the problems of estate management in one of England's most commercialized regions during the 1460s and 1470s, and they suggest that the 1460s in particular were a period of agrarian depression in Norfolk. The combined effect of these observations is to show how even as a rentier family the Pastons were intimately involved in the commercial dilemmas and social conflicts arising from crisis management.

SOURCES for the agrarian history of the fifteenth century, when landlords large and small usually leased out their demesne lands,[1] are for the most part laconic. With few exceptions estate accounts and *valors* lack the current information about the commercial environment needed for explaining management in action. Fluctuations in rents and arrears of rent make poor indicators of either economic change or administrative policy, so that it is difficult to identify the problems confronting estate officials or to evaluate their performance. Memoranda and correspondence give occasional insights into thinking and practice on large estates, but such details are not abundant, and there is even less material with which to observe the way knights and gentlemen managed their affairs.[2] For these reasons the *Paston Letters* are of particular interest as a source of agrarian history. They discuss many problems of estate administration, and their personal nature means that it is often possible to gauge the frame of mind in which particular decisions were taken. They come, too, from a poorly recorded level of landed society. It would be a pity if their evidence were to be ignored because of its unusualness.[3]

The letters are interesting for another reason. It so happens that the interests of the main branch of the Paston family were chiefly in eastern and north-eastern Norfolk, the most fertile and commercially advanced region of English agriculture. An examination of agrarian conditions here during the 1460s and 1470s from a landlord's point of view is of more than local interest. This period has been seen in many parts of England as the low point of the fifteenth-century economy with respect to population[4], output[5] and levels of rent.[6]

[1] J L Bolton, *The Medieval English Economy, 1150–1500*, 1980, p 220. For smaller estates see N Saul, *Knights and Esquires: The Gloucestershire Gentry in the Fourteenth Century*, Oxford, 1981, pp 234–8; N Saul, *Scenes from Provincial Life: Knightly Families in Sussex, 1280–1400*, Oxford, 1986, pp 109–110; C Richmond, *John Hopton: A Fifteenth-Century Suffolk Gentleman*, Cambridge, 1981, pp 34–5, 79, 84; S M Wright, *The Derbyshire Gentry of the Fifteenth Century*, Chesterfield, 1983, pp 14–16; C Carpenter 'The Fifteenth-Century Gentry and Their Estates', in M Jones (ed), *Gentry and Lesser Nobility in Late Medieval Europe*, Gloucester, 1986, pp 46–7.

[2] K B McFarlane, *The Nobility of Later Medieval England*, Oxford, 1973, pp 50–2; R R Davies, 'Baronial Accounts, Incomes, and Arrears in the Later Middle Ages', *Econ Hist Rev*, 2nd ser, XXI, 1968, pp 211–29; J T Rosenthal, 'The Estates and Finances of Richard Duke of York (1411–1460)', *Studies in Medieval and Renaissance History*, II, Nebraska, 1965, pp 123–4, 137–8; A J Pollard, 'Estate Management in the Later Middle Ages: The Talbots and Whitchurch, 1383–1525', *Econ Hist Rev*, 2nd ser, XXV, 1972, pp 563–5; C Rawcliffe, *The Staffords, Earls of Stafford and Dukes of Buckingham, 1394–1521*, Cambridge, 1978, pp 148–9.

[3] The letters are here cited from *Paston Letters and Papers of the Fifteenth Century*, N Davis, (ed), 2 vols. out of 3, Oxford, 1971, 1976, referred to hereafter as *PL*.

[4] J Cornwall, 'English Population in the Early Sixteenth Century', *Econ Hist Rev*, 2nd ser, XXIII, 1970, p 44; J Hatcher, *Plague, Population and the English Economy, 1348–1530*, 1977, pp 43–4; R S Gottfried, *Epidemic Disease in Fifteenth-Century England*, Leicester, 1978, pp 228–9.

[5] M M Postan, 'The Fifteenth Century', in idem, *Essays on Medieval Agriculture and General Problems of the Medieval Economy*, Cambridge, 1973, p 43; Hatcher, *Plague*, pp 36–42; A R H Baker, 'Changes in the Later Middle Ages', in H C Darby (ed), *A New Historical Geography of England before 1600*, Cambridge, 1976, pp 202–4; A C Chibnall, *Sherington: Fiefs and Fields of a Buckinghamshire Village*, Cambridge, 1965, pp 147–54.

[6] F G Davenport, *The Economic Development of a Norfolk Manor, 1086–1565*, Cambridge, 1906, p 78; J A Raftis, *The Estates of Ramsey Abbey*, Toronto, 1957, pp 293–4; J Hatcher, *Rural Economy and Society in the Duchy of Cornwall, 1300–1500*, Cambridge, 1970, pp 159–65; Hatcher, *Plague*, pp 36–42; C Dyer, *Lords and Peasants in a Changing Society: The Estates of the Bishopric of Worcester, 680–1540*, Cambridge, 1980, pp 188–9.

The letters enable us to observe what agrarian problems there were in a well endowed region of the country and to discover what people said and did about them.

I

The earliest Paston estates lay around the Norfolk coastal village from which the family took its name. Properties became more numerous and more widely distributed in the time of William Paston I, but many of these remained in his widow's hands for thirty-five years after his death in 1444.[7] The rest of his estate was divided between his children. His eldest son, John Paston I, had to be content initially with the manor of Gresham, near Cromer, though he later recovered his father's manors of Swainsthorpe, just south of Norwich, and Snailwell, Camb.[8] Meanwhile, by his marriage to Margaret Mautby, John held her manors at Bessingham, Matlask, Mautby and Sparham, all in Norfolk. The most important of these was Mautby, which gave him a foothold in the rich soils of Flegg.[9] John's interest in Flegg was increased from 1459 as a result of claims under an alleged will of Sir John Fastolf. The Fastolf properties were scattered, and some were lost after a few years, but the Pastons' permanent gains from this inheritance were all near Mautby: manors in Caistor, Winterton and Bastwick, together with one third of the manor of Runham and some lands in Stokesby. Caister (held 1459–69, 1470–1 and from 1476) was particularly important as a new focus of the Paston estates in Flegg.[10] John Paston I died in 1466, and the estates were inherited by his elder son John Paston II, who died in 1479.[11]

The distinctive characteristics of medieval agriculture in north-eastern Norfolk are now well known through the work of Dr Campbell. The area was one of exceptionally rich soils, capable of supporting heavy crops with less frequent fallowing than elsewhere. Arthur Young cited Mautby by name in 1804 as an example of the exceptional fertility of Flegg soil, which he regarded as among the finest in the kingdom. It was normal here for over half the sown area to be under barley and for between a fifth and a tenth to be under wheat, as on the demesne lands at Ormesby Hall in Ormesby St Margaret, a well-documented manor near Mautby belonging to the Clere family. In the Paston correspondence there are details of a tenant's cropping on ten acres at Filby which suggest a pattern of this intensive character; 5 acres had been summer-fallowed and sown with barley, and the other 5 were divided between 3½ acres of barley and 1½ acres of peas. The Pastons liked to choose their tenants with care, since this type of husbandry called for knowledge which evidently not all small farmers possessed. In addition to its fertile soils eastern Norfolk had easy communications by sea to London and other east-coast towns. No region further inland could export grain and malt so cheaply.[12]

[7] *PL*, I, pp xli–xliii, 22, 45, 175–7.

[8] *PL*, I, pp 45, 128–9, 223, 251; II, pp 64, 258, 297, 328, 555; F Blomefield and C Parkin, *An Essay towards a Topographical History of the County of Norfolk*, 11 vols, 1805–10, V, p 60 and VIII, p 127.

[9] Blomefield and Parkin, *An Essay*, VIII, pp 84, 137, 259–60 and XI, p 228. *PL* I, pp 142, 222, 251, 259, 292; II pp 26–7, 141, 217–18, 223, 257, 280, 328, 353–4, 555.

[10] *PL*, I, pp 259, 376, 426–7, 503, 574, 619, 629; II, pp 280, 355, 421. The most important temporary gains from the Fastolf estate were Hellesdon and Drayton (both held 1459–65), Guton in Brandiston (held 1459–c1470), and Titchwell (held 1459–71): *PL*, I, pp 129, 132–3, 136, 145–6, 292–6, 301–5, 309, 311, 532, 553, 564; II, pp 218, 299, 311, 348, 359, 372, 395, 555, 571. The dates are those of effective occupation.

[11] *PL*, I, pp lv, lix.

[12] B M S Campbell, 'Agricultural Progress in Medieval England: Some Evidence from Eastern Norfolk', *Econ Hist Rev*, 2nd ser, XXXVI, 1983; idem, 'Arable Productivity in Medieval England: Some Evidence from Norfolk', *Jnl Econ Hist*, XLIII, 1983; A Young, *General View of the Agriculture of the County of Norfolk*, 1804, pp 13, 366; *PL*, II, pp 408–9. For comments on the technical competence of potential tenants see *PL*, II, pp 217–18, 380. Cropping and rotations at Ormesby are illustrated in R H Britnell, 'Utilisation of the Land in Eastern England' and 'Agricultural Techniques in Eastern England', in E Miller, ed., *The Agrarian History of England and Wales*, III, Cambridge (forthcoming).

Like most fifteenth-century families of their status the Pastons normally took no direct responsibility for the cultivation of their lands but leased them out. In most of southern England this policy would have implied freedom from all concern with marketing. But because of the commercial advantages of selling barley in bulk, Norfolk landlords often took much of their rent in kind, and in this part of the kingdom the prevalence of demesne leases did not imply a withdrawal by landlords from commercial activities. Rents in barley were not confined to the coastal region, but they probably accounted for a higher proportion of the total there than further inland. Fifteenth-century accounts from Burgh St Margaret and from Ormesby St Margaret give details of barley rents close by Mautby and Caistor, and it is evident from the *Paston Letters* that barley rents were a regular feature of the Paston family's income, particularly from the Flegg estates. Some of this barley was always malted for sale, but when prices were low the proportion going to malt was increased. John Paston I was said about the year 1445 to have 200 combs of malt for sale at Mautby. Involvement in this trade increased with the acquisition of Fastolf's lands in Flegg. In 1465, in a list of matters requiring sound counsel, John Paston I included 'the gaderyng of the reveneus of my livelode or greynes' and 'the more poletik meane of sellyng and carijng of my malt'. The importance of barley rents is yet more emphatic in letters of John Paston II. 'I pray yow,' he wrote in 1473 on return from a spell of service in Calais, 'make a goode bargeyn for my ferme barly in Fledge, so that I myght haue mony now at my beyng in Ingelond'. A year later, when aiming to return to Calais, he complained that he had not heard from his mother or her servant about how much he had made from the sale of his farm barley. John Paston III, the younger son of John Paston I, wrote to his mother about the barley rents in Flegg in 1479; he wanted them to be gathered and sold or malted. The Pastons usually sold their grain and malt through merchants, so that they would receive only the local price prevailing in Norfolk.[13]

Besides barley, the other main commercial product of the Paston estates, and of the region as a whole, was wool. In eastern Norfolk there were extensive natural pastures in the marshes of the rivers Waveney, Yare and Bure as well as numerous tracts of heath on higher lands. At Mautby there was a tract of marsh which the Pastons leased for money rents, but elsewhere they had flocks of their own, some of which were large by contemporary standards. John Paston I reckoned to have taken 3000 sheep on Sir John Fastolf's manors in 1459, and he calculated that he had lost 1100 sheep and 400 lambs in 1465 in the raids on Hellesden and Drayton by the Duke of Suffolk's men. Another reference to these raids speaks of 1300 sheep and other beasts driven from Drayton. John Paston II claimed to have lost 600 sheep and 30 neat in the Duke of Norfolk's raids on Caister Castle and elsewhere in June 1471. An undated inventory of Margaret Paston's sheep at Sparham, Hellesden and Drayton lists only 166 sheep and 60 lambs, but shows that different manors specialized in different types of shepherding. Like other wool from south-eastern England, that of Norfolk was of inferior quality, and most of it was probably destined to make the relatively low-grade cloths of East Anglia. Hardly any wool was exported through Great Yarmouth at any stage of the fifteenth century. Wool was nevertheless a principal source of cash for Norfolk landlords, and it is sometimes coupled directly with barley or malt in this connection.[14]

[13] PRO., SC.6/931/27 (Burgh St Margaret), SC.6/939/1 (Ormesby Hall); *PL*, I, pp 127, 456, 474, 619; II, p 26.

[14] *PL*, I, pp 109, 129, 136, 145–6, 292, 314, 329, 488; II, p 359; V Young, *General View*, 366; T H Lloyd, *The Movement of Wool Prices in Medieval England*, Econ Hist Rev, Supplement 6, Cambridge, 1973, p 71; E M Carus-Wilson and O Coleman, *England's Overseas Trade, 1275–1547*, Oxford, 1963, pp 136–7.

II

By the 1460s the Paston estates were large enough to need the services of a professional administrator. Between 1460 and the early 1470s the letters show that Richard Calle had central responsibility for the estate revenues; he is best thought of as John Paston I's receiver-general. Calle found tenants and employees, collected rents and debts, sold malt, barley and wool, and made payments or cash deliveries out of the sums he received. Occasionally he was commissioned to buy produce for the Paston household. He sealed tenants' leases after receiving authorization from his employer. Some at least of the estate records were in his custody, and he was expected to draw up occasional rentals and annual accounts. A few autograph drafts of his accounts, written in standard clerical Latin, survive on the backs of letters. There are also some English letters in his hand.[15] His place was eventually taken by an old servant of the Paston family, William Pecok, who exercised most of Calle's former duties between 1475 and 1479.[16]

Besides the receiver-general there were other literate family servants with administrative responsibilities, and in busy periods their duties overlapped with his. It is difficult to make clear distinctions between them. John Paston I's notion of efficiency rested on the principle that 'if on man may not attende a-nother shall be comaundid to do it'. Instructions from John Paston I written about 1463 were addressed jointly to Richard Calle, John Pampyng and John Wykes. While John Paston I was away in 1465 Calle was expected to work in tandem with John Daubeney, who was, in effect, steward of the household, and there are two sets of instructions addressed to Margaret Paston, Calle and Daubeney. Another set of instructions that year is addressed to Margaret Paston, Calle and James Gresham. Calle is also found sharing some administrative duties on the estate with Sir James Gloys, the family chaplain. There was no estate steward to hold courts on the Paston manors; this task seems to have been allocated to varying groups of servants sometimes headed by one of the family. Once in 1465 Margaret Paston was all set to hold a court at Drayton herself if her husband wanted her to. The letters imply a household team dependent for its efficiency upon instructions from the head of the family rather than upon any careful demarcation of duties. The principal servants constituted the core of the family council referred to in some of the letters. They were associated there on occasion with more professional friends of the family; Margaret Paston, writing to her husband in 1465, referred to 'suche as be of yowr councell lernyd'.[17] Councils such as these, predominantly composed of family servants, were a normal feature of households like the Pastons'.[18]

Ultimate responsibility for estate administration fell squarely upon the Pastons themselves. In January 1465 John Paston I recalled that, even without the Fastolf estates, he had had more cash at his disposal in the old days 'whill I toke hede to my livelode my-self', implying that he had been more in control before 1459. But he remained heavily involved in decision-making. When away from home, he was kept informed of negotiations with tenants, the collection of rents, sales of produce and some purchases. His letters from London in 1465 show that he could handle queries at a distance and was expected to

[15] *PL*, I, pp 92, 96, 117, 142, 259, 279, 309, 317, 397, 407, 522, 531, 542, 548–9, 551, 553, 581; II, pp 217–18, 223–4, 249, 256–8, 328, 373, 380, 395–6. Calle's letters are listed on *PL*, II, p xxvii.

[16] *PL*, I, pp 376–7, 380, 515, 619; II, pp 412, 421–3.

[17] *PL*, I, pp 116–18, 126–34, 136–8, 142, 168, 261, 310, 321, 470; II, pp 395–6. For Gloys, the family chaplain, see H S Bennett, *The Pastons and their England*, 2nd edn, Cambridge, 1932, pp 228–31. The comments on the holding of courts are based on *PL*, I, pp 294, 311, 318–20; II, p 257.

[18] *PL*, I, p 86; II, p 134; Saul, *Scenes from Provincial Life*, p 99; Saul, *Knights and Esquires*, p 85; R W Dunning (ed) *The Hylle Cartulary*, Somerset Record Society, LXVIII, 1968, p xxiii; Richmond, *John Hopton*, pp 151–5.

give instructions about the letting of lands, the sale of grain, and other matters. He told Margaret to cross items off the list of tasks he sent her as she completed them. In September he made rules for drawing up manorial accounts, explaining that he did not want them to contain items which were not strictly manorial receipts and expenses. John Paston II's letters between 1466 and 1479, after his father's death, show less attention to detail, partly because of the amount of time he spent on active service abroad, partly because of disinclination.[19]

During John Paston I's absences from home he expected much of the everyday responsibility to fall upon his wife. In 1465 he enjoined that she, Calle, Daubeney and other friends and servants of the family should put their wits together in weekly meetings. In her husband's absence Margaret had to handle personally business which he would have undertaken had he been at hand, including the instructing of Calle and the other servants. It is unlikely, to judge from his letters, that Calle had much independent authority. He was in any case sometimes away for weeks at a time; he made at least two journeys to London in the Pastons' service in 1465.[20] In that year Margaret seems to have taken over some of his normal duties. Her correspondence shows her to have been exceptionally encumbered with responsibility. She is found having to deal with selling malt, organizing its shipping, supervising accounts relating to sales of barley and malt, and negotiating with tenants. But in other years, too, the same situation sometimes presented itself in the absence of her husband and, later on, when her son was away from home. In a letter of perhaps 1470 she wrote to John Paston II to let her know as soon as possible how he wanted her to handle his affairs.[21]

Margaret was not the only member of the family to be busied with estate matters. John Paston III as younger son also came in for a share of the work. An early letter from him to his father, probably from 1461, shows him negotiating with potential lessees. In times of trouble he was involved in collecting rents and distraining tenants. In 1470 he was actively trying to collect arrears owed to his brother and in 1473 he was responsible for selling barley on the latter's behalf.[22] The *Paston Letters* conclusively support the idea that the members of gentry families concerned themselves with minutiae of policy and administration on their estates. This conclusion is particularly interesting because the Pastons were no mean gentry. What is true of them is likely to be true *a fortiori* of lesser Norfolk families.

Problems of administration were a matter for frequent comment in letters between the Pastons and between them and their servants, and in the 1460s and 1470s problems were numerous. Despite the exceptional qualities of Norfolk estates the *Paston Letters* provide unambiguous and unusually intimate evidence of the difficulties facing landlords in these decades. This evidence needs careful handling, since the lack of money which Bennett identified as a recurrent theme in the Paston correspondence derived in part from some extraordinary vagaries of family fortune. Some of the former Fastolf manors were the scene of violent disputes with John Paston I's co-executors and with the Duke of Suffolk. Members of the family were often in the front line in defending their interests. There is little to be learned about the normal problems of estate administration from manors whose title was in dispute, since on these rent-collecting was liable to

[19] *PL*, I, pp lix, 125–46, 292–332, 396–516; II, pp 256–8, 261, 271, 280, 296–7, 299.
[20] *PL*, I, pp 127, 129, 131, 274, 306–7, 315, 319, 321–2.
[21] *PL*, I, pp 130, 142, 298, 301–2, 307, 315, 319, 321, 357; II, pp 353, 359, 367.
[22] *PL*, I, pp 117, 318, 456, 521–2, 529, 532, 557–8.

be interrupted by rival claimants and the problem of finding tenants was increased by the inevitable precariousness of leases.[23] But it is clear from the letters that in several years during the 1460s and 1470s members of the family were worried about their ability to raise cash even on manors whose title was not in dispute. This was so with Mautby, a manor whose title was clear, whose natural endowment was very favourable, and which lay only three miles from the coast. Nearly a month after Michaelmas 1460 the demesne had still not been leased. Calle wrote to John Paston I, probably at this time, to explain the situation; he could find only a man of doubtful suitability who would pay no more in rent than a comb (four bushels) of barley for each acre. Presumably the rent had to be lowered. In 1470 Margaret Paston faced a yet more serious crisis in the management of Mautby; the rent was still too high and the tenant could not pay it. She therefore felt obliged, with considerable misgivings, to manage the manor directly through her servants.[24]

The uncertainty which Margaret Paston expressed in her comments on Mautby was echoed in other letters written by the Pastons and their servants, and the nature of the record gives eloquent testimony to the way the difficulties of these decades were perceived and to the personal involvement of the Pastons in their resolution. There was a cluster of related problems which may be categorized under three heads: low prices, arrears of rent, falling rents.

III

Low prices of grain in a number of years in the 1460s meant that the Pastons were earning less than they might hope from the sale of barley rents. Calle wrote to John Paston I, probably in 1461, that 'wee can here non goode price of malt in no place'. In July the following year he reported that the price of malt in Great Yarmouth had fallen and was likely to fall farther because the harvest in Flegg was expected to be reasonably good. Sometime again in the earlier 1460s James Gresham explained the problems that low prices caused tenants: 'Halman can not yet gete monay, for his cornes arn at so litell price that he can not vtter them, and yet is ther noman wole bye it for al the gret chep'. In April 1465 Margaret Paston was already complaining that the price of malt was 'sore falle' to 2*s* 2*d* a comb (i.e. 4*s* 4*d* a quarter), and in May John Russe wrote to John Paston I saying he was unable to find a merchant who would buy his malt for more than 1*s* 10*d* a comb (i.e. 3*s* 8*d* a quarter). Then in August Margaret herself informed him that again the price of malt 'is fallen here sore', and was by now only 2*s* 8*d* a quarter in Yarmouth. There was another bad patch at the end of the decade. In 1469 Calle wrote to John Paston II telling him that malt should be sold to enable him to pay some overdue wages, including his own: 'the pris her is no better then xx d. a quarter. Neuertheles it were better to selle som of it as the price gothe than for to lete hem be on-payd'. Although prices were generally better in the 1470s there were some bad years, especially 1475, when the king prohibited agricultural exports in preparation for the invasion of France. In January that year Margaret Paston observed that unless barley prices rose she intended to have her barley malted, and she was still beset by marketing problems in May. In February John Paston II, explaining why he could not repay a loan from his mother, told her optimistically that 'iff the markett be nott goode yit I hope jt shall be better'. Low prices twice provoked comment from William Pecock again in 1477. This could

[23] Bennett, *The Pastons*, pp 10–21.
[24] *PL*, I, pp 259, 351; II, pp 217–18.

TABLE 1
Selling prices of malt and barley at Ormesby Hall, 1440–1475 (prices per quarter)

	malt		*barley*	
	range	*main sales*	*range*	*main sales*
1440–1	2*s* 0*d*–2*s* 8*d*	2*s* 0*d*	2*s* 0*d**	2*s* 0*d**
1441–2	1*s* 10*d*–3*s* 2*d*	1*s* 10*d*	2*s* 0*d*	2*s* 0*d*
1443–4	2*s* 0*d*–2*s* 8*d*	2*s* 4*d*	2*s* 1*d*–2*s* 4*d*	2*s* 1*d*
1444–5	1*s* 10*d*–2*s* 4*d*	2*s* 0*d*	2*s* 0*d*–2*s* 4*d*	2*s* 0*d*
1446–7	2*s* 0*d*–2*s* 8*d*	2*s* 6*d*	2*s* 2*d*–2*s* 8*d*	2*s* 2*d*
1447–8	2*s* 6*d*–3*s* 0*d*	2*s* 6*d*	2*s* 4*d**–2*s* 10*d**	2*s* 8*d**
1449–50	2*s* 4*d*–3*s* 0*d*	2*s* 4*d*	2*s* 0*d*–2*s* 4*d*	2*s* 4*d*
1451–2	1*s* 10*d*–2*s* 8*d*	2*s* 0*d*	2*s* 0*d**–2*s* 8*d**	2*s* 4*d**
1452–3	1*s* 8*d*–3*s* 0*d*	1*s* 8*d*	2*s* 0*d*–2*s* 4*d*	2*s* 4*d*
1454–5	2*s* 4*d*–3*s* 0*d*	2*s* 4*d*	2*s* 8*d*–3*s* 0*d*	2*s* 8*d*
1457–8	2*s* 0½*d*–2*s* 10*d*	2*s* 6*d*	2*s* 4*d*–2*s* 8*d*	2*s* 4*d*
1458–9	2*s* 4*d*–3*s* 2*d*	2*s* 8*d*	2*s* 4*d*	2*s* 4*d*
1459–60	2*s* 4*d*–3*s* 6*d*	3*s* 4*d*	3*s* 0*d**–3*s* 2*d**	3*s* 0*d**
1460–1	2*s* 6*d**–3*s* 10*d**	2*s* 6*d**, 2*s* 8*d**	2*s* 6*d*–3*s* 4*d*	2*s* 6*d*
1461–2	no sales		2*s* 6*d*–2*s* 8*d*	2*s* 8*d*
1462–3	1*s* 8*d*–2*s* 4*d*	2*s* 0*d*	2*s* 4*d**	2*s* 4*d**
1464–5	4*s* 0*d**	4*s* 0*d**	2*s* 4*d**–3*s* 8*d**	2*s* 4*d**
1465–6	4*s* 0*d**	4*s* 0*d**	3*s* 4*d**–4*s* 0*d**	3*s* 10*d**
1466–7	3*s* 4*d**–4*s* 0*d**	4*s* 0*d**	4*s* 0*d**	4*s* 0*d**
1467–8	4*s* 0*d**	4*s* 0*d**	4*s* 0*d**	4*s* 0*d**
1468–9	no sales		2*s* 0*d**	2*s* 0*d**
1470–1	3*s* 0*d*–3*s* 4*d*	3*s* 4*d*	4*s* 0*d**	4*s* 0*d**
1471–2	4*s* 0*d**–4*s* 4*d**	4*s* 0*d**	4*s* 0*d**	4*s* 0*d**
1472–3	no sales		3*s* 4*d**	3*s* 4*d**
1473–4	3*s* 4*d**–4*s* 0*d**	3*s* 4*d**	3*s* 10*d**–4*s* 4*d**	4*s* 0*d**
1474–5	4*s* 0*d**	4*s* 0*d**	no sales	

Note: the 'range' column records the lowest and highest prices obtained for malt and barley. The 'main sales' column records the price obtained for the largest sale or group of sales. Prices marked with an asterisk were for grain sold with every fourth bushel heaped. Heaping a bushel raised the volume of grain in the measure by a quarter, so sales by heaping every fourth bushel raised the volume of a quarter of malt or barley by one sixteenth. The presentation of prices for sales by heaped and unheaped measures in the same table is justifiable because in practice the differences were slight. Sales by level measure were often made with 'advantage' to the buyer, commonly an additional twentieth.

Source: PRO, SC6/940/3–SC6/942/8

undoubtedly be a source of personal anxiety for members of the family. In Margaret Paston's case anxiety turned to distress in the summer of 1465. John Russe explained the situation to her husband, à propos the low price of malt: 'My maistresse is right heuy therfore, but I can not remedy it'.[25]

These comments present some problems of interpretation. It is not obvious, from such independent evidence as we possess, why the prices quoted by the Pastons and their servants were considered so depressed. The prices for malt and barley recorded by the Pastons' neighbours at Ormesby Hall (Table 1) imply that landlords had had twenty years to get used to the price level of the 1460s. In fact malt prices for 1464–5 at Ormesby were above the average for the period, and even those quoted by the Pastons themselves were not low by normal standards (Table 2). The first point to observe is that evenness of prices for Ormesby produce through the fifties and early sixties probably misrepresents the real situation. The Paston correspondence implies that bulk buyers were harder to find than in the past, perhaps because of contracting demand in the east-coast towns.[26] To get the sort of contracts

[25] *PL*, I, pp 292, 314, 372, 375, 485; II, pp 257, 280, 306, 327, 396, 421, 423; C D Ross, *Edward IV*, 1974, p 218.

[26] C Phythian-Adams, 'Urban Decay in Late Medieval England', in P Abrams and E A Wrigley, (eds), *Towns in Societies: Essays in Economic History and Historical Sociology*, Cambridge, 1978, pp 167–8; R H Britnell, *Growth and Decline in Colchester, 1300–1525*, Cambridge, 1986, pp 193–202.

TABLE 2
Barley and malt prices in eastern Norfolk cited in the Paston Letters (price per quarter)

Nov [1461]	barley	1*s* 4*d*
Nov [1461]	malt	1*s* 6*d*
July [1462]	malt	2*s* 2*d**
April 1465	malt	4*s* 4*d*†
May 1465	malt	3*s* 8*d*
May 1465	malt	3*s* 4*d*
July 1465	malt	4*s* 0*d*‡
Aug 1465	malt	2*s* 8*d*
May 1469	malt	1*s* 8*d*
Jan 1475	barley	1*s* 8*d*
Jan 1475	barley	1*s* 10*d*
Jan 1475	malt	2*s* 2*d*
May 1475	malt	1*s* 8*d*
Nov 1477	barley	2*s* 4*d*
Nov 1477	barley	2*s* 4*d*

* 'euery busschell streken in the combes'

† 'clenefyed and strek met and non jument [?]'

‡ 'at daijs xxj for xx deliuerid of Yermoth mesur'. For the expression 'xxj for xx' see R H Britnell, '*Advantagium Mercatoris*: A Custom in Medieval English Trade', *Nottingham Medieval Studies*, XXIV, 1980, pp 43–50.

Note: prices per quarter have been converted from prices per comb where necessary.

Source: *PL*, I, pp 136, 292, 314, 372, 375; II, pp 257, 280, 306, 396, 421, 423.

they required for their malt they were having to engage in a more energetic search for buyers, and this inevitably made for higher costs and more anxiety. The prices for 1461–2 and 1465–6 cited in Table 2 from the Paston correspondence are generally lower than those received at Ormesby Hall, and though this could be because they relate to different months of the year it may be that the prices obtained for Ormesby malt and barley give an optimistic impression of the movement of prices locally. This possibility has some support in the Ormesby accounts themselves. Normally malt from Ormesby was sold in Great Yarmouth, but in 1460–1 two-thirds of the total was marketed at a distance; 60 quarters were delivered to a servant of Elizabeth Clere's to sell in Newcastle upon Tyne and 100 quarters were sold in London. The costs of marketing that year were therefore higher than usual, even though the price ultimately obtained for Ormesby malt was not low by the standards of the 1450s. When they could not sell grain locally on favourable terms the Pastons too sought buyers at a distance and themselves bore more of the expenses of marketing. In 1461 Calle reported that because the local price of cereals was low he had ventured sending 100 combs of malt across the Channel to Flanders. In 1462 (probably) he reported that there were likely to be 400 quarters of new and 40 quarters of old malt available at Caister and recommended shipping them from Great Yarmouth to London at 6*d* a quarter to get a better price than he could hope for locally. A policy of direct shipment is also implied in John Paston I's instruction to his wife in 1465 that malt from Guton should be shipped from Blakeney, fifteen miles to the north-west. The Pastons had the particular advantage that when John Paston I was in London he was able to gather market information there, to sell any wool and malt which was sent to him, and to find contractors for produce still in Norfolk. In 1465 Margaret Paston let him know that she had heard neither from Colte of Newcastle nor from any other contractor who would buy his malt, which suggests he had previously told her about some of his negotiations.[27] Such active marketing involved landlords in higher costs, even if they eventually obtained better prices for their grain than they would otherwise have done. On this interpretation, then, lower prices in the local market encouraged more personal involvement by members of the Paston family in the 1460s, though even their most strenuous endeavours could achieve no more than making the best of a bad job.

[27] *PL*, I, pp 126, 130, 136, 298; II, pp 257, 280; PRO, SC6/941/5.

IV

The second main problem was arrears of rent. Tenants were not able to engage in the type of marketing activity which the Pastons undertook; they were restricted to selling at local prices. And low prices meant that they often fell behind with their money rents. A letter from Calle to John Paston I, probably of 1461, mentions problems in collecting rents at Gresham. Margaret Paston wrote to her husband early in 1462 that 'as for gadyryng of mony I sey nevyr a werse seson', telling him that Calle could collect debts neither on the Pastons' own lands nor on those claimed from the Fastolf estates. Sometime in the earlier 1460s James Gresham corresponded about arrears of rent at Great Cressingham, which he partly explained by reference to low prices. The rent for the manor of Stratton was behind 'for certeine yeres' in 1462. Arrears were one of the things depressing Margaret Paston in the summer of 1465; Russe told her husband that 'she considerith the gret decay of youre lyflode, the gret dettys that hange in detourys hands'. In 1469 there were problems all over the estate; in May Calle wrote a sombre letter to John Paston II saying how little money he had been able to collect and observing that 'her is moche malte made and not solde'. The problem of accumulated debts continued to present administrative problems in the summer of 1470, when John Paston III wrote that he had been unable to collect any arrears from his brother's estates. He proposed that a clear assessment of arrears should be drawn up for the whole estate, together with a statement of his brother's debts. By October that year Margaret Paston reckoned she was owed over £80 by the farmer of Mautby manor. There are more references too of arrears of rents from the late 1470s.[28]

The problem of arrears did not reduce the Pastons to passivity. On the contrary, it induced a more embattled attitude towards their tenants. The failure of tenants to pay rents and arrears was at least in part the result of marketing problems like those of the Pastons themselves, and this was well understood to judge from some of the comments already cited. But the Pastons did not restrict themselves to charitable explanations. They also believed that tenants were deliberately resisting payment. Such suspicions were particularly acute during the period of political unrest between 1461 and 1463; in 1462 'John Paston seyth they that may pay best, they pay werst. They fare as thow they hopyd to haue a newe werd (*world*)'.[29] But even in other years the Pastons sensed a spirit of tenant resistance not uncommon in the fifteenth century.[30] This in turn encouraged them to adopt an aggressive approach to rent-collecting. In 1465, for example, John Paston I noted that the lessee of Swainsthorpe, and probably those of Snailwell and Gresham, had fallen heavily into debt because they had not been visited often enough and that greater exertions would be necessary to collect the rents there. Some later resolutions are more explicit. The seizing of crops at harvest time to ensure the payment of dues was adopted where necessary. John Paston III wrote to his brother in 1472 that his servant William Barker could collect no money till the harvest, but intended then to distrain on crops in the field. There survives a plan of campaign for the harvest of 1477 on the estates of Agnes Paston, the aged widow

[28] *PL*, I, pp 279, 351, 557–8, 615; II, pp 258, 272, 306, 327, 395–6, 412.

[29] *PL*, I, p 279. This letter reports rumours of an immanent popular uprising hostile to the Duke of Suffolk. For the instability of the time, see Ross, *Edward IV*, pp 41–5.

[30] C Dyer, 'A Redistribution of Incomes in Fifteenth-Century England?', in R H Hilton (ed), *Peasants, Knights and Heretics: Studies in Medieval English Social History*, Cambridge, 1976, pp 203–14; Dyer, *Lords and Peasants*, pp 275–82; R H Hilton, *The English Peasantry in the Later Middle Ages*, Oxford, 1975, pp 64–73; R H Hilton, 'Ideology and Social Order in Late Medieval England', in idem, *Class Conflict and the Crisis of Feudalism*, 1985, pp 246–52.

of William Paston I. The properties from which rents were to be collected were listed with a view to making sure that Agnes's interests were remembered. In 17 out of 35 cases tenants were to be distrained for arrears of rent, and the way of doing so was prearranged. Eight tenants were to be left to take their corn in, then the Pastons' officers were to seal their barn doors and distrain them. At Trunch the crops were to be distrained immediately after cutting, while they still lay on Agnes's land, presumably because the tenant's barn was held from someone else. Evidently collecting rents in the 1470s was a matter for vigilance and the judicious use of force. These problems were the result only of economic conjuncture; the ownership of these properties, which had belonged to William Paston I, had never been in question.[31]

V

The third area of difficulty was the problem of maintaining the level of rents; the difficulty of letting lands on the old terms meant that there was downward pressure on rents which it was often hard to resist. Calle wrote to John Paston I in 1461 that a lease of 40 acres of arable in Boyton was so out of tilth that scarcely anyone would give anything for it; to get any rent at all it would be necessary to spend a lot of money on repairs. 'And as for Spitlynges,' he added, 'I haue lete som of the land in smale parcelles because I cowde gete no fermour for it'. A certain Kook, the tenant of 18 acres at Earlham, was at this time refusing to lease them on the old terms at 7*d* or 8*d* an acre; he would only have them at 6*d* an acre and would not commit himself to undertaking repairs. Maintaining the rent of Mautby manor was a problem in the sixties, as we have already seen. There were arguments against struggling too hard to maintain existing levels of rent. A couple of letters of 1467 argue that rents for manorial demesne lands at Snailwell and Sporle should be lower; Gloys wrote that 'if ye vndo your tenauntes with ouerchargyng of your fermes it shall distroy your tenauntes and lordshepes'.[32]

The maintaining of rent levels inevitably required complex deals with potential tenants. Usually these negotiations were conducted by Calle, but as with the other main problems of estate management difficult cases were often taken up by members of the family. A couple of instances will demonstrate the intricacy of such dealings. In an example probably from 1461, both John Paston III and his mother are seen haggling about the level of rent at Earlham. The information is known from a subsequent letter from John Paston III to his father. It is interesting to see in this example how the money rent, the length of the lease and responsibility for repairs were seen as interdependent items for negotiation:

> I haue spoke wyth Warwyk and Stwkle fore the plase [*residence*] and the londys in Arleham, and they wyle not geue but vj d. for an acre, and they to kepe the reparacion of the plase; but so I wold not lete heme haue it. But Stwkle hathe promysyd me that all the londys schalle be purveyd for as for thys yer [*leased on the same terms as this year*]. Warwyk was wyth my modyr as thys day, and he desyiryth to haue the londys in Arleham for vij d. an acre as for thys yer. And in as myche as Stwkle had promysyd me to purvey for [*lease*] the londys for thys yer, I cownselyd my modyr that he [i.e. *Warwyk*] schuld not haue heme wyth-owt he wold tak hem for a longer terme.

The second example involves correspondence from Calle to John Paston I in London, a further letter from John to Margaret, and then an interview conducted by Margaret. In 1465, seven years or so after the rent of Mautby Marsh had fallen from £8 6*s* 8*d* to £8, Margaret described her attempt to make the sitting tenant pay the old rent. Her husband had told her on

[31] *PL*, I, pp 128–9, 175–7, 576.

[32] *PL*, I, pp 521; II, pp 256, 261, 376–7.

Calle's authority that there was an (unnamed) rival bidder who would pay more, so Margaret used this phantom in her negotiations:

> I have spoke wyth Borges that he shuld heyne [*raise*] the price of the mershe or ellis I told hym that he shuld no lenger have it, for ye myght [have] other fermors therto that wold geve ther-fore as it was late be-fore; and yf he wold geve therfore as moche as a-nother man wold, ye wold that he shuld have it be-for any other man. And he seyd he shuld geve me answere be a fortenyght after Esterne. I can get non other fermor ther-to yet.

The delay of three weeks suggests that Borges was unconvinced.[33]

These observations imply that the financial problems of the Pastons in the 1460s and 1470s were not caused solely by personal failings and misfortunes, such as John Paston II's alleged improvidence or the loss of most of the Fastolf lands. The Pastons' friends were in the same sort of difficulty. In 1461 Sir John Heveningham wrote to excuse himself from doing a favour for John Paston I on the grounds that he was having problems in collecting his dues and maintaining his livelihood. A letter from Margaret Paston to John Paston III, probably in 1470, tells of her 'cosyn Calthorp', who was in such in straitened circumstances because his tenants would not pay him that he was having to reduce the size of his household. Margaret Paston had feared the same fate in 1469, when she told her son that 'as fore myn owyn lyuelod, I am so symppely payed thereof that I fere me I xale be fayn to borow fore my-sylfe ore ell to breke vp howsold, ore bothe'.[34] The Pastons were perhaps less hard pressed for cash in the 1470s than they had been in the 1460s. Most problems concerning the Fastolf inheritance were resolved in 1470, though possession of Caister Castle was not assured until 1476. The recovery of several properties in eastern Norfolk from junior branches of the family enabled John Paston II to raise money on mortgages without any reduction of his normal income, and he benefited temporarily by the sale of timber from Sporle Wood. At times he earned an income in Calais, where one could obtain wages sufficiently high to live like a gentleman. But although the 1470s were less troubled than the previous decade, the Pastons remained aware of living in hard times. A memorandum concerning the income of Oxnead parsonage drawn up in 1478 describes a severe decline from the level of 1420.[35] It is tempting to describe the problems described in the letters as those of agrarian depression. A contemporary formulation of the problem in 1475 was that 'the contry is bareyn of money'.[36] The letters imply that malt prices in the years 1460–2, 1465, 1469–70, 1475 and 1477 were particularly low and that on each occasion the problem was viewed as more than a transient disappointment. The family's concern with low prices and rents in eastern Norfolk, despite the commercial opportunities available there, confirms the view of these decades – and particularly the 1460s – as a period of difficulty for landlords in eastern England.

VI

The *Paston Letters* have been used to illustrate the ravages of lawlessness and violence in the later Middle Ages while this less conspicuous evidence of the problems of estate management during the 1460s and 1470s has been ignored. Such one-sidedness needs correcting if only because it leads to an unduly particularized interpretation of the family's problems. It is of course true that the Pastons were in a self-imposed predicament after 1459 because of John Paston's claims on the

[33] *PL*, I, pp 129, 293, 521.
[34] *PL*, I, pp 346–8; II, pp 258–9.
[35] *PL*, I, pp xlviii–l, 178, 410–11, 470, 474, 477, 486. For the sale of timber from Sporle Wood, see *PL*, I, pp 372, 447, 458–9, 550, 569–70; II, pp 356–7, 406–7.
[36] *PL*, I, p 377.

Fastolf inheritance and the violent opposition he encountered. But the Pastons also suffered, as did their neighbours, from the problem of maintaining their livelihood in a period of stagnant or contracting demand. They were no more passive in the face of economic difficulties than they were in warding off challenges to their property. In adverse circumstances they and their servants responded speedily to changes in prices and other economic circumstances, even on occasion acting in anticipation of events. When things seemed blackest they engaged more energetically in finding buyers for their barley and outmanoeuvring their tenants. Estate organization involved close co-operation between members of the family and their servants and the frequent interchange of news, comment and advice. Without the letters this is something we could never have known and should not have presumed to guess.

Can the personal involvement of the Pastons in their estates be used as evidence that the smaller landlords of fifteenth-century England possessed a more commercial spirit than the nobility? The question needs subdividing, since even within the category of smaller landowners there is a distinction to be made between knights and others. Did knightly status induce an ethic opposed to preoccupation with mundane affairs? It is interesting that John Paston II, knighted in 1463, shared less in the administration of the family estates than either his mother or his younger brother. Bennett describes him as 'easy-going'; his father used stronger language. But this probably tells us more about elder sons in *nouveau riche* families than it does about the knightly ethic as such. To counter the example of John Paston II we need look no farther than the Paston family's benefactor Sir John Fastolf. Not only did he acquire his English estates with great shrewdness; he administered them with the personal touch of a committed businessman. The knight was plainly more of an entrepreneur than his secretary, William Worcester, who had qualms about his employer's tying up capital in ships, merchandise and Yarmouth property. Fastolf was extraordinary, but the fact that so successful a military man should have such interests is enough to sink the idea that the knightly ethic precluded the energetic management of worldly goods. The business-like attitude which fifteenth-century knights adopted to military campaigns should, in itself, warn us against assuming that they thought like Sir Percival.[37]

The distinction between smaller landowners and the nobility is a different question. It was more the rule than the exception for noblemen to take an active interest in the administration of their estates, though the extent of their involvement depended in part on the time taken up by military or political duties. Some leading landlords of the later fifteenth century – Anthony Wydeville, Earl Rivers, or Henry Stafford, Duke of Buckingham – became known for their mercenary attitude. Lord Edmund Grey whose political role was slight, took so great an interest in estate matters that he took over financial responsibilities from his household officers. It would be a mistake to suppose that the nobility were less commercially minded than smaller landlords; the difference between winning and wasting was more a matter of personality than of social class. The differences between great landlords and lesser men lay rather in the type of tasks that they undertook and the type of administration that they headed. The estates of the nobility inevitably needed more administering because of their greater size and wider geographical spread. The

[37] Bennett, *The Pastons*, pp 13, 230; *PL*, I, p 132; II, pp 171–2; K B McFarlane, 'The Investment of Sir John Fastolf's Profits of War', *TRHS*, 5th ser, VII, 1957, pp 115–16; A Smith, 'Litigation and Politics; Sir John Fastolf's Defence of His English Property', in A J Pollard (ed), *Property and Politics: Essays in Later Medieval English History*, Gloucester, 1984, pp 60, 73; E M Carus-Wilson, 'Evidences of Industrial Growth on some Fifteenth-Century Manors', in idem, *Essays in Economic History*, 3 vols, 1954, 1962, II, pp 160–2.

Pastons' personal attentions to local detail across their estates was more than a nobleman would have been able to tolerate. Large estates required their bureaucracies to be carefully structured; the tasks of different servants had to be separately demarcated to eliminate slackness and to allow for accountability. There had to be more tiers of administration between a lord and his manors, usually with some sort of regional division. Even Lord Edmund Grey needed to delegate much of the local administration to local receivers. The councils of noblemen, too, had sometimes to be capable of taking command of affairs. When a nobleman was preoccupied with other business, as during a military campaign, he was more likely to leave responsibility in the hands of his council, his receiver-general and his auditor than to his wife.[38]

In this respect the *Paston Letters* illustrate with exceptional clarity the main features distinguishing smaller estates from greater ones in the late Middle Ages. Even in regions where the commercial opportunities were fewer than in Norfolk the personal involvement of landlords in minute matters was characteristic of small estates. The servants of minor families were accordingly less specialized than those of the nobility and estate organisation was less structured. These points can be demonstrated with shreds of evidence from earlier periods and in other parts of England. But there is no other evidence to compare in vividness and coherence with that of the Paston correspondence. Despite their neglect by historians of agriculture, the letters deserve to be ranked as a source of major importance for the history of estate management in England.[39]

[38] McFarlane, *The Nobility*, pp 47–53; J T Rosenthal, *Nobles and the Noble Life, 1295–1500*, 1976, pp 77–9; Bolton, *Medieval English Economy*, pp 225–8; C D Ross and T B Pugh, 'Materials for the Study of Baronial Incomes in Fifteenth-Century England', *Econ Hist Rev*, 2nd ser, VI, 1953–4, pp 190–4; C D Ross, *The Estates and Finances of Richard Beauchamp Earl of Warwick*, Dugdale Society Occasional Paper 12, Oxford, 1956, pp 5–14; J M W Bean, *The Estates of the Percy Family, 1416–1537*, Oxford, 1958, pp 141–7; R I Jack, (ed) *The Grey of Ruthin Valor, 1467–8*, Sydney, 1965, pp 45–51; Rosenthal, 'The Estates and Finances', pp 169–85; Hatcher, *Rural Economy and Society*, pp 42–51; Pollard, 'Estate Management', pp 554–5, 561–4; Rawcliffe, *The Staffords*, pp 45–65.

[39] R H Britnell, 'Minor Landlords in England and Medieval Agrarian Capitalism', *Past & Present*, LXXXIX, 1980, pp 7–8; Saul, *Scenes from Provincial Life*, p 98; Richmond, *John Hopton*, pp 97, 117–20, 137.

Continuity and Change in Hertfordshire Agriculture 1550–1700: II – Trends in crop yields and their determinants

By PAUL GLENNIE

Abstract
Using a version of a method developed by Overton, data from probate inventories are used to identify periods of increasing land productivity in early modern Hertfordshire. Some of the factors which may underlie higher crop yields are discussed. It is suggested that increasingly systematic ground preparation prior to sowing was a major factor increasing land productivity. The chronological and geographical patterns of higher yields were similar to those of recorded valuations of ground preparation. A concluding discussion investigates possible changes in patterns of farm investment.

THIS paper is the second of two essays discussing agricultural change in the county of Hertfordshire in south-east England. Its partner, in the previous issue, dealt with aspects of agricultural production and their geography. This paper tackles the difficult topics of trends in crop yields, of how yields may have been raised, and of farmers' attitudes to agricultural investment.

Since the discussion involves many detailed stages and qualifications, it may be helpful to outline the argument advanced. In section I, I argue that substantial yield increases for wheat, barley and oats were achieved by farmers in Hertfordshire during the later seventeenth century. The absolute level of yields remains uncertain, but it is likely that yield increases during the eighteenth century were relatively modest. In section II, the yield increases are shown to pre-date the widespread introduction of new fodder crops. Instead, more systematic preparation of ground prior to sowing (both to raise soil fertility and to improve moisture retention on light soils) is suggested as an important contributory factor, although some other factors influencing yield cannot be investigated using inventory data. In section III, the geography of 'high-yield' farms is examined, and shown to coincide with areas in which ground preparation was most frequently evident. The wider context of the changes identified is discussed in section IV, which suggests that farmers' attitudes to investment were changing, and argues that shifts in relative prices provide a poor guide to farmers' incomes at times of productivity change.

I

It is probably fair to say that yields per acre and productivity per man are the two great unknowns of early modern agriculture; the keys that more than any others might move us closer to an understanding of English agrarian development. Unfortunately, there are no sources which directly record agricultural yields on a wide scale prior to Governmental interest around the turn of the eighteenth century, leaving a long gap from the major medieval source of yield data, the manorial account.[1]

Recent work, summarized in Table 1, indicates that in *c.*1800 yields in Hertfordshire were above average by contemporary

[1] It must be recognized that knowledge of medieval yield trends is restricted to a few areas and estates: J Z Titow, *Winchester Yields: A Study in Medieval Agricultural Productivity*, Cambridge, 1972; D L Farmer, 'Grain yields on the Winchester manors in the later middle ages', *Econ Hist Rev* 2nd ser XXX, 1977, pp 555–66; D L Farmer, 'Grain yields on Westminster Abbey manors, 1271–1410', *Canadian Journal of History/Annales Canadiennes d'Histoire*, 18, 1983, pp 331–48; B M S Campbell, 'Agricultural productivity in medieval England: some evidence from eastern Norfolk', *Jnl Econ Hist* 43, 1983, pp 379–404.

TABLE 1
Yields in Hertfordshire, c.1794-c.1836

	Wheat	*Barley*	*Oats*
1790s average	20	30.5	28.5
1794	19	24.5	22
1795	15	31.5	30.5
1800 average	20-24	32-40	31-36
1801	25	34	—
1836 average	21.6	29.4	33.6

Yields as percentage of estimated national averages

	Wheat	*Barley*	*Oats*
1790s average	103	111	105
1794	113	110	102
1795	96	111	107
1800 average	91-110	117	98
1801	111	113	—
1836 average	100	96	96

Sources: Calculated from: M Turner 'Agricultural productivity in England in the eighteenth century: evidence from crop yields' *Econ Hist Rev* 2nd ser, xxxv, 1982, 492-510; E J Connell 'Hertfordshire agriculture during the Napoleonic wars' *Hertfordshire's Past*, 10, 1970, 22-35; R Kain *An Atlas and Index of the Tithe Files of mid-nineteenth-century England and Wales* Cambridge, 1986, unweighted county averages.

English standards.[2] Wheat yields were about 10 per cent above average yields notified to the two House of Lords Committees on the Dearth of Provisions in 1795 and 1800, and as stated in the Crop Returns of 1801, although the small number of parishes with extant data means that these results should be treated with some caution. The tithe agreements in the 1830s produced very similar yield estimates,[3] and so there is little sign that productivity per acre increased in the first third of the nineteenth century. Average yields increased elsewhere during this period, and wheat yields in Hertfordshire were thus no longer above the English average. Much the same was true for barley and oats. Since these average yields are considerably higher than those of the most productive medieval estates, the question arises as to when exactly yield increases had been achieved.

At best, yield and productivity changes can only be estimated indirectly from sources such as inventories. A major new approach to this intractable topic has been originated by Overton and developed by Allen (outlined in Appendix 1).[4] Put simply, Overton estimates yield trends from the relationship between valuations per acre of grain growing shortly before harvesting and valuations per bushel of grain in store after harvesting. In valuing standing grain, appraisers were estimating two things, the likely yield (quantity of grain per acre) and the likely selling price per unit quantity. Any estimate of valuation per acre implies one of a number of particular combinations of these two variables. By treating the estimated sale price and the value of grain after the harvest as equivalent, the average valuation per acre of growing grain can then be expressed in terms of bushels. In applying this method, I follow Allen's modification and treat years independently rather than combining valuations from several years as Overton did (see Appendix 1). However I have also calculated results using Overton's original method for purposes of comparison.

[2] M Turner, 'Agricultural productivity in England in the eighteenth century: evidence from crop yields', *Econ Hist Rev* 2nd series, XXXV, 1982, pp 489-510.

[3] R Kain, *An Atlas and Index of the Tithe Files of Mid-Nineteenth-Century England and Wales*, Cambridge, 1986.

[4] M Overton, 'Estimating crop yields from probate inventories: an example from East Anglia, 1585-1730', *Jnl Econ Hist* 39, 1979, pp 363-78. Bob Allen of the University of British Columbia suggests methodological modifications and makes criticisms of Overton's interpretation of results in R C Allen 'Inferring yields from probate inventories' *Jnl Econ Hist* 48, 1988, pp 117-125. I am very grateful to Dr Allen for a draft copy of the paper. A comparison of the results produced with and without certain of Allen's modifications to Overton's method may be found in Appendix 1. Recent attempts to infer productivity changes via the use of patent data and agricultural publishing to determine 'periods of inventiveness and innovation' have not been convincing, R J Sullivan, 'Measurement of English farming technological change, 1523-1900', *Explorations in Economic History*, 21, 1984, pp 270-89; R J Sullivan, 'The timing and pattern of technological development in English agriculture, 1611-1850', *Jnl Econ Hist*, 45, 1985, pp 305-14.

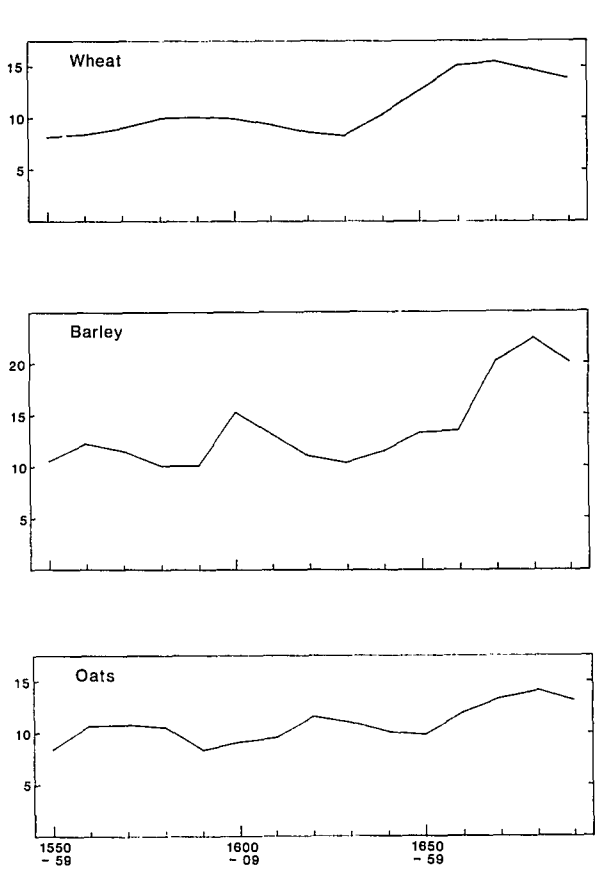


FIGURE 1
Trends in mean valuation per acre of cereal crops.

Note: The cash valuation for standing grain has been divided by the average valuation of the relevant grain from post-harvest inventories of the same year. Only inventories from July and later have been used. Inventories in which grain is valued at the perceived costs of production rather than the likely worth to the heir have been excluded.

Results obtained by this method are clearly not estimates of yield per acre as such, since valuations of growing crops are net of presumed or estimated harvesting costs, and of tithes to which crops were liable. 'Yields' thus estimated are, more correctly, 'bushel equivalents of valuations per acre'. Bushel equivalents of average valuations per acre for wheat, barley and oats, based on a total of about 800 inventories are shown in Figure 1. Not only are these valuations per acre not yields as such, since they include allowances for the perceived costs of harvesting and tithes, but both valuations per acre and valuations per bushel presumably include an allowance for the cost of transporting grain to market. How this was calculated we do not know. However, since valuations per bushel bear a reasonably consistent relation to market prices these estimates should establish trends in appraisers' predictions of yields.

Prior to interpreting these trends it should be recognized that while the total number of inventories is quite large, they stretch over a 150-year period, and there are still several years for which any inventory valuations for growing or stored grain are lacking. For several other years, the number of suitable inventories available is small, and the estimates for these years may be subject to wide margins of error. This is true mainly of the early decades for each series and for the 1650s.[5]

In Figure 1 a three-decade moving average has been used to smooth the series in order to draw attention to the long-term changes. All three series have two major points in common. First, yields towards the middle of the seventeenth century were no higher than in the 1560s and 1570s. Secondly sustained increases occurred from the 1660s or 1670s, and these were on a scale and of a substantial nature which was different in kind from the shallower or more short-lived upward fluctuations observable in the century or so before about 1650.

[5] Since this study used only inventories which contained an occupational designation, the sample of inventories could be enlarged by utilizing inventories which do not specify the occupation of the deceased.

Before accepting that these were genuine yield increases, at least three possible explanations need to be considered. First, the representativeness of the inventory sample may have changed. For example, if yields and the size of farms were positively related, then the effect of land becoming concentrated in the hands of larger farmers would be higher mean yields. This would not imply that any particular group of farmers was achieving higher yields through innovations in crops or techniques. While this scenario is a plausible one for the late seventeenth century, the scale of yield increases evident from Figure 1 are so large that differences in productivity with farm size cannot have produced more than a small proportion of that increase.

A second factor likely to influence average yields is the extent of the cultivated area. All other things being equal, average yields should vary inversely with the conversion of pasture land to arable, as land that was marginal for arable cultivation moved from one sector to the other. It might be expected that at times when price relatives were moving towards pasture (such as after 1650) average yields would rise as the poorest arable land was converted to permanent pasture.[6] However, the pattern of farm specialization (Table 2) indicated that any arable to pasture switch across the county as a whole was on a very modest scale and is thus unlikely to have been a significant factor in producing higher yields.[7] Even if large-scale changes in land use had occurred, though, it is implausible that differences in land quality alone could explain more than a small part of the increases graphed in Figure 1.

It is more difficult to be sure that the changes in yield estimates found were not the result of some change in the appraising conventions which the compilers of inventories applied when they viewed growing crops. We lack other documentation which might allow us to cross-check the process of appraising against the items listed in inventories. However on the internal evidence of the appearance and contents of inventories through time, such a change appears unlikely. There was no change in the legal requirements relating to the duties of appraisers or methods of valuing. There is no detectable change in the way of valuing grain in store, which continues to correlate with market prices. The pattern in which livestock and other farm equipment were valued does not appear to have changed. In short for this explanation to account for the estimated yield increases, we would be required to accept that a change in the conventions regarding the appraising of growing crops, but no other component of farms, had taken place. Furthermore we should have to accept that such a change had no legal basis and yet occured over the wide geographical area in which farms with significantly above average valuations of grain per acre were to be found. Such an explanation is highly implausible.

It therefore seems that these results do indicate a genuine increase in arable yields. As was suggested above, a critical stage in interpreting these results comes in estimating absolute actual yields: the gross yield rather than the yield net of harvesting costs, transport, tithes and so on, which is what is plotted in Figure 1. Obviously the degree to which we inflate the net yield series to compensate for these costs will affect the relative importance of the seventeenth and eighteenth century as periods

[6] A short-term exception to this would be where permanent pasture is ploughed up for arable. Here, yields are likely to be raised in the short term as arable crops make use of the nutrients stored in the soil and not used by the grass.

[7] *Ag Hist Rev*, 36, p 69.

TABLE 2
Characteristics of two groups of farms in the 1690s

	Inventories with prepared ground (n=33)	*Inventories of other active farmers (n=96)*
Mean farm (crops + stock)		
for yeomen	380 (19)	122 (49)
for husbandmen	234 (14)	43 (47)
Mean valuation (£)		
of crops	230	82
of livestock	88	40
of farm equipment	28	14
Percent possessing		
horses	94	72
cattle	97	76
sheep	88	65
hogs/pigs	85	64
Percent growing		
clover or other new grass-substitutes	28	7

of agricultural progress.[8] For example, if we guess that the appraisers of inventories reduced the gross value of crops by about 20 per cent to allow for total harvesting costs (and tithes), then there is still room for significant, though not dramatic, yield increases in the eighteenth century to reach the yields recorded in *c* 1800. On the other hand, if appraisers allowed say 35-40 per cent for total harvesting costs (and tithes), then gross wheat and barley yields in Hertfordshire in the 1680s were as high as they were in 1801.

I would regard the lower figure as the more plausible, but this cannot be demonstrated. It should be noted, though, that the key question here is not what the actual costs of harvesting were (although these can be estimated from some farm accounts), but how appraisers took these costs into account in making valuations. For example, if some of the labour involved in harvesting was provided by farm servants rather than hired wage labour, then the labour costs relating specifically to harvesting would be quite low, since the maintenance of servants was a one-off fixed cost for the year, not a variable cost depending on the performance of particular tasks. In this context it is notable that Kussmaul identifies a significant growth in the incidence of farm service in southern and eastern England in the later seventeenth century.[9]

II

Many factors affect output per acre. Until comparatively recently it was almost axiomatic that sustained yield increases in early modern agriculture occurred only after the widespread introduction of new fodder crops such as turnips, clover and other

[8] It is in part a failure to appreciate this point that has led to the disagreement between Turner and Overton concerning crop yields in the eighteenth century: Turner, 'Agricultural productivity'; M Overton, 'Agricultural productivity in eighteenth-century England: some further speculations', *Econ Hist Rev* 2nd series XXXVII, 1984, pp 244-51; M Turner 'Agricultural productivity in eighteenth-century England', *Ibid.*, pp 252-7. Turner's comment (1984, p 257) that 'between Overton's inventory data of the 1730s and Arthur Young's visitation of the 1760s something extraordinary seems to have happened down on the farm in East Anglia' takes no account of the fact that Overton's estimates are of 'yield' net of tithes, harvesting and possibly some other costs, while Young's estimates were of gross yield.

[9] A Kussmaul, *Servants in Husbandry in Early Modern England*, Cambridge, 1981, pp 97-119.

new grasses. However it seems highly unlikely that the appearance of new grasses and root crops has a significant role to play in explaining how these higher arable yields were achieved. First, the widespread occurrence of either type of new crops in inventories substantially post-dates the yield increases, and so cannot logically explain them. Secondly, while clover and other new 'mowing grasses' were more common than turnips and other root crops, they appeared in barely 10 per cent of farmers' inventories by the end of the seventeenth century. Even if we allow for the likelihood that new crops appear in inventories at a lag of some years after their introduction, they still appeared in numbers and quantities too small for them reasonably to be invoked to explain the yield increases of Figure 1.

A possible cause of higher yields is hinted at by one of the most persistent observations made by contemporary commentators such as Ellis, Walker and Young.[10] While Young found little to admire about agriculture in Hertfordshire, he and other writers were unanimous in commending the high level of dunging and other fertilization, and the range of techniques involved in its application and in the preparation of soil for crops. 'It will be apparent', wrote Young, 'that manuring alone must occasion a disproportion so very great between the soil and the crops; the latter being so very superior to the soil.' In saying this, Young was essentially echoing the comments of his predecessors through the eighteenth century.[11] Elsewhere he says that most progressive agricultural methods were known in the county in Ellis's day, which may imply limited progress between the 1730s and 1790s.[12]

All these commentators list a wide range of substances applied to soil. The general term 'ground preparation' is an appropriate label because applications were made for diverse purposes. Many substances were applied to raise fertility, but other techniques, such as the ploughing in of shredded rags, were primarily directed to increasing the capacity of light soils to retain moisture. One way of approaching the question of how effective was the use of manure, marl, chalk and other substances applied to arable land is the appearance in increasing numbers of inventory valuations relating to the preparation of ground for crops. While these entries are not always as explicit as we might like, a number of examples will help to illustrate their style, and hint at the sort of activities which lie behind less informative entries.

One of the earliest inventories to make explicit what was involved in ground preparation is that of the quaintly named Affabell Battle, yeoman of Tewin, from 1630.[13] His total estate of over £1000 included nearly £700 of farm produce and equipment, amongst which was £42 17*s* 0*d* 'for dunging and chalking and fallowing and stirring of ground'. The Christian name Affabell perhaps suggests a Puritan background, but there is little indication that Puritanism and this sort of 'agricultural investment' were particularly related: few such inventories were those of men with overtly Puritan Christian names. At the end of the century and on the other side of the county at Great Gaddesden, Henry Tudder's inventory of nearly £200 included £10 for 'fallowing, stirring, dunging and dressing' land in readiness for crops.[14] At

[10] W Ellis, *Chiltern and Vale Farming*, 1732; W Ellis, *The Practical Farmer, or Hertfordshire Husbandman*, 1732; W Ellis, *The Modern Husbandman*, 1744; D Walker, *A General View of the Agriculture of Hertfordshire*, 1795; A Young, *A General View of the Agriculture of Hertfordshire*, 1804, reprinted Newton Abbot, 1971.

[11] Young, *op cit* pp 157-8: 'There is no part of the kingdom in which this branch of husbandry ... is more generally attended to; or where exertions in it are more spirited'. Walker had commented that 'top dressing is the leading feature of Hertfordshire farming' *op cit*, p 40.

[12] Young, *op cit* p 55: 'this appears from the writings of Ellis, ... There are at present scarcely any practices to be met with in the county, that were not well understood at that period'.

[13] HCRO 10/HW/23.

[14] HCRO H23/2388.

about the same time at Hitchin, John Everard's appraisers were allowing £7 'for the composting laid on the land hired by him which is to be tilled for barley'.[15] Finally, the most detailed account of all comes from the inventory of John Kirby of Ardleigh in 1695,[16] where preparation for crops contributed nearly £40 to an inventory of about £240. Unusually his appraisers listed and valued various components of this valuation separately. Presumably from a notebook or farm accounts, they enumerated:

£29 for 29 acres of land ploughed four times,
£2 14*s* for the dung carted at 6*s* a day for nine days,
£1 10*s* for the application and the stirring of the dung,
£6 fo the folding of nine acres at 13*s* 4*d* an acre,
4*s* 6*d* for the spreading of nine acres of dung there.

Although they are rare, valuations like these are not unknown in the late sixteenth century, but through the seventeenth century the proportion of inventories with them grew fairly rapidly (Figure 2). Of the 156 inventories which specify valuations ground prepared for crops, more than half occur after 1660. Their frequency varied among status groups, being commoner among yeomen than those designated husbandman, and only occasionally being mentioned in the inventories of labourers, or of craftsmen and tradesmen.

The figures themselves may be underestimates of the frequency of the technique, since they are based on inventories from all times of the year, whereas the frequency of recording varied slightly over the year. Taking the period 1610-1699 as a whole, a disproportionately high number of mentions of prepared ground occurred in inventories appraised between August and January. There were 27 per cent more mentions of prepared ground in these autumnal and winter inventories than there would have been if inventories mentioning prepared ground had been evenly distributed throughout the year. Whilst this is a less strongly seasonal pattern than affects

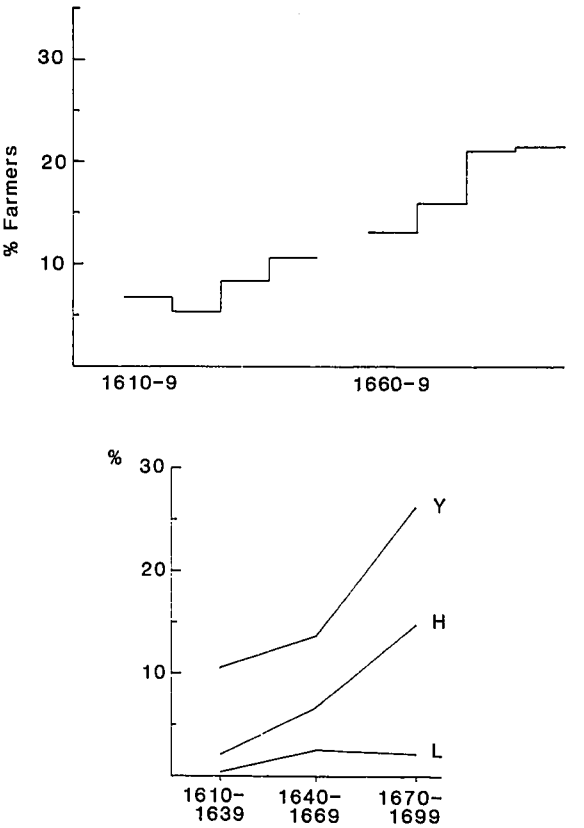


FIGURE 2
Trends in the percentage of farmers' inventories in which ground preparation is recorded.
Note: In the lower graph, Y = Yeoman, H = Husbandmen, L = Labourers. Labourers are not included in the upper graph.

some other aspects of farming (such as the mentionof particular crops), it is likely to reflect the seasonality of the underlying activity. It may therefore be appropriate to inflate the figures in Figure 2 by about 25 per cent to obtain a more accurate estimate of the frequency of major ground preparation activity amongst farmers. Naturally this increases the apparent rate of diffusion of the innovation among the farming population.

The increase of references to ground preparation may reflect the growing tendency for leases explicitly or tacitly to specify a range of obligatory cultivation practices to tenants.[17] Whether such ground

[15] HCRO 38/HW/11.
[16] HCRO 76/HW/27.
[17] Highlighted by C Clay, 'Landlords and estate management in England', *AHEIV* V, II, pp 119-251, especially pp 214-24.

preparation predominantly reflected landlord influence, or the enthusiasm or desperation of tenants, is an open question. However, there is no doubting its proliferation, and I believe that this represented a significant intensification of farming systems. It is possible that increasing ground preparation provides an example of the application in agriculture of lessons learned in horticulture. Unless the inventory evidence is totally misleading, the attention to soil preparation, which later so impressed Ellis, Walker and Young, was one of the major developments in seventeenth-century agriculture in this area.

III

Overton's method of estimating yields from inventory valuations produces estimates of yields at an aggregate level for the whole body of farmers' inventories. He does not attempt to estimate yields for individual farms. Such knowledge would be very desirable since yields on particular farms could then be related to other characteristics of farms, shedding light on hypothesised causes of yield changes and variations. Overton's reservations over attempting to estimate yields for individual farms reflect the impossibility of distinguishing, from inventories themselves, between variations in valuations per acre due to higher yields and variations in valuations per acre resulting from the dispersal of 'estimation errors' about the mean valuation per acre. This difficulty is particularly acute when only relatively few inventories provide sufficiently detailed valuations in a given year. Thus a simple map of farms on which valuations per acre of a crop were high relative to the average for that crop in that year would include both farms on which yields were high and unit valuations average, and farms on which yields were average and estimates of standing crop quantity were at the high end of the distribution.

The following section should therefore be regarded as an experiment as to whether analyses based on estimated yields for single farms will produce meaningful results. For each farm in the periods 1610-1649 and 1660-1699, I have divided the valuation per acre of each of wheat, barley and oats by the average per bushel valuation of that grain in all late summer/autumn inventories from that year. From each year I have identified the inventories containing the highest per acre valuations of each crop, provided that two criteria are met. The first is that there are at least six relevant inventories for that crop in that year, and the second is that this highest valuation per acre is at least 25 per cent above the average valuation per acre. Thus a maximum of three farms (one for each crop) could be selected by this procedure for each year. In practice the number of relevant farms is lower, because of a shortage of sufficiently detailed inventories (especially for barley before 1649 and for oats throughout), or because the highest per acre valuation was less than 25 per cent above the mean for the crop in that year. While more 'high yield' farms could be picked out using a lower threshold, it would be more likely that they owed high valuations to inadvertent over-estimates of quantities of standing grain by appraisers.

Figure 3 indicates the locations of farms thus selected. Data are too sparse to sustain

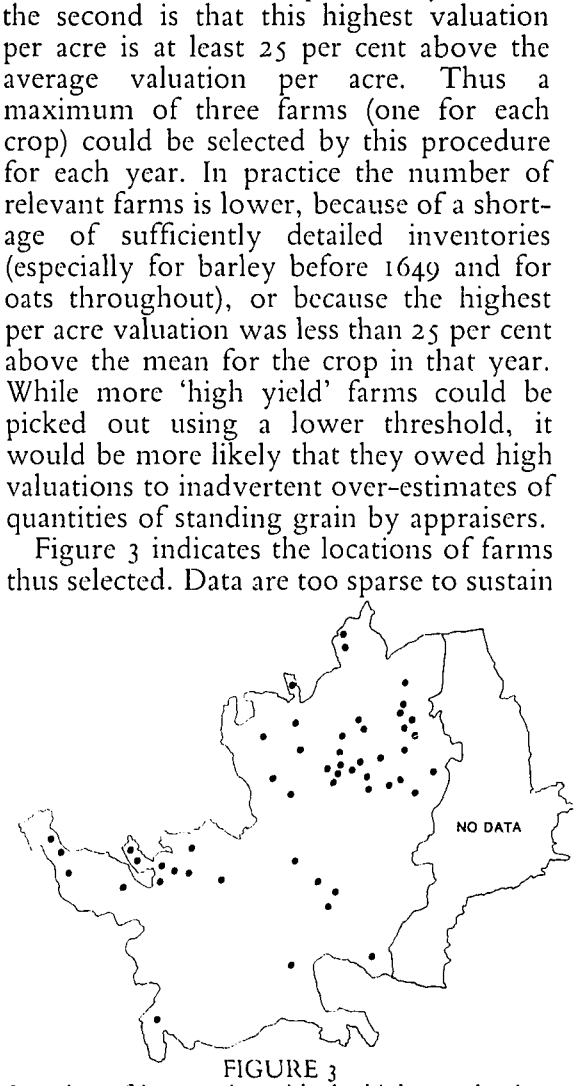


FIGURE 3
Location of inventories with the highest valuations per acre of growing crops, 1660-1699.

a detailed discussion for the period before the 1660s, but the pattern thenceforth, when crop yields appear to have been rising, is of great interest.[18] There is a striking concentration of high valuations of growing crops in two areas. The larger concentration lies in the central northern part of the county running from the Waldens, Hitchin and Stevenage in the west to the Mundens, Cottered and Rushden in the east, with a second area in the extreme west, stretching from Tring eastwards to the Gaddesdens and Flamstead. Neither of these areas coincides with a distinct region of geology, relief, or soils. The easternmost takes in areas with a range of clay, loam and chalk soils, while the western concentration consists mainly of loams on the dip-slope of the Chiltern scarp, but includes also some much chalkier areas in the very north-west. Clearly though, high valuation farms were very rare in the southern half of the county, even though large numbers of inventories survive for this area. A preliminary evaluation of this pattern then, would suggest that the increases in yields may have been concentrated in (although not necessarily confined to) particular areas within the county, mainly on lighter soils.

It would clearly be too simple to assume that higher yield areas in the second half of the century were the only locations of increased yields, or that the amount by which yields were higher than average on these farms represented the amount by which they had increased, since it is unlikely that yields had previously been approximately the same all over Hertfordshire. Even so, the emergence of much more distinct high valuation clusters suggests that there emerged distinct areas in which either higher yields were achieved or that, for some reason, appraising conventions became regionally differentiated, with consistently higher valuations of growing crops produced in two areas through the use of new valuation procedures and conventions.

One way to investigate whether regions of higher valuations are an artifact produced by a change in conventions or their application is to apply a similar procedure to other farm items recorded in inventories, to see if similar regional patterns emerge. The most germane item is stored crops, since if different appraising conventions are being applied to growing crops, then we might expect them to be applied to grain once it had been harvested. However, no such regional pattern emerges from this procedure for wheat, barley, oats or pulses. In the circumstances, the possibility that the high valuation areas represent genuinely higher yields remains. While it cannot be shown that there were systematic variations in valuation procedures which can explain the pattern found, it would be unwise to ignore the tenuous assumptions involved in using per acre valuations as a surrogate for yields *at the level of the individual inventory*. We can be less confident of the geography of yields than about the aggregate trends discussed previously, but the pattern is not obviously an artifact.

Given the broad similarity in chronology between estimated yields and the increasing proportion of farmers whose inventories included valuations of ground prepared for crops, it is of considerable interest whether there are similar parallels between the geographical disposition of 'high yield' and 'ground preparing' farms. The increasing number of inventories which recorded ground preparation was indeed reflected in a wider geographical distribution, but this distribution was very uneven. It is striking that the densest occurence of these entries lay in northern and

[18] In Figure 3, 'high valuation farms' are drawn from the following years and decades: wheat 25 years (1660s 4 years, 1670s 5 years, 1680s 8 years, 1690s 8 years); barley 22 years (1660s 3 years, 1670s 4 years, 1680s 5 years, 1690s 10 years); oats 16 years (1660s 5 years, 1670s 3 years, 1680s 4 years, 1690s 4 years). These 63 valuations relate to 51 different farms since some farms had high valuations of more than one crop. Each of these farms is plotted only once in Figure 3.

central Hertfordshire, largely overlapping the major concentration of 'high valuation' farms (compare figures 3 and 4). Before 1649 there was a slight concentration of ground preparation in the second 'high valuation' area in the west of the county, but overall these entries appeared here only slightly more frequently than in southern Hertfordshire generally.

Since the pattern of soils at a local scale is highly complex, and the location of lands in an inventory cannot usually be resolved below the scale of the parish unit, relationships between ground preparation and the nature of the soil being prepared can only be explored in general terms. The practice was far more common on predominantly chalky and loamy soils than on the heavier clays and infertile gravels to the south. In a general sense, therefore, the new methods were mainly to be found on lighter soils, though not in all light soil areas. This is consistent with the expectations of what has been termed the 'John-Jones' model of early modern agricultural innovation, which emphasizes light soil mixed farming systems as the pre-eminent location of attempts to raise arable yields in response to depressed grain prices after *c.* 1650.[19]

The characteristics of farms on which ground preparation was being recorded in inventories can easily be compared with those of farms where ground preparation was not recorded. In the 1690s, there were thirty-three active farmers whose inventories mention ground preparation and ninety-six other active farmers. The composition of the farm wealth of the two groups is compared in Table 2. It is apparent that the innovating farmers were operating much larger farms than their non-innovating counterparts (the two groups of inventories having a similar seasonality pattern), although the relative importance of crops, stock and equipment as components of total farm valuation was similar. As might be expected given the contrast in livestock valuations between the two groups, the 'ground preparers' owned a much greater variety of livestock, over 80 per cent of them owning some of each type tabulated. Also noteworthy is their greater adoption of clover and other new grasses. Nine of thirty-three 'ground preparers' had inventories including new grasses compared with only a handful of other farmers. Thus not only was ground preparation geographically concentrated, but it was mainly a feature of large farms, and farmers carrying out ground preparation were more likely to be growing 'new' fodder crops than their contemporaries (even though by the 1690s the distribution of 'fodder crop growers' showed no particular geographical concentration).

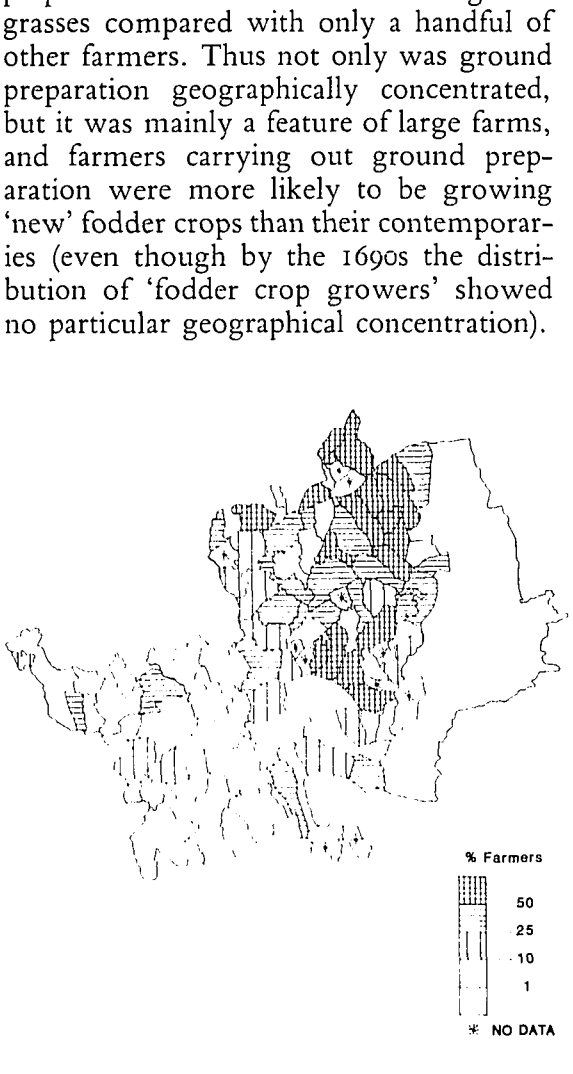


FIGURE 4
Percentage of farmers' inventories containing valuations of prepared ground, 1660-1699.

[19] Although John and Jones were concerned mainly with innovations of fodder crops, rather than the techniques being considered here.

Similarly, where inventories were compiled during the summer months, and are sufficiently detailed, the types of farm on which ground preparation was most frequent can be identified. In the context of the pattern of production changes already discussed, and the wealth characteristics of different types of farms, it is no surprise to find that the various types of grain-oriented farm were the major setting for ground preparation, or that it was particularly associated with the large sheep-corn farms, whose growing numbers and size have already been highlighted in sections IV and V.[20]

IV

This exploration of crop yields in Hertfordshire has suggested that significant improvements in output per acre had occurred by 1700. Improvements were concentrated in the later seventeenth century which, as earlier writers have noted, is slightly surprising given prevailing depressed prices for agricultural produce, especially grains. Despite generally stagnant or falling grain prices, and unfavourable price relatives between grain and livestock prices, arable output per farm increased sharply. There were three distinct components to this. First, average farm size was increasing, and the relative importance of crops and livestock did not change greatly. Secondly, average yields per acre for several crops were increasing. Thirdly, shifts in the relative importance of particular crops were away from lower yielding and lower quality crops (such as rye) and towards higher yielding grains (such as barley, of which both the yields and the cultivated area rose substantially). The timing of these increases in arable output raises a number of questions.

Neither the innovation of new fodder crops nor increased livestock numbers seem able to account for the yield increases described. While both developments can be discerned, neither of them occurred on a sufficient scale to account for a widespread improvement in yields. Instead, higher yields may be due to the more careful and more systematic ground and seed-bed preparation prior to sowing, reflected in the increasingly frequent valuations of such work which appear in inventories. These activities both reduced the impact of some types of adverse weather (for example, the impact of long dry spells, where the moisture retaining capacities of light soils were enhanced) and allowed higher yields than hitherto to be achieved under average or better conditions (through the addition of various fertilizers).

Hertfordshire agriculture was characterized on the one hand by relatively high yields, and on the other by relatively low livestock densities, high levels of manuring, considerable ploughing and weeding of fallows, and the widespread cultivation of peas and other pulses. It is intriguing that this combination of features echoes that stressed by Campbell with regard to some distinctively high-output medieval estates in north-east Norfolk.[21]

Obviously the parallel between fourteenth-century East Anglia and seventeenth-century Hertfordshire should not be overdrawn. The social, organizational and institutional contexts of the two areas at these widely separated times were clearly very different. Nevertheless, in both cases, higher crop output per acre resulted from a similar pattern of intensification of certain inputs to arable systems. If greater attention to ground preparation underlay increased yields in seventeenth-century England, medieval and early modern yield increases had much in common. The higher crop yields of the later seventeenth century cannot be seen as indicating a

[20] *Ag Hist Rev*, 36, pp 68-72.

[21] B M S Campbell, 'Agricultural progress in medieval England: some evidence from east Norfolk', *Econ Hist Rev* 2nd series XXXVI, 1983, pp 26-46.

decisive break between medieval and modern agriculture, but rather continuity in the techniques by which land productivity could be raised. A more important difference between the two periods lay in new configurations of social and institutional structures, such that more labour intensive techniques were not confined to a few particular geographical contexts, as they had been in the thirteenth and early fourteenth centuries.[22] A decisive break between medieval and modern techniques *per se* awaited much later changes of mechanization and artificial fertilizers.

It is unhelpful to assume that early modern yield increases were attained in one uniform way, a view recently neatly summarized by O'Brien:

'At the core of a protracted process . [of agricultural change] . was a set of fodder crops which offered a solution to the age-old problem of how to raise the capacity of farmland to carry more animals. By the early nineteenth century (perhaps long before), a major distinction between England and large parts of continental Europe was the more animal intensive character of its agriculture'.[23]

It would be foolish to deny that the introduction of crops such as clover and turnips was later of critical importance, but they were not *necessary* conditions for sustained improvements in crop yields.

The continued arable emphasis of Hertfordshire agriculture, and the chronology of increasing crop yields, fit fairly comfortably with E L Jones's notion that farmers committed to arable production might respond to falling prices by attempting to raise grain output and hence maintain farm revenue. However, the ways in which I have suggested grain output was increased differ from those envisaged by Jones in two ways. First, in emphasizing ground preparation rather than new fodder crops backed up by higher livestock densities; and second, because Jones emphasized cost-cutting strategies for farmers, whereas the evidence presented here concerns the wider use of labour intensive techniques.

The latter feature raises the question of why labour-intensive innovations would have been introduced at a time when labour was becoming more expensive (insofar as agricultural wage rates were rising in real terms). But whether increased labour inputs actually raised farmers' costs depends on the form and organization of farm labour. If extra labour inputs were drawn from servants on annual contracts, then they would not in themselves have increased labour costs, unless more servants were hired. And this was a period in which the importance of farm servants increased at the expense of day labourers in regions of arable and mixed husbandry, as real daily wage rages increased after *c.* 1640.[24] Even if ground preparation was performed entirely by day labourers, quite minor changes in the *pace* of work could bring about significant changes in labour productivity. At all events, it is difficult to interpret ground preparation as anything other than deliberate modification of agricultural practice. We cannot argue that yields were raised 'inadvertently' by moves towards more pastoral types of agriculture.

The general thrust of this argument is consistent with Jones's suggestion that some farmers were attempting to invest their way out of falling incomes, even though this ensured in the medium term that grain prices would remain low. It is not easy to substantiate the suggestion that investment by farmers inveased, since we cannot trace actual income, investment expenditure or consumption expenditure from inventories. The relation between these money flows and the capital stocks recorded in inventories is unlikely to be

[22] In particular, the relationships among enclosure, market integration and ground preparation demand attention.

[23] P K O'Brien, 'Agriculture and the home market for English industry, 1660–1820', *Eng Hist Rev*, 100, 1985, pp 773–800, quote from p 779.

[24] Kussmaul *op cit*, pp 97–119.

straightforward, but we can make simple comparisons between the wealth represented by a farmer's farm equipment, and by his personal and household possessions.[25]

Figure 5 shows the outcome of this comparison for all the farm inventories. The graph plots the importance of total valuations of farm equipment (gear, tools etc,) relative to the combined total valuations of farm equipment and household goods. This is clearly a very crude calculation, since changes in the value of farm equipment provide only a poor surrogate for investment, and changes in the valuation of household goods provide only a poor surrogate for consumption. Even so, the steady upward trend of farm equipment valuations relative to household goods valuations from the middle decades of the seventeenth century provides food for thought. The most obvious explanation of this trend is that patterns of spending changed. This in turn can most easily be explained by changes in attitudes towards investment. It is certainly not the product of a withdrawal from consumption, as is clear from detailed analysis of the volume and composition of farmers' inventoried household goods.[26]

Thus far I have accepted the arguments of Jones and others that price relatives were moving away from the arable sector to favour the producers of livestock and livestock products, and that shifts in price relatives underlay some changes in agricultural specialization. This orthodoxy has



FIGURE 5
Trends in mean valuation of farm equipment relative to mean valuation of household goods.

recently been challenged by O'Brien.[27] O'Brien develops new price series for the period 1660-1815 covering grain prices, animal products, and a variety of industrial commodities. He argues that

'the new price indices suggest that the reallocation of resources from arable to pastoral husbandry had little to do with inducements offered by shifts in relative prices. Between 1660 and 1820 the movement in the relative prices of grains compared to animal produce is almost imperceptible. ... On balance, English farmers were not receiving the strong price signals (posited by several agrarian historians) to shift land and other resources from arable to pasture.'[28]

Whilst the availability of high quality price series for many commodities is a major step forward, there are several respects in which O'Brien's series reveal much more about the situation of consumers than the situation of farmers. The most important is that he is concerned with prices per unit of sale (per bushel, per lb, per pint of milk, etc.), not with prices per unit of production (per acre of crops, per sheep, per cow). Prices per item of sale (at wholesale markets, moreover) are unlikely to have borne a constant relation

[25] 'Farm equipment' includes gear such as carts, ploughs, harrows, wheels, husbandry tools, measures, and dung and compost, together with some items involved in processing such as malt mills, malting equipment, and shears. 'Household possessions' include all furniture, ornaments, clothing, linens, brass, pewter, ironware, and luxuries such as gold, silver, plate, books and clocks. They do not include either cash in the deceased's purse or elsewhere in the house, and take no account of debts owed to or by the deceased.

[26] P Glennie, 'The emergence of a consumer society in south-east England' (forthcoming).

[27] O'Brien, *op cit.*

[28] O'Brien, *op cit*, pp 779.

to prices per unit of production over the limited period 1660-1700, let alone the period 1660-1820. For O'Brien's price series to be useful in summarizing the income situation facing farmers, two assumptions would have to hold. Both relate to stages intermediate between the farmer's decision to produce and the market.

The first assumption is that the relative importance of production and transport costs contained in wholesale prices was constant, or at least that it shifted at the same speed for different commodities. If grain, livestock or animal products could be got to market, or sold via middlemen outside open markets, more efficiently, then we would expect wholesale prices to move partly independently of farmers' profits. Chartres suggests that several important developments were underway in this period, and that they affected some sectors, and some regions, very much more than others.[29]

The second assumption is that it is unnecessary to take account of productivity changes in agriculture, yet we can be sure that these will be highly disruptive to the relationship between market prices and farm profits. The interpretation of series of prices per unit of sale in terms of farmers' incomes is hazardous where, for example, the productivity of livestock or crop yields per acre are increasing. Yet in the case of grains, this is precisely what John and Jones suggest was crucial in shaping farmers' reactions! The yield increases discussed above have been inferred from the divergence of trends in valuations per bushel of stored grain (i.e. the price per unit of sale) and valuations per acre of growing grain (i.e. the price per unit of production). Similarly, if animals were getting larger, leaner, or higher-yielding of wool, milk and so on, then prices per unit of produce fail to provide an appropriate measure of income potentially available to farmers from particular types of livestock husbandry. O'Brien's claim that farmers did not receive price-driven income signals reflects a method which brackets out the possibility of the very productivity shifts whose existence we want to investigate.

The O'Brien price series also raise the problem of the applicability of national or multi-regional price series in the explanation of regional or local level trends in farm income. On the one hand, there is little doubt but that inter-regional price differentials for most commodities diminished during this period, and that a more nationally integrated marketing system for agricultural commodities was reflected in a greater synchronism in price movements in different parts of the country. On the other hand, changes in crop yields and the quality and productivity of livestock are each likely to have been concentrated in particular areas. Consequently, the relationship between price per unit of sale and price per unit of production was probably at least as variable geographically as it was temporally. It would be most surprising if the precise patterns of geographical variation did not change substantially over time.

Overall, then, considerable caution is required in attempting to infer the consequences for farm income of farmers' land-use decisions from series of wholesale or retail prices. Moreover, the degree to which farmers were price-responsive appears to have changed during the seventeenth and eighteenth centuries, as landholding became more polarized and less subsistence-oriented, and as cultural changes prompted shifts in how both landlords and tenants regarded the purpose and aims of farming.[30]

[29] J Chartres, 'The marketing of agricultural produce', *AHEW* V II, pp 406-502.

[30] J Thirsk, 'Agricultural policy: public debate and legislation' and 'Agricultural innovations and their diffusion' in Thirsk (ed), *AHEW* V II, pp 298-388 and 533-89, especially pp 546-59; K Tribe, *Land, Labour and Economic Discourse*, 1978, pp 53-79; K Wrightson, *English Society, 1560-1680*, 1982, pp 135-6.

V

This paper has dealt only with trends in crop productivity per acre. Labour productivity remains almost inaccessible. Neither do inventories offer much insight concerning trends in livestock productivity. Changes in the number of livestock per farm can easily be calculated, but the size of animals, the quality of their outputs, the combination of outputs they produced, and the throughput (or speed of turnover) of animals through the farm cannot be determined. All of these are ways in which livestock productivity could increase without involving larger herds or flocks. The way in which inventories were compiled, and the lack of contemporary understanding of breeds and genetics, means that improvements (or at least interest) in livestock quality can only occasionally be suspected, for example in unusually specific entries such as Henry Edlin's '6 milchbeasts or kine and 1 heireford calfe' worth £17 10*s* 0*d* at Watford in 1614.[31] Even in entries like these, however, we cannot be sure exactly what his appraisers meant by 'heireford', and the chronology of general improvements in livestock husbandry is likely to remain obscure.[32]

The foregoing discussion raises at least as many questions as it answers. In several sections, the inventory data have been pressed quite hard, and further quantitative analyses of data from probate inventories are needed before the methodological acceptability of particular measures of agricultural activity can be adequately evaluated. In particular, the attempt to use high per-acre valuations of growing crops to identify individual farms on which yields were high reveals some highly suggestive regional patterns, but may go beyond the range of legitimate inference in ascribing these to genuine yield differences rather than other factors. To some extent it will be easier to judge the validity of this approach once further studies are available and the plausibility of the patterns which they produce. However it would probably be naïve to expect an unambiguous verdict.

If it were to be concluded that the exploration of 'yields' at the level of the individual farm is useful, then two particular investigations would be worthwhile. First, a more detailed comparison of 'yield' and innovations, whether ground preparation, new crops or others. Secondly, an investigation of the relationship, if any, between 'yield' and some measure of investment.

The answers to further questions (such as the relationship between enclosure and yields, how input changes were understood and communicated, the detail of relationships between local topography, crops and yields, and direct measures of labour productivity) clearly cannot be approached adequately using inventories alone.

These enquiries also require the integration of the present aggregate-level analysis with more detailed local studies: for example, the relationship between enclosure and ground preparation practices, or trends in the size of the agricultural labour force and the intensity of its work. Both the application of new analytical techniques, and the integration of research focusing at very different geographical scales, will be of central importance in answering the many questions directly raised, and indirectly stimulated, by the *Agrarian History* volume V, and by reviewers and commentators.

Appendix 1

Methods of yield estimation

Methods such as Overton's which estimate yield trends by comparing pre-harvest valuations of standing grain with post-harvest valuations of stored grain face

[31] HCRO ASA 25/2360. This is the earliest such mention found. Examples are rare before the 1680s.

[32] A very crude measure would be to divide the selling prices of particular types of livestock by the selling prices of particular animal products, but the multi-purpose role of most animals means that this is a much more dangerous procedure than the equivalent calculation for crops. For a recent overview of the field, see N Russell *Like engend'ring like: heredity and animal breeding in early modern England*, Cambridge, 1986.

problems because only a minority of inventories specify areas/volumes and prices for cereal crops individually.[33] Many inventories are excluded because they refer to the 'wrong' time of year, or because they value combinations of crops (e.g. '85 acres of wheat and barley' ... £100) or because they lump valuations (e.g. '17 acres of wheat and 12 acres of oats... £25') or because they omit quantity (e.g. 'the barley in the barn ... £25').

Hence it is almost unavoidable, unless inventories from a very large area are grouped together, that inventories from more than one year are grouped together for analysis. Where our main interest is in long-term trends in yields rather than short-term fluctuations some temporal lumping of inventories is appropriate in any case. However, there is more than one way in which temporal lumping can be incorporated into Overton's procedure.

Overton's preferred method is to reach an average 'yield' figure by dividing every per acre valuation from the same run of years. The resulting figures are then weighted according to the number of inventories available for each combination of years, and summed to produce an overall estimate for the period. The weight applied to a single calculation is given by

$$\frac{1}{(a \times b \times c)}$$

where a = square of number of years in period

b = number of inventories with usable valuations per acre for a given cereal crop

c = number of inventories with usable valuations per bushel for a given grain.

Thus if ten-year periods are used, in a year for which there are 12 usable valuations of growing wheat and 10 of stored wheat, each of the former divided by each of the the latter contributes $1/(100 \times 12 \times 10)$ to the estimated average wheat 'yield' for that ten-year period.

As Overton recognizes, the utility of a measure produced by dividing the frequency distribution of valuations per acre by the frequency distribution of valuations per bushel depends on both distributions being approximately normal statistically. Unfortunately, the distribution of per acre valuations in the case of Hertfordshire is rather right-skewed in the earlier decades, especially for wheat, (i.e. there is a small number of valuations which are much larger than average and which exert a disproportionate upward influence on the final estimate).[34]

It is more appropriate here to follow Allen's suggestion of calculating the mean figure for each year separately (by dividing each per-acre valuation by the average per-bushel valuation), and of averaging these annual averages to produce an estimated 'yield' for a longer time period.[35] It is this procedure which produced the estimates

[33] This is particularly true for grains other than the major cash crops of wheat and barley.

[34] A right-skewed distribution has a particularly dramatic effect because grain valuations increase disproportionately in years of below average yield. A reduction in yield of say 20% below average produces a price increase of much greater than 20%. On the other hand, yields 20% above average produce a smaller decrease in price than the lower yield did an increase. This asymmetry means that a few high per-acre valuations as the numerator in a 'yield' calculation have a much greater effect than a few eccentrically high per-bushel valuations as the denominator. Thus overestimates of average yield will be produced by Overton's method when per-acre valuations are right-skewed. The whole issue of the relationship between gross yield, net yield, and price changes is discussed with great insight in E A Wrigley 'Some reflections on corn yields and prices in pre-industrial economies' in his *People, cities and wealth: the transformation of traditional society*, Oxford, 1987, pp 92–130.

[35] I have not followed another of Allen's suggestions, which is to use market prices of grain instead of the inventory valuations per bushel. The latter are lower than the former, presumably reflecting both the additional costs of transporting grain to market and the likelihood that not all grain valued in inventories would have been of marketable quality. Since this would certainly be true of standing grain valued in the fields, it seems appropriate to use inventory valuations of both pre- and post-harvest grain.

TABLE 3
Estimates of mean per-acre valuation in bushels

	Modified method		*Unmodified method*	
	Wheat	*Barley*	*Wheat*	*Barley*
1550-59	(8.2)	(10.5)	(9.0)	(11.8)
1560-69	8.4	12.2	9.2	13.1
1570-79	9.0	11.5	9.2	11.8
1580-89	9.7	10.9	10.2	11.0
1590-99	9.9	10.9	10.5	10.7
1600-09	9.7	14.1	10.9	12.8
1610-19	9.2	13.4	10.6	13.0
1620-29	8.6	11.0	9.8	11.8
1630-39	8.3	10.4	9.4	10.2
1640-49	10.3	11.5	9.8	10.2
1650-59	(12.7)	(13.3)	(10.8)	(11.8)
1660-69	15.1	13.5	11.1	13.7
1670-79	15.4	20.2	11.0	16.3
1680-89	14.6	22.4	11.0	17.1
1690-99	13.4	19.8	11.3	17.0

Note: Periods used are three-decade moving averages, centred on the decade shown. Figures in brackets are based on small numbers of inventories and include years from which no inventories survive (the early-1540s and mid-1650s).

plotted in Figure 1. A comparison with the results produced by the unmodified Overton method is given in Table 3.

The two methods produce differing estimates of 'yields' at a number of points but they are in broad agreement over the timing of trends. The skewed distribution of per-acre valuations in the early decades is reflected in the higher wheat 'yields' estimated using Overton's method. Towards the end of the seventeenth century, when the distribution of per-acre valuations is less skewed, the 'yields' calculated by the unmodified method are below those obtained by the modified method, though above those of the decades around 1600. To reiterate: the Overton method under-estimates the increase in 'yields' because of the greater degree of right-skew in the frequency distributions of per-acre valuations in the first half of the study period.

The Size and Weight of Cattle and Sheep in Early Modern Scotland

By A J S GIBSON

Abstract

This paper argues the need for a greater understanding of the size, weight and carcass composition of cattle and sheep in early modern Scotland. These questions are then addressed through a consideration of modern 'unimproved' breeds, archaeological evidence regarding bone measurements, eighteenth-century household accounts, and contemporary agricultural commentaries. On the basis of these four sources, working estimates of the carcass-weight and composition of pre-improvement cattle and sheep are proposed and their usefulness illustrated through a calculation of the nutritional contribution, and cost relative to oatmeal, of meat in the diet of masters and students at St Leonards College, St Andrews, in 1671.

In a project aimed at charting the movement of wages, prices and living standards in Scotland between 1550 and 1780[1] a quite unexpected problem emerged with regard to the size and weight of contemporary cattle and sheep. This arose from a concern, on the one hand, with the nutritional value of known diets and, on the other, with the relative cost of different types of food.[2] Both demand an appreciation of the quantities to which diet accounts or price quotations refer, and although rarely a straightforward matter – the weights and measures used in early modern Scotland are notoriously difficult to quantify – this is a particularly difficult task where meat is involved. Early sources almost invariably refer to the consumption and cost of beef and mutton in terms of whole carcasses, whilst any investigation of the nutritional value of the meat provided in early diets, or of its value relative to other foods, demands a much more precise understanding of the quantities involved.

The St Leonards College diet accounts of 1671 illustrate the problem.[3] These reveal that over the period 5 May to 29 June the masters and students consumed (among many other items) some 145½ pieces of salt beef, 141 pieces of fresh beef, and 171 quarters of mutton. Any estimate of the nutritional value of this meat requires some knowledge of the size of the pieces of beef and quarters of mutton. Glosses in the accounts show that 223½ of these pieces of beef were cut from 3¾ carcasses and, as would be expected, that each mutton 'bowk' provided four quarters. The problem thus becomes one of establishing the amount of flesh carried by these carcasses.

Similarly, oatmeal cost in the region of

[1] A J S Gibson and T C Smout, 'Wages, Prices and Living Standards in Scotland'; an ESRC funded project, the results of which are to be published in due course by Cambridge University Press.

[2] In relating the cost of one food to another the determining criterion has been the effective cost of the calories provided. Food does, of course, provide much more than just calories, but a deficiency is felt immediately as hunger and, for those whose resources did not permit indulgence or variety, the satisfaction of energy requirements was probably the most important factor governing the choice of food.

[3] St Leonards College Diet Accounts, 1671; St Andrews University Muniments, SL 530/3. I am indebted to Miss M M Innes for allowing me to use her transcripts of these accounts.

£3.13*s* 4*d* Scots per boll at this time.[4] Taking the boll to weigh 8 stone Scottish Troy (or 2228 oz Imperial Avoirdupois), and oatmeal to provide 114 Kcal per ounce, this means that a penny spent on oatmeal obtained something of the order of 290 Kcal.[5] Knowing that beef and mutton carcasses purchased by the college cost, on average, £15.6*s* 8*d* and £2.6*s* 0*d* respectively is of little use in determining the cost of meat relative to oatmeal unless we also know approximately how much meat was provided by each carcass. Further progress clearly demands some working estimates regarding the size of pre-improvement cattle and sheep and the amount of flesh they provided.

That these animals were smaller than their modern counterparts is unquestionable, but just how much smaller never seems to have been considered in any detail. Robert Trow-Smith said of the weight of seventeenth-century beef carcasses that 'there is grossly insufficient evidence... to permit any dogmatic statement to be made upon them' and was able to do no more than draw attention to what he considered to be the two extremes; an ox slaughtered in Lincolnshire in 1692 with a live-weight of nearly 32 cwt (3584 lb), and a contemporary estimate which put the live-weight of an Irish ox at 784 lb.[6] The former was originally noted only because it was an exceptional weight, but even the latter appears quite large in the face of the Scottish evidence. Such estimates led Trow-Smith to voice 'a suspicion – but no more – ... that the later improvers redistributed the weight of beef in the mature beast rather than added to it'.[7] Certainly the major concern of livestock breeders during the eighteenth and nineteenth centuries was not to increase overall carcass-weight but to change the proportion both of edible meat and the best joints on the carcass. The meat was progressively moved from the fore-quarters to the hind-quarters, the barrel rounded, the thigh and second thigh more heavily fleshed, the hide thinned, and the bone fined down.[8] Simultaneous achievements included a mixing of fat and lean meat on the carcass so that the meat became marbled, and a shortening of the time it took to bring an animal to full maturity.[9] However, whilst the largest animals of the late seventeenth century, invariably Shorthorns, were comparable in size to the largest beasts recorded at the end of the eighteenth century, other breeds, and the common run of animals, were undoubtedly to experience a considerable increase in size during the eighteenth and nineteenth centuries. Thus in 1710 the average carcass-weight of an ox was supposed, in England, to have been around 370 lb, whilst by the end of the eighteenth century Youall considered it to be more like 550 lb.[10] The Scottish evidence, although limited and drawn from a number of disparate sources, points towards a smaller average weight than might be supposed from these English figures, and a much smaller weight than was envisaged by Trow-Smith.

[4] Fiars' prices provide a valuable guide to Scottish grain prices during the seventeenth and eighteenth centuries (R Mitchison, 'The Movements of Scottish Grain Prices in the Seventeenth and Eighteenth Centuries', *Econ Hist Rev* 2nd ser XVIII., 1975, pp 278-91). Whilst there are no prices available for Fife in 1671, the Fiars' price for oatmeal in 1672 was £3.13*s* 4*d* per boll (M Flinn *Scottish Population History*, Cambridge, 1977, Appendix on Fiars' Prices). Elsewhere in Scotland 1671 prices were somewhat higher than those recorded in 1672 so this figure should be seen as a minimum price at which oatmeal could have been purchased.

[5] The oatmeal boll was not defined as 8 stone Scottish Troy weight until 1696 (*Acts of the Parliaments of Scotland*, Vol 10, p 34, c6), but as this seems to have been an attempt to standardize the existing boll by measure in terms of weight it may be taken as the size of the boll in 1671. According to A A Paul and D A T Southgate's *McCance and Widdowson's The Composition of Foods*, 4th revised edition, MAFF, 1978 oatmeal provides 113.68 Kcal per ounce.

[6] R Trow-Smith, *A History of British Livestock Husbandry to 1700*, 1957, p 240 quoting A Young, *Farmer's Tour through the East of England*, 1771, Vol. I, p 469 and J O'Donovan, *The Economic History of Livestock in Ireland*, Cork, 1940, p 47.

[7] R Trow-Smith, op cit., p 240.

[8] R Trow-Smith, *A History of British Livestock Husbandry, 1700 – 1900*, 1959, p 170.

[9] *Ibid.*, pp 257-8.

[10] J Clutton-Brock, 'British Cattle in the Eighteenth Century', *The Ark*, Vol. IX (2), 1982, p 56.

The paucity of the evidence does mean that only the broadest guide to the average weight of pre-improvement Scottish cattle and sheep can be claimed, but even more problematic is the fact that individual animals would always have varied greatly in size, weight and composition. The age, breed and the time of year an animal was slaughtered would clearly have affected its size; as would the region and even locality in which it was raised. Cattle pose particularly severe problems, as recognized by the Town Council of Aberdeen who, whilst meeting annually for much of the sixteenth and seventeenth centuries to set the price of mutton, usually shied away from fixing the price of beef carcasses specifically because their size was so variable.[11] The difficulty lies in the fact that although it is possible to establish a reasonable estimate of the average weight of cattle and sheep carcasses, the distribution of individual weights about the average is so great that the actual animals referred to in diet accounts and price series may be very different indeed. Unless such accounts and price series provide some internal evidence on the size of the animals in question (and they very rarely do) it must be accepted that the weights determined in this paper can only provide the most general working estimates necessary for the analysis of relative food costs and the nutritional value of known diets in early modern Scotland. This variability of carcass-weights clearly poses considerable problems for the interpretation of diet accounts and price series, but the present task is to establish some realistic estimates regarding the average size and weight of pre-improvement cattle and sheep. To this end evidence has been sought from four sources;

1) a comparison with modern 'unimproved' breeds
2) archaeological evidence (extrapolation from bone measurements)
3) general agricultural commentaries
4) Slaughter books and household accounts

Used together these sources provide some indication of the average weight of pre-improvement cattle and sheep, the relationship between live-weight and carcass-weight, the amount of meat and edible fat on the carcass, and the nature (and hence nutritional value) of that meat and fat.

I

The evidence refers to both live-weight and carcass-weight, whilst the ultimate goal is to establish the amount of usable flesh on each carcass. Carcass-weight relative to live-weight is described by the killing-out percentage. As tabulated by Sir J B Lawes in the nineteenth century,[12] this percentage varies with the type of carcass slaughtered;

	Killing-out Percentage
Store Cattle	50 – 51
Fresh Store Cattle	52 – 53
Moderately Fat Cattle	54 – 57
Fat Cattle	58 – 62
Very Fat Cattle	62 – 65

Unimproved breeds would certainly have lain towards the lean end of this range as small scraggy animals naturally tend to have a higher proportion of skin, bone and entrails relative to body-weight than larger animals. B Noddle has assumed a killing-out percentage for Anglo-Saxon and medieval cattle of 45 per cent,[13] but if some degree of fattening for the market may be presumed then an average killing-out

[11] Minutes of the Annual Head Court, held in October or November, and recorded in the Aberdeen Town Council Register held at the Town House, Aberdeen.

[12] J B Lawes, *Tables for Estimating Dead Weight and Value of Cattle from Live Weight*, (undated, but published by the Agricultural Society of England in the late nineteenth century).

[13] B Noddle, 'The Determination of the Body Weight of Cattle from Bone Measurements', *Domestikationsforschung und Geschichte der Haustiere, Internationales Symposium in Budapest, 1971*, edited by Janos Matolcsi, Budapest, 1972, p 384.

percentage of 50 per cent seems more reasonable.

The amount of edible flesh carried by such carcasses has also been analysed[14], and it too varies according to the type of carcass:

	Type of Carcass		
	Lean	*Average*	*Fat*
Lean Meat	66%	59%	50%
Edible Fat	13%	21%	32%
Tallow Fat (Kidney Knob and Channel Fat)	3%	4%	5%
Bone	18%	16%	13%

Before the fashion for breeding fat animals took hold, the majority of beasts would have tended towards the 'lean' end of this range, and both M L Ryder and B Noddle have suggested that a total fat content of 15 per cent would be a reasonable estimate for pre-eighteenth-century animals.[15] It has also been suggested that breeding for meat has led to a shift in fat distribution within the body.[16] Unimproved breeds, and those bred for milk production, tend to have a relatively higher proportion of internal fat (i.e. as the kidney knob and channel fat) and less subcutaneous fat; a distribution which would have resulted in a smaller proportion of edible fat on the carcass. A reasonable estimate of carcass composition in early breeds would seem to be:

	Percentage of Carcass-weight	*Percentage of Live-weight*
Lean Meat	66	33
Edible Fat	12	6
Tallow Fat	4	2
Bone	18	9
Remainder [Head, hide and entrails]	–	50

Using these figures, 78 per cent of a carcass or 39 per cent of a live animal may be presumed to be edible flesh; the nutritional value of which may be calculated from modern tables of food composition on the understanding that 85 per cent of that flesh was lean meat and 15 per cent was fat. Although only a broad estimate, this would mean that after cooking the edible flesh provided about 44 Kcal per ounce.[17]

Turning to the question of how much flesh pre-improvement cattle may have carried at the end of the nineteenth century Pitt-Rivers suggested that the Kerry was comparable in size to Romano-British cattle.[18] The Kerry, however, with a live-weight of about 1000 lb, is not a particularly small animal and M L Ryder has argued that the Dexter, with a live-weight of only about 650 lb, is a more appropriate modern analogy for the Celtic ox.[19] With a carcass-weight in the region of 325 lb, and therefore providing about 253 lb of flesh, the Dexter is certainly much more in keeping with the size of pre-improvement breeds as determined by recent archaeological studies.

Through the examination of modern carcasses and skeletons B Noddle has found that certain bone measurements provide a useful guide to the fat-free carcass-weight of cattle.[20] Assuming that this relationship holds good for early breeds, Noddle calculated the probable fat-free carcass-weight of a number of animals discovered at British archaeological sites. Taking these fat-free carcass-weights to represent 42 per cent of the live-weight of cattle her results are summarized in the table below.

Great variation in the size of animals is clearly implied by these measurements of bone material, but the evidence also points to an average fat-free carcass-weight of

[14] A J Kempster, A Cuthbertson and G Harrington, *Carcass Evaluation in Livestock Breeding, Production and Marketing*, 1982.
[15] M L Ryder pers comm; B Noddle, *op cit.*, p 381.
[16] M L Ryder, pers comm.
[17] According to A A Paul and D A T Southgate, *op cit.*, lean beef provides about 27 Kcal per ounce and beef fat about 138 Kcal per ounce after cooking. If early-modern carcasses comprised 85 per cent lean meat and 15 per cent edible fat then each cooked ounce would provide about 44 Kcal.
[18] A Pitt-Rivers, *Excavations in Cranborne Chase*, Vol II, 1898, pp 218-9; quoted by Trow-Smith, *British Livestock Husbandry to 1700*, p 21.
[19] M L Ryder, 'Livestock', in S Piggot (ed) *The Agrarian History of England and Wales*, I part 1, Cambridge, 1981, p 384.
[20] B Noddle, *op cit.*, pp 377-84.

	Bone Measurements	*Fat-Free Carcass-weight*			*Live-weight*		
	n	*lb*			*lb*		
		Min	*av*	*max*	*min*	*av*	*max*
Anglo-Saxon	71	49	252	525	117	600	1250
Medieval	27	159	257	324	379	612	771
Late-Medieval	14	35	215	412	83	512	980

about 250 lb (implying an overall carcass-weight of about 300 lb) and thus a live-weight of about 600 lb.

General agricultural commentaries also provide some evidence, although as it was not until Sir John Sinclair's *Statistical Accounts* of the late eighteenth century that any systematic examination of Scottish agriculture was undertaken much of the evidence post-dates the beginnings of the scientific breeding which so improved the native cattle stock. In Sinclair's *General Report of the Agricultural State, and Political Circumstances of Scotland* of 1814 William Aiton noted the weights of the principal breeds of cattle found at the turn of the century.[21] The figures are almost certainly in Imperial Avoirdupois and refer to carcass-weights:

Highland Cattle; The best 3-year old – 364 to 420 lb [The smallest were scarcely half this.]

Norlands Cattle; Oxen – 440 lb
Cows – 180 lb
[These were to be found in Orkney and Shetland and were the smallest breed in Britain.]

Galloway Cattle; The best 3-year old – 574 lb
The best 4-year old – 798 lb

North-eastern Breeds; 4- or 5-year old stots – 560-672 lb [Aiton notes that these breeds had at least doubled in size over the preceeding 30 years, principally through selective breeding and winter feeding with turnips.]

Fife Breeds; The best 3-year old bullocks – 448 lb

The Wild Breed; Oxen – 490 – 630 lb
Cows – 350 – 490 lb
[These were also known as White Cattle. They were systematically culled and although possibly the direct descendents of an aboriginal breed they would have been considerably larger.]

These figures are broadly supported by those given by George Culley[22] (although he was concerned mainly with English breeds), and by James Anderson, John Smith, John Thomson and George Robertson in their *General Views* of the agriculture of Aberdeen, Argyll, Fife and Midlothian respectively.[23] The latter two authors also noted the weights achieved, in these two most favoured of Scottish counties, by their local breeds of cattle. In Midlothian they were 'short legged and thick bodied' and weighed, on average, between 418 and 627 lb, whilst in Fife they weighed, when fattened for the butcher, from 525 to 1044 lb. A carcass at the top end of this range, indicating a live-weight of about 1600 lb, was certainly large by Scottish standards, but was still only about half the size of the largest English Shorthorns. Charles Collings of Ketton near Darlington fed on one ox – the Durham Ox – to 3024 lb at five years only to sell him into a fate of six years' itinerant exhibition throughout Britain.[24] Such weights were, however, exceptional and even the largest Fife carcass of

[21] W Aiton, 'On the Livestock of Scotland', chapter 14 of Sir John Sinclair's *General Report of the Agricultural State, and Political Circumstances of Scotland*, Vol. III, Edinburgh, 1814.

[22] G Culley, *Observations on Livestock*, 1807.

[23] J Anderson, *General View of the Agriculture of the County of Aberdeen*, Edinburgh, 1794; J Smith, *General View of the Agriculture of the County of Argyll*, Edinburgh, 1798; J Thomson, *General View of the Agriculture of the County of Fife*, Edinburgh, 1800; and G Robertson, *General View of the Agriculture of the County of Midlothian*, Edinburgh, 1793.

[24] R Trow-Smith, *British Livestock Husbandry, 1700 – 1900*, p 238.

1044 lb was hardly indicative of the common run of beasts sent to market.

In addition to these observations, two rather different estimates of carcass-weights are to be found. James Cleland, writing at the beginning of the nineteenth century, estimated the average carcass-weight of no less than 10,859 cattle slaughtered in Glasgow in 1815 to be 416 lb.[25] Over a century earlier, Gregory King had estimated the average carcass-weight of 'Beeves' slaughtered in late seventeenth-century England to be 360 to 370 lb.[26] The two estimates are not, of course, strictly comparable, and the accuracy of both statements is open to question (Robert Harley, a contemporary of Gregory King, considered his estimate to be too high[27]), but it does seem likely that the difference between them reflects what must have been a slow but perceptible increase in the size and weight of cattle over the eighteenth century; an increase noted by many agricultural commentators in the late eighteenth and early nineteenth centuries.

William Aiton ascribed this increase (as well as the general variability of cattle weights) principally to the conditions under which cattle were kept.[28] Winter feeding, particularly with turnips, was seen as paramount to the production of large beasts; a practice which became widespread only towards the end of the eighteenth century. It is almost certain[29] that there was a general increase in cattle weights in the centuries leading up to 1815, but if we must make some overall estimate of pre-improvement cattle-weights from the evidence of these agricultural commentators then a carcass-weight of about 300 lb (providing 234 lb of flesh) seems quite reasonable.

Slaughter books and household accounts provide the final source of evidence on cattle weights. Usually these do little more than record a few miscellaneous weights. The Ochtertyre House Book of Accompts for 1738 provides a case in point[30], for in it are a series of references to cattle killed and consumed on the estate for example:

Quarter of a large ox	8 stone
Hind-quarter of beef	5½ stone
Leg of beef	6½ stone
Quarter of beef	4 stone 5 lb.
Hind-leg of a stott	3½ stone

Somewhat later, in 1774, a note of a 'Beeve' killed for the use of the Grant family at Monymusk[31] gave the total weight of the four quarters as 372 lb. This is very similar to the four-year old black bullock killed by Macintosh of Borlum in 1730 which, as he reported to the Society of Improvers in the Knowledge of Agriculture in Scotland,[32] had a carcass-weight of 392 lb. Occasionally, however, the accounts concerned themselves with larger numbers and a more reliable guide to the average weight of contemporary cattle is provided. At Gordon Castle in 1779 some 16 oxen and 5 'Isle of Skye' cows were slaughtered. Carcasses of the former weighed, on average, 624 lb whilst those of the latter only 321 lb.[33]

By far the best evidence, however, comes from the Buchanan estate of the Earl of Montrose where cattle and sheep were being raised for the Glasgow market.[34] Carcass-weights were only recorded

[25] James Cleland, *Annals of Glasgow*, Glasgow, 1816, Vol. I, pp 324-7.

[26] 'Gregory King on the State of England in 1695' and 'Gregory King Elaborates on his Calculations in Reply to Criticisms by Robert Harley, 1697', in J Thirsk and J P Cooper (eds) *Seventeenth-Century Economic Documents*, Oxford, 1972, pp 770--98.

[27] *Ibid.*, p 797.

[28] W Aiton, *op cit.*, pp 90-100.

[29] J Clutton-Brock *(op cit.*, p 56) has suggested that Shetland and Highland cattle of the late eighteenth century were no larger than their medieval ancestors.

[30] James Colville (ed) *Ochtertyre House Book of Accompts, 1737 – 1739*, Scottish History Society, Vol 55, Edinburgh, 1907.

[31] Scottish Record Office (SRO), GD 345/990; Grant of Monymusk Muniments, 'A Note of a Beeve killed for the use of the family, 1 October 1774'.

[32] R Maxwell, *Select Transactions of the Honourable The Society of Improvers in the Knowledge of Agriculture in Scotland*, Edinburgh, 1743, pp 294-5.

[33] SRO, GD 44/52/96(1); Gordon Castle Muniments, Account of Cattle and Sheep Slaughtered at Gordon Castle, 17 Nov 1779 to 24 Oct 1780.

[34] SRO, GD 220/6/1413-1579; Montrose Papers for Stirlingshire, Farms Accounts, 1752 – 1786.

when animals were slaughtered for family consumption, but as this amounted to 139 stotts and 57 cows over the period 1752 to 1780, the numbers involved were quite substantial. The variability of cattle-weights is striking, but no apparent trend emerges over twenty-eight years covered by the accounts. The average carcass-weight of the stotts was 424 lb whilst that of the cows was 338 lb. An overall average carcass-weight of 380 lb seems reasonable, and this figure may be added to those already established from the other sources considered:

1. through a comparison with modern breeds – 325 lb
2. on the basis of the archaeological evidence – 300 lb
3. from general agricultural commentaries – 300 lb
4. from slaughter books and household accounts – 380 lb

Although a general increase in average carcass-weights over the sixteenth, seventeenth and eighteenth centuries must have occurred, and though there must always have been a wide distribution of individual weights about the average, a carcass-weight of about 310 lb would seem to be a reasonable working estimate. Such would contain about 242 lb of flesh, 206 lb being lean meat and 36 lb being edible fat. Returning to the illustrative problem with which we began, using these figures the masters and students at St Leonards College in May and June of 1671 would together have been provided with a daily average of 21 lb of beef contributing approximately 13 per cent of the total energy provided by their diet.[35] Similarly, if the cattle bought by the college provided, on average, 242 lb of flesh – or 170,368 Kcal – for an average price of £15 6*s* 8*d* then a penny spent on beef would have purchased only 46 Kcal. As a source of energy beef was thus about six-and-a-half times more expensive than the oatmeal which provided in the region of 290 Kcal per penny.

II

Similar calculations may be made with regard to sheep. Modern lamb carcasses comprise about 65 per cent lean meat, 12 – 18 per cent fat and 15 – 18 per cent bone. In older animals the proportion of bone is higher, as much as 22 per cent. Unimproved breeds, however, tend to have lighter skeletons – bringing the proportion of bone down to about 18 per cent of carcass-weight.[36] Carcasses of Scottish sheep at the end of a winter on the mountains have been found to contain only 10 per cent fat; described as 'pregnant skeletons covered with wool'[37] these probably represent an extreme – a more likely working estimate would be 15 per cent fat. Establishing the killing-out percentage of early breeds is a little more problematic. Modern lambs kill-out at about 50 per cent, older animals at 60 per cent.[38] But as has been suggested with respect to cattle, unimproved animals naturally tend to have a lower carcass-weight relative to live-weight. A killing-out percentage of about 50 per cent seems reasonable, although this may be a little optimistic as sheep about to die of prolonged malnutrition have been found to contain as little as 30 per cent carcass-weight relative to live-weight.[39]

[35] There were, on average, just under 60 'pieces' of beef cut from each carcass. If each carcass provided 242 lb of flesh, then each 'piece' would have weighed 65 ounces. Some 286½ pieces of beef were consumed over the 56 days covered by the accounts, a daily average of just under 21 lb to be shared between the masters and students. It is difficult to be sure of the number of individuals living at St Leonards at this time, but the average total daily provision of energy was about 115,000 Kcal of which about 13% (14,800 Kcal) was provided by the beef.

[36] M L Ryder, pers comm.

[37] A J F Russel, R G Gunn & J M Doney, 'Components of Weight Loss in Hill Ewes during Winter', *Animal Production*, 10, 1968, pp 43-51.

[38] M L Ryder, pers comm.

[39] H H Mitchell, W G Kammlade & T S Hamilton, 'Alfalfa, Clover and Timothy Hay for Sheep', *University of Illinois Agricultural Experimental Station Bulletin*, 317, 1928; quoted by B Noddle, *op cit.*, p 384.

The 'prehistoric' Soay sheep has fat deposited internally rather than subcutaneously,[40] just as appears to be the case with unimproved breeds of cattle. It is likely, therefore, that pre-improvement sheep contained relatively less edible fat than their modern counterparts and that an acceptable estimate of carcass composition would be:

	Percentage of Carcass-weight	*Percentage of Live-weight*
Lean Meat	66	33
Edible Fat	12	6
Tallow Fat	4	2
Bone	18	9
Remainder [Head, hide and entrails]	–	50

Although their skeletons have not attracted the sort of detailed analyses undertaken for cattle, sheep from the neolithic to the middle ages are reckoned from bone measurements to show about the same range of height as modern Soay sheep.[41] This breed has a live-weight of about 80 lb for rams and 55 lb for ewes, although both vary considerably from season to season.[42] This suggests carcass-weights of about 40 and 27 lb respectively. M L Ryder has also drawn attention to the modern Orkney and Shetland breeds as being similarly comparable to earlier unimproved Scottish breeds.[43] The carcass of a mature Orkney wether weighs only about 30 lb, the mature Shetland about 32 lb.

William Aiton identified and recorded the average weights of four breeds of sheep present in late eighteenth-century Scotland;[44] the Aboriginal or Hebridean; the Blackface; the Cheviot; and the Leicester or Dishley. Other early agricultural writers noted the weights of the native Shetland, the ancient Fife and the contemporary Midlothian breeds of sheep.[45]

		Carcass-weight
Hebridean		20 lb [often much less]
Blackface	(fat wether)	52 lb
	(ewe)	40 lb
Cheviot	(wether)	60 – 72 lb [when fed on turnips]
	(draft wether)	48 – 60 lb
Leicester	(young wether)	80 – 120 lb
	(ewe)	64 – 104 lb
Old Fife		33 – 36 lb [even when fat]
Midlothian		52 lb [maximum]
Shetland		32 lb

The Hebridean, Shetland and Old Fife breeds stand quite distinct from the rest. These were local remnants of the native white-faced breed, whereas the Blackface, Cheviot, Leicester, and probably the Midlothian, were all eighteenth-century innovations.[46] By the nineteenth century few of the ancient white-faced breed remained; as mutton animals they were negligible and, although unsurpassed for quality, their wool clip was equally small. Ousted by the Cheviot and the Blackface, a few flocks were still to be found on the Scottish islands and one was maintained in the ancient style by the Earl of Cawdor at Nairn.[47] Here even the best feeding succeeded only in bringing wethers from the 32 lb carcass-weight recorded by Robson in 1794 to about 13 lb the quarter.[48] For unimproved Scottish breeds an average carcass-weight of the order of 30 lb does not seem unduly pessimistic in the light of this evidence.

The great leap forward in sheep weights took place, not with the improvement of the native stock, but with its replacement by the larger breeds of northern England and the borders: the Linton from the hills of Yorkshire and Westmorland from which the Scottish Blackface descended;

[40] M L Ryder, pers comm.
[41] M L Ryder, 'Livestock', *AHEW*, I part I, p 364.
[42] P A Jewell, C Milner & J M Boyd, *Island Survivors: The Ecology of the Soay Sheep of St Kilda*, 1974, pp 101-4.
[43] M L Ryder, *Sheep and Man*, 1983, pp 531-39.
[44] W Aiton, *op cit.*, pp 108-48.
[45] G Culley, *op cit.*, p 102; J Thomson, *General View . . . of Fife*, p 262; George Robertson, *General View . . . of Midlothian*, p 53.
[46] M L Ryder, *Sheep and Man*, p 514.
[47] R Trow-Smith, *British Livestock Husbandry, 1700 – 1900*, p 276.
[48] J Robson, *Agriculture of Argyll and West Inverness*, 1794, p 8,24.

and the Cheviot from the hills on either side of the Anglo-Scottish border. Unfortunately, surviving slaughter books and household accounts seem to refer to these imported breeds and may not be directly relevant to the weight of Scottish sheep in earlier centuries. An exception may be the fifty-six wedders which were killed at Gordon Castle between November 1779 and October 1780.[49] These had an average carcass-weight of 35 lb. Four ewes were also killed, but with an average carcass-weight of 48½ lb the suspicion must be that these were representatives of one of the new imported breeds.

Once again, however, the farm account books of the Earl of Montrose's estate of Buchanan provide the most detailed evidence.[50] Between 1752 and 1780 some 299 wedders were killed for the family's consumption and their carcasses weighed, on average, 51½ lb each. These accounts hint at a general upward trend over the twenty-eight years they cover. It is not pronounced, but in only one year prior to 1760 did the average weight of a wedder carcass rise above 50 lb, whilst in only one year after 1760 did it fall below that weight. Before 1760 the average carcass-weight was only 45 lb. It is most unlikely that these animals were of the old Scottish white-faced breed, but the accounts do show that more gradual stock improvements were taking place during the eighteenth century. This improvement may, of course, have been restricted only to those estates engaged in the commercial productin of mutton, as Buchanan was for the Glasgow market.

Matters were clearly changing rapidly with the introduction of new breeds and new methods of farming. Drawing together all the available evidence it seems most unlikely that before the eighteenth century, and for much of the country during the greater part of that century, that sheep carcasses weighed more than about 30 lb. Such a carcass would have contained about 23½ lb of flesh, of which 20 lb would have been lean meat and 3½ lb edible fat. After cooking, this flesh would have provided about 49 Kcal per ounce, a total of 18,300 Kcal for the entire carcass.[51] Returning once more to the example of St Leonards College, this would mean that sheep carcasses which cost, on average, £2 6*s* 0*d* provided energy at a rate of about 59 Kcal per penny. A slightly cheaper source of energy than beef, mutton was still five times more expensive than oatmeal.

III

Regarding the nutritional contribution that mutton made to the diet of the masters and students at the college; the 171 quarters of mutton they were allowed would have provided in the region of 1000 lb of flesh for the eight-week period covered by the accounts. With this providing approximately the same amount of energy as the beef, meat of one sort or another (including smaller quantities of veal and lamb) contributed about 38 per cent of the total provision of energy in the college diet.[52] This was a generous diet with a substantial meat component.

It has been this quantification of the nutritional value of meat in known diets and its cost relative to other foods which

[49] SRO, GD 44/52/96(1); Gordon Castle Muniments, Account of Cattle and Sheep Slaughtered at Gordon Castle, 17 Nov. 1779 to 24 Oct. 1780.

[50] SRO, GD 220/6/1413-1579; Montrose Papers for Stirlingshire, Farm Accounts, 1752 – 1786.

[51] According to A A Paul and D A T Southgate, *op cit.*, lean lamb provides about 33 Kcal per ounce and lamb fat about 137 Kcal per ounce after cooking. If early-modern carcasses comprised 85 per cent lean meat and 15 per cent fat then each cooked ounce would provide about 49 Kcal. Thus a carcass of 23½ lb (376 oz) would provide just under 18,300 Kcal.

[52] There was a total daily provision of about 115,000 Kcal shared, probably unequally, between the masters and students (and possibly servants) at St Leonards College. Beef provided about 14,800 Kcal, mutton about 14,000 Kcal, veal about 11,000, and lamb about 3,800 Kcal. Totalling something of the order of 44,000 Kcal, meat thus contributed about 38% of the total energy provided by the diet.

has necessitated the assessment of early-modern cattle and sheep weights. Although the conclusions must remain tentative, further studies may be able to throw more light on regional variations and the changes which were undoubtedly occuring during the eighteenth century. Such studies would certainly be worthy of attention as the history and development of early breeds clearly has an important place in addressing key issues relating to diet and living standards in early modern Scotland.

Notes and Comments

ANNUAL CONFERENCE AND AGM, 1988

The Spring Conference was held at Plaxtole House, King's Lynn from 6-8 April 1988. A report on the conference appears elsewhere in the *Review*. Hitherto the Secretary has been rather constrained since he was responsible both for inviting speakers to the conference and for reporting on their performance afterwards. The 36th AGM was held on 7 April 1988. Professor Mingay was re-elected President of the Society, Dr Collins re-elected Treasurer, and Dr Overton re-elected Secretary. Dr Chartres was re-appointed Editor of the *Review*. The meeting expressed thanks to Dr Bettey who retired from the Executive Committee. Dr Hey, Dr Holderness, Professor Roebuck, and Professor Thompson were elected unopposed to the Executive Committee.

The Chairman of the Executive Committee, Dr Hey, presented the Committee's report. Membership of the Society stood at 897, a net decrease of four over the year. The Treasurer presented the audited accounts of the Society and outlined the case for a subscription increase as reported below. The Editor, Dr Chartres, reported that he had received 27 articles for consideration over the period from April 1987 to April 1988. A supplement to the *Review* by A Hall on *Fenland worker peasants* was to be published soon and an *Index* to the *Review* was to be issued free with the first issue of 1989. The meeting expressed its thanks to Dr Holderness the conference organizer, to the staff of Plaxtole House, and to the Officers of the Society.

WINTER CONFERENCE, 1988

The next Winter Conference is to be held at the Institute of Historical Research, Senate House, Malet Street, London, on 1 December 1988. Once again it is to be held jointly with the Historical Geography Research Group and the theme is 'Agriculture and the Village'. Booking forms should be included in this issue of the *Review*.

SPRING CONFERENCE, 1989

Next year's Spring Conference is to be held at Burwalls, the University of Bristol's conference centre. An advance booking form should be inserted in this issue of the *Review* although another form will be in the first *Review* of 1989.

EUROPEAN ASSOCIATION FOR ENVIRONMENTAL HISTORY

This Association has been founded following a workshop held in Bad Homburg in March this year during which papers were given on a wide variety of topics in environmental history including; the history of energy flows and their bearing on past societies; pollution of air, water and soil; and environmental perception. The Association will publish a newsletter. For further information contact Professor Christian Pfister, Historisches Institut, Engehaldenstr. 4. CH-3012 Bern.

A LAXTON VIDEOTAPE

Laxton, England's last open field village, is well known to members of the British Agricultural History Society. Laxton has thousands of visitors every year, many of them school parties, but unlike a country house or a cathedral it is not easy to understand on the ground. The Visitors' Centre, opened in the summer of 1986, provides a starting point but now a short video has been produced by the University of Nottingham in conjunction with the Trustees of the Visitors' Centre, which attempts to explain how open field farming works. The video is designed as a teaching aid for schools, colleges and universities, which can be shown either prior to, or possibly after, a visit to the village. It describes how the open field system works in modern Laxton, and how the system has changed since the seventeenth century. It comes complete with a set of notes designed both to develop some of the points made in the video, and also to offer guidelines on when to visit the village, and what to look for. The video lasts for 23 minutes, and is supplied in VHS format. In the UK it costs £14.50 (incl VAT, p&p). Enquiries to Dr John Beckett, Department of History, University Park, Nottingham, NG7 2RD.

The South-Eastern Agricultural College and Public Support for Technical Education, 1894–1914*

By STEWART RICHARDS

Abstract

During the agricultural depression of the late nineteenth century several Acts of Parliament, and the fortuitous 'whiskey money', laid the foundations for a new policy towards technical education. The South-Eastern Agricultural College (1894) was an example of this policy in action, for it represented an attempt to bridge the traditional chasm between practical and theoretical agriculture by means of public funding. Its staff quickly produced textbooks and research publications which summarized and promoted agricultural science, and the London University BSc in agriculture (1902) created a precedent by demanding the same standards as other natural science subjects. The new institution justified its support by placing a high proportion of its students in responsible posts in the agricultural industry and in teaching, and its reputation helped to establish the principle that only on the basis of state support could there be an effective national system of agricultural education and research.

In his inaugural lecture as Sibthorpian Professor of Rural Economy at Oxford, given in February 1895, Robert Warington felt keenly the responsibility of his position. 'Seldom', he said,

> have circumstances been so adverse to the prosperity of the agricultural community as they are at present. The extremely low prices which have prevailed for many years . . . have brought both the tenant and landlord in many cases to the verge of bankruptcy.[1]

This was no exaggeration. The price of wheat, for example, had fallen in 1894 to little more than one-third the level that was typical twenty years before. Indeed, the severe agricultural depression of the 'nineties was worse even than that of the previous decade, and prices were to show but little recovery by the beginning of the Great War.[2] The harsh realities of free trade had opened the home markets first to the importation of cheap North American grain, and then to an ever accelerating barrage of meat and dairy products from the Americas and Australasia. British farmers – especially those on the drier grain lands of the east and south – suffered a devastation from which recovery could be salvaged only by radical adaptation. Many, however, exhibiting not for the first time 'traditional'inflexibility and conservatism, were forced off the land either to seek in industry the menial wages which cheap and abundant food could justify, or to chance their luck as pioneers in the New World. The ones who survived, at first to eke out a living during what for the more fortunate among the expanding urban population and their political masters was a period of peace and plenty were, in substantial measure, those who accepted the new situation and determined to utilize the cheap grain as a basic commodity for producing the eggs, milk and meat that were by now in increasing demand.

The several government inquiries of the period did little except document the extent of the depression. Direct state aid for agriculture was still widely regarded as unthinkable, although by the time of Warington's appointment at Oxford, a beginning had at least been made in the name of technical and scientific education. This beginning, however, was largely fortuitous, for it sprang from the government's entirely separate policy of 1890 to reduce the number of liquor

* I am grateful to Professor Maurice Crosland of the University of Kent at Canterbury, and to two anonymous referees for helpful advice. The work was supported by a grant from the Royal Society for research in the history of science.

[1] R Warrington, *On the Present Relations of Agricultural Art and Natural Science*, 1985, p 3.

[2] R E Prothero (Lord Ernle), *English Farming Past and Present*, 1912, p 441.

licences and to impose an additional tax on beer and spirits with the view of paying reasonable compensation to the holders. But the idea of recompense raised such sanctimonious hostility that the scheme had to be hastily abandoned. The result was that the government now had an annual income of more than £700,000 (the Residue Grant, known almost universally as the 'whiskey money') for which no purpose existed. A H Acland,[3] general secretary of the National Association for the Promotion of Technical and Secondary Education (founded in 1887), advocated its allocation to the county councils for technical instruction and this, being an uncontroversial even though a surprising suggestion, was duly accepted by a 'lethargic and half-empty House'.[4]

What was so remarkable about the phenomenon of the 'whiskey money' was that the shock of its accidental emergence seemed at last to break down government resistance to public enterprise, such that it represented more than did any prefabricated strategy the official recognition of the principle of state aid for technical instruction; the result was that every county council in England eventually became involved in educational administration. Once begun, developments were relatively rapid reaching, for agriculture, a first climax in 1894 when several events gave promise of recovery even at the very nadir of the depression and when apathy and cynical opposition seemed to be perversely entrenched.

The most general of these events was perhaps the formation of the Agricultural Education Association, which held its first meeting at Cambridge in June, with A E Brooke-Hunt from the Board of Agriculture as guiding spirit and chairman, and D A Gilchrist of the University Extension College, Reading, as secretary.[5] The Association's objective was the encouragement of all branches of agricultural education and research by the mutual assistance and advice of its members, all of whom were, or had been, engaged in teaching, and who currently represented major institutions connected with agriculture. The chief significance of Brooke-Hunt's initiative was, of course, that it gave to the small band of seven pioneer educationists a direct, respectful and sympathetic ear at a time when the Board of Agriculture was, as Charles Crowther has put it, 'content to referee our game and leave us free . . . to formulate the rules'.[6]

More specific events of 1894 (in addition to the appointment of a new Sibthorpian Professor after an interval of four years) included the first examination for the diploma in agriculture at Cambridge. Significantly in the present context, this covered a host of science subjects, but made no provision for agriculture itself, the more applied 'bread studies' being still regarded with the utmost suspicion.[7] The diploma represented, however, formal recognition of the past efforts of the Cambridge and Counties Agricultural Education Committee as well as the first step towards a future School of Agriculture (1899) of great

[3] Arthur Herbert Dyke Acland, 1847-1926 (son of Sir Thomas Dyke Acland), educational reformer and Liberal MP for Rotherham, was the individual largely responsible for reorganising the Science and Art Department and abolishing payment-by-results.

[4] See P R Sharp, 'Whiskey money and the development of technical and secondary education in the 1890s', *Journal of Educational Administration and History*, 4, 1971, pp 31-6; and H E Dale, *Daniel Hall. Pioneer in Scientific Agriculture*, 1956, p 29. For the political background to this fund see P R Sharp, 'The entry of county councils into English educational administration, 1889', *Jnl Ed Admin and Hist*, 1, 1968, pp. 14-22.

[5] Arthur Ernest Brooke-Hunt was a Cambridge graduate and had also studied at the Royal Agricultural College, Cirencester. The Minute Books and other papers of the Agricultural Education Association are held at the Library of the University of Reading. Its activities from 1894 to 1915 are detailed in MS 123/1/1 and 2. I am grateful to Mr M Bott for giving me access to the material in his care.

[6] C Crowther, 'Agricultural education and the work of the Agricultural Education Association, 1894-1994', *Agricultural Progress*, 19, 1944, pp 37-41 (p 38). See also C Tyler, 'The history of the Agricultural Education Association, 1894-1914', *Agric Prog*, 48, 1973, pp 1-9.

[7] See R Ede, 'The School of Agriculture, University of Cambridge', *Agric Prog*, 15, 1938, pp 137-42; and F L Engledow, 'Agricultural teaching at Cambridge, 1894-1955', *Memorandum of the Cambridge University School of Agriculture*, 28, 1956, p 5.

distinction. Then there was the effective establishment, under Gilchrist, of the agricultural department at Reading and the issue of its first diploma with the validation of the Oxford Delegacy for Local Examinations.[8] Finally, 29 November saw the arrival of thirteen students at the small Kentish town of Wye for the opening of the South-Eastern Agricultural College, 'the first and only college founded and maintained by public money solely for the benefit of agriculture in England', and 'the only institution in this country comparable, in its scope and equipment, with the national agricultural schools of France, the Lehr-Anstalten of Germany, or the State colleges in America'.[9]

It is the purpose of this paper to investigate the character and influence of this new institution as a particularly successful example of how higher agricultural education came to be established in England at this time despite – or perhaps because of – the deep depression, and only in consequence of the emerging policy of public enterprise.

I

But before we examine the particular case of the 'South-Eastern', it will be as well to recall rather more of the developments of the previous decade which had made possible the events of 1894. Against the sombre background of the depression and the vast but divided literature that discussed it, it was at first extremely difficult to generate enthusiasm for the idea – and it was this idea which was crucial – that technical education might be a necessary, if still perhaps not a sufficient remedy.[10] In 1887, the *Report of the Departmental Committee on Agricultural and Dairy Schools*, under Sir Richard Paget, had recommended the provision and maintenance by the state of a Central Normal School for Agriculture (to be built, it said, near Rugby), although in the counties agricultural schools should be established by 'local effort . . . [being merely] . . . stimulated and assisted' by government aid.[11] The proposed School would not compete with such established private institutions as the Royal Agricultural College at Cirencester or the Downton Agricultural College near Salisbury (for which the government might provide exhibitions of £80–100 per annum), because its predominant purpose would be the training of much-needed teachers. In this connection the Committee noted the poor record of the existing 'long course' (three years) at the Normal School of Science in South Kensington, an average of only seven students per year having graduated in the principles of agriculture since 1878. While these few individuals certainly had a comprehensive training in science, their knowledge of practical farming remained hopelessly inadequate.

In the years immediately following publication of the Paget Report, there passed through parliament four Acts which were to have a profound effect upon the teaching of agricultural science. Before this time the backwardness of rural education (and secondary education generally) was largely guaranteed by the absence of any organizing machinery. Therefore the establishment, first by the Local Government Act of 1888 of a publicly-elected local authority

[8] See D A Gilchrist, 'The agricultural department of the University Extension College, Reading', *The Record of Secondary and Technical Education*, 3, 1894, pp 514-25; and H A D Neville, 'The University of Reading', *Agric Prog*, 22, 1947, pp 67-75.

[9] A D Hall, quoted in *Kentish Gazette*, 18 July 1896, on the occasion of the visit to the College by the Duke of Devonshire; and *idem*, 'A plea for higher agricultural education', *Rec Sec and Tech Ed*, 3, 1894, pp 256-60 (p 259).

[10] The Royal Commission of 1882, by emphasising the poor seasons of the late 1870s, perhaps delayed remedial action, while that of 1893 took a complacent view which broadly approved the status quo. There was little unanimity of opinion within the agricultural community itself, one of its major sources of weakness. For an interesting critique see E A Attwood, 'The origins of state support for British agriculture', *Manchester School*, 31, 1963, pp 129-48.

[11] *Report of the Departmental Committee on Agricultural and Dairy Schools*, 1887, *Parliamentary Papers (PP)*, 1888, XXXII, 6.

for every county area, and then, after a good deal of wrangling, by the Technical Instruction Act of 1889 of provision for technical education by means of a penny rate, undoubtedly marked the opening of a new era in agricultural education, for it was specifically named in the Act as proper to be aided.[12]

Also in 1889 there was at last created by the Board of Agriculture Act a department of state which could represent the interests of agriculture at cabinet level. Prosperity, it said, must be brought back to the farmers, 'not by any action of Parliament, not by the fostering care of a Department, but by bringing home to them that knowledge and power by which they themselves may work out their own deliverance'.[13] One of the tasks of the new Board was thus to develop agricultural education, and a modest grant of £5000 per annum was made available for the whole country. The first institution of higher education to benefit from this fund (by £200) was the University College of North Wales at Bangor, a development of some significance since it represented the initiation of what soon became the Board's overt policy, that of integrating agriculture within the existing framework of university education throughout the country, the more elementary forms of instruction being left to the fledgeling local authorities.

Because the local authorities were in most cases slow to use the rates as a means of raising funds for technical instruction, and because the Board of Agriculture grant was still so limited, little progress might have been made had it not been for the financial windfall represented by the 'whiskey money' (Local Taxation (Customs and Excise) Act of 1890). The restrained tippling which had commenced with the Technical Instruction Act was now transformed into a minor orgy of intoxication. Even though no obligation was placed on the councils to use the funds for educational purposes – and some applied them to reduction of the rates – the 'whiskey money' grants were greater than any other public contribution to technical education throughout the 1890s. In every year, for example, they exceeded the total expenditure of the Department of Science and Art (only part of whose funds was in any case directed to science and art classes).[14]

Unfortunately, because virtually all initiative was left to the local authorities, there were major differences between the educational achievements of the various areas. While the total 'whiskey money' applied to agricultural instruction was of the order of £80–90,000 per year – spent on local lectures, itinerant instruction, dairy schools and so on, as well as on grants to new or existing agricultural colleges – some counties spent nothing, others as much as £15,000. Paradoxically, it seems that the counties prominent in agriculture generally spent least, for the task of soliciting support for scientific education was there the most difficult.[15] Although the Education Act of 1902 (which significantly improved the arrangements for secondary education and hence provided a sounder basis for technical instruction) finally ended the tendency of some counties to direct the 'whiskey money' to rate relief, the inequitable system of dividing the grant persisted well into the twentieth century.

But the 'whiskey money' undoubtedly proved to be the major stimulant behind the developments which followed. One of the first actions of the Board of Agriculture was to veto the suggestion of the Paget Committee concerning the establishment

[12] The prolonged efforts necessary to secure the Technical Instruction Act on the Statute book have been described by Sharp, 'The entry of county councils', *loc cit*.

[13] Mr W H Smith, in moving the Second Reading of the Bill. Quoted in F L C Floud, *The Ministry of Agriculture and Fisheries*, 1927, pp 13-14.

[14] Sharp, 'Whiskey money', *loc cit*, pp 31 and 35. According to A D Hall, state support specifically for agricultural education rose from £5000 in 1899 to £12,300 in 1908-09 and £35,500 (including £17,000 to local authorities) in 1913-14. See 'Agricultural education in England and Wales', *JRASE*, 83, 1922, pp 15-34 (p17).

[15] See Floud, *op cit*, p 91.

of one state-aided Central Normal School, even though this had also been recommended by a joint committee of the Farmers' Club and the Central Chamber of Agriculture.[16] It is surprising that separate groups of agriculturists should have differed radically on so fundamental a point of policy, but in the event it seems that the Board finally acceded to the view expressed by the Education Committee of the long-influential Royal Agricultural Society of England. In their Report of 1890, the Committee argued that:

> From the varied nature of English agriculture, a single establishment would be of comparatively little use, and there would probably be a narrowness in the spirit of its teaching which would render it undesirable. We must rather look forward to the movement that is now taking place at the higher seats of education in this country . . . which will provide more varied centres of instruction, with the adjuncts of almost every branch of scientific teaching in immediate propinquity.[17]

II

For the present moment it is sufficient to say that in the four years to 1894, agricultural departments had indeed been developed at the university centres of Aberystwyth, Bangor, Cambridge, Leeds, Newcastle, Nottingham and Reading, while in 1900 the six-year-old South-Eastern Agricultural College was to become, by a special arrangement, the School of Agriculture of London University within its Faculty of Science, enjoying all 'such privileges as it would have had if situated within the administrative county of London'.[18] This association was unusual – almost unique – for the College was sixty miles from its adoptive parent and had therefore been obliged, from the moment of its independent reincarnation, to provide all the necessary staff and facilities on its own site; there could thus be no dependence upon other departments to provide 'service' teaching. As a result the College exhibited in microcosm many of the controversies and paradoxes which have always beset the world of higher agricultural education. At one and the same time it was rural in location and had all the trappings of the more traditional, and more practically-orientated, 'agricultural college', yet the remarkable men who ran it during the first few critical years were scientists in the best academic sense, and at least at the start, there was not a trained agriculturist among them.

The success of the College is a salutary story which shows how much could be achieved by able men, at last given the financial wherewithal, and cooperating in their dedication to an idea whose time (they believed against all apparent odds) had come. There can have been few periods during which the traditional opposition of British farmers towards formal education was stronger than in the 1890s, the great majority holding a thoroughly jaundiced view of agricultural science as a result of what they perceived to be the close links by now forged with unprofitable farming practice by the labours of Lawes, Gilbert and their colleagues at the Rothamsted Experimental Station in Hertfordshire. Only a small sanguine minority argued that it might conceivably be the very failure to transmit this new science (which was not infrequently opposed to established custom) to the farmers that explained the poverty of their farms.[19] Even the Duke of Devonshire, a redoubtable propagandist for applied science, then President of the

[16] See A H H Matthews, *Fifty Years of Agricultural Politics, Being a History of the Central Chamber of Agriculture, 1865-1915*, 1915, pp 318-23.

[17] 'Report on Technical Education in Agriculture', *JRASE*, Third Series, 1, 1890, pp 851-4 (p 853).

[18] *The University of London Act, 1898, PP 1898, V, 586. See also N Harte, The University of London 1836-1986. An Illustrated History*, 1986, pp 166-67. For the full text of the Statutes, see *The University of London: The Historical Record*, (first issue), 1912.

[19] For example, George Bayliss of Berkshire, who applied the basic lessons of the Rothamsted experiments and successfully grew corn without livestock (for manure). See C S Orwin and E H Whetham, *History of British Agriculture, 1846-1914*, Newton Abbot, 1971, p 277.

National Association for the Promotion of Secondary and Technical Education and Chancellor of Cambridge University, speaking at Wye of his own belief in the future of scientific agriculture, confessed that if confronted with the question, 'Why don't you try it for yourself?' would have found it 'almost unanswerable'[20]

At the College there was also a complete break with tradition, not in the emphasis on science in the curriculum, but in the high scientific calibre of the staff, which provided 'a distinctive character, enabling it to achieve results quite impossible under the old scheme in which teachers were nominally agriculturalists who had acquired some knowledge of science'.[21] Yet this emphasis was of just the kind which Daniel Hall, the first Principal, must have known would antagonize many individuals on the county councils that were to finance his institution under the terms of the Technical Instruction Act. Indeed, East and West Sussex withdrew from the proposed scheme before it could take final shape (establishing a more modest school of agriculture and horticulture at Uckfield), leaving only Kent, a famous, if unusual, agricultural county, and Surrey, already becoming (sub)urbanized. But there were not only bitter opponents in the counties; even among the first College Governors were some who thought it an impertinence to force a technical education upon farmer's sons, Hall himself quoting one as saying, 'What we want is a place from which we can get a really good ploughman or shepherd'. Of two possible farms available to the College, the sceptical Governors pointedly chose the one notorious for its poverty and with the ominous name of 'Coldharbour', expressing the view that 'if the Professors can make that pay they will really have something to teach us'. At first they even retained control of the farm themselves and employed to run it their own bailiff, who was not a member of the College staff. The professors were to 'teach [and] the Farm Committee would demonstrate the practice';[22] surely as classic an instance as any of the chasm which still yawned between practical and theoretical agriculture.[23]

The location of the College was to be around the nucleus of an old foundation originally built in 1447 by Cardinal Archbishop John Kemp as a College of Secular Clergy, where twelve priests were to pray for the souls of his parents and to educate the children of his home town in the art of grammar. The buildings of the College of St Gregory and St Martin were now modified and extended at the County Councils' expense to include lecture rooms, laboratories and student accommodation. The Councils also released as the original staff the men who for two or three years had been serving as Extension Lecturers.[24] It was an unorthodox method of recruitment but one that was to serve the new institution exceptionally well.

The individual to whom we probably owe the first conception of the College was Hugh Macan, a leading figure in the national movement for technical education and secretary of this committee for Surrey. He envisaged an institution of university rank which would provide for the south-eastern counties facilities comparable to those, for instance, of the Yorkshire College, Leeds, the College of Science in

[20] The 8th Duke (Spencer Compton Cavendish) visited the College during its second year. See *Kentish Gazette*, 18 July 1896.

[21] E J Russell, 'Alfred Daniel Hall, 1864-1942', *Obituary Notices of Fellows of the Royal Society*, 4, 1942, pp 229-50 (p 233).

[22] A D Hall, 'The South-Eastern Agricultural College, Wye, Kent', *Agric Prog*, 16, 1939, pp 1-7 (pp 5 and 2-3).

[23] For an investigation of this theme during earlier periods, see S Richards, ' "Masters of Arts and Bachelors of Barley": The struggle for agricultural education in mid-nineteenth century Britain', *History of Education*, 12, 1983, pp 161-75; and *idem*, 'Agricultural science in higher education: problems of identity in Britain's first chair of agriculture, Edinburgh 1790-c1831', *Ag Hist Rev*, 33, 1985, pp 59-65.

[24] For an account of this aspect of the work (which reached a peak during 1891-92) made possible by the Technical Instruction Act, see S Marriot, 'The whiskey money and the University Extension Movement: "golden opportunity" or "artificial stimulus"? *Jn' Ed Admin and Hist*, 15, 1983, pp 7-15.

Newcastle, or the Hartley Institute at Southampton.[25] At Oxford Macan had been a contemporary of Daniel Hall (and, as it happened, of M J R Dunstan, who was to be the second Principal) in the Chemistry School, and he now worked closely with E J Halsey, Chairman of the Surrey County Council and a city financier. Halsey had grown to know and respect Hall during the latter's years as Extension Lecturer, and as first Chairman of the College Governing Body he was doubtless influenced by him in agreeing its strong scientific representation. Among the original Governors, for example, were the distinguished chemist and popularizer of science and technical education, Sir Henry E Roscoe, MP (who had played an active part in establishing the Technical Instruction Act of 1889 and who became Vice-Chancellor of London University in 1896), the professor of chemistry from Cambridge, George Downing Liveing, and the eminent botanist Harry Marshall Ward from the Royal Indian Engineering College.

Yet it was clear from the beginning that the College would have to justify itself by the efficient use of public funds. Macan argued that its financial advantages would include the more effective use of monies already spent on peripatetic lecturers and their classes, the status necessary to claim a share of the Treasury's grant to university colleges, and the ability of its dairying and research departments to qualify for support by the Board of Agriculture. Overall, he estimated that the buildings and farm could be rendered suitable at an initial outlay of £7000, while total running costs (including salaries) would be about £4700, this figure representing no more than 10 per cent of the four counties' combined technical education grant (or still less than 13 per cent of those of Kent and Surrey alone).[26]

As to the staff, there was no doubt that Alfredy Daniel Hall himself combined remarkable qualities of personality, ability and vision and, in the words of Sir E John Russell, 'had the further advantage of being ready for [his] work just when it was ready to be done.[27] At Manchester Grammar School he had been strongly encouraged in science, and as a Brackenbury Scholar at Balliol College, Oxford – during a golden period of that institution's history – he blossomed under the tutorship of the chemist Harold Baily Dixon. In 1884 Hall obtained a first class degree in chemistry, and might then have been lost in anonymity had he not, after a few years of school teaching, joined the University Extension movement.

At the South-Eastern College he was joined by Herbert Henry Cousins as lecturer in chemistry (Hall was officially professor of chemistry as well as Principal), also an Oxford man (Merton) with a first class degree, who had subsequently studied in Heidelberg before returning to Oxford as demonstrator. As professor of botany there was John Percival, 'a heaven-born teacher and an incomparable field naturalist'[28] from St John's College, Cambridge, where he had succeeded brilliantly in the Natural Sciences Tripos in 1887–88, worked for a few years at the British Museum and then, like Cousins, returned to his *alma mater* as junior demonstrator. The College lecturer in zoology and economic entomology was Frederic Vincent Theobald, also from St John's, Cambridge (though five years younger than Percival). Finally – though not at the outset – Hall himself appointed Frank Braybrook Smith from Downing College, Cambridge to rectify the omission of a teacher of practical agriculture. Smith was a farmer's son and, it seems, of a diplomatic nature, for he showed the greatest respect for his colleagues' science and yet proved himself a most

[25] See H Macan, 'Agricultural college for the counties of Kent, Surrey and Sussex', *Rec Tech Sec Ed*, 3, 1892, pp 291–99.
[26] *Ibid.*
[27] Russell, *loc cit*, p 229.
[28] Hall, *loc cit*, p 3.

capable agriculturist. Accordingly, the management of the farm was quickly transferred to his hand and in 1895 he himself was made Vice-Principal.

What is striking about these men is that each was an individual of high calibre, breaking fresh ground, and soon to establish a considerable reputation; their career achievements, both at College and elsewhere, tell us a good deal about how it was that so improbable an undertaking could flourish at so unlikely a time. The four scientists quickly began to produce research papers[29] and – probably of greater importance at this stage – a clutch of textbooks of which it can safely be claimed that they summarized and systematized the agricultural science of the day. Based in most cases on their College lecture courses, and written against the perspective of their advisory work for farmers, they remained in successive editions the definitive texts in Britain for the next twenty years. As early as 1895, Cousins had exploited his fluency in German by translating E T Wolff's *Landwirtschaftliche Futterungslehre* (first edition, 1861) under the title *Farm Foods*, and three years later he brought out his compact *Chemistry of the Garden* as one of Macmillan's well known 'Primer' series. This proved highly popular at the time, even though in retrospect it seems to present a somewhat naive advocacy of artificial fertilizers as against traditional farmyard manure, and must often have failed in its recommendations. But, after several corrected editions were reprinted, it was more fully revised in 1916 and again in 1920 and 1924.[30] Cousins was, however, the first of the pioneers to leave Wye when, in 1900, he became agricultural analyst and later Director of Agriculture for the government of Jamaica, establishing thereby the first of the College's numerous imperial connections. During his subsequent career he published numerous papers on agricultural chemistry and tropical agriculture. Cousins was replaced at the College by Edward John Russell, a young chemist educated at the University College of Wales, Aberystwyth and at Owen's College, Manchester, whose professor (Hall's former tutor H B Dixon) had advised him that there was no career to be made in agriculture and that in any case good men did not go to agricultural colleges.[31] After some important research on soil oxidation and the activity of micro-organisms, Russell eventually moved in 1907 to the Rothamsted Experimental Station at Harpenden, where he made a great contribution to agriculture as Director from 1912 to 1943 and wrote many of the books for which he is so justly famous.[32]

Theobald, a man of private means and the only founding member of the College staff to remain for his entire career, nevertheless established a reputation as one of the country's leading economic biologists. In 1899 he published his *Textbook of Agricultural Zoology* which, though it drew on the earlier work of John Curtis and Eleanor Ormrod, was a success in its own right,

[29] *The Royal Society Catalogue of Scientific Papers, 1884-1900*, lists a total of ten publications by Cousins, Hall, Percival and Theobald, as well as four by Albert Howard and six by E J Russell (see below). With the partial exception of one paper by Cousins in the *Gardener's Chronicle*, none of these appeared in specifically agricultural journals, such as that of the Royal Agricultural Society of England. *The Journal of Agricultural Science* (in which Hall had a major hand) was not begun until 1905.

[30] E J Russell, in his invaluable book, *A History of Agricultural Science in Great Britain, 1620-1954*, 1966, says (p 218) that Cousins also translated O Kellner's *Grundzuge der Futterungslehre*. He seems to have been mistaken in this, confusing Cousins with William Goodwin (also a lecturer and research chemist at Wye) who made the authorized translation as *The Scientific Feeding of Animals*, in 1909. Also see Russell, p 285.

[31] E J Russell, *The Land Called Me*, 1956, p 93. Russell provides some entertaining anecdotal detail on the early days of the College.

[32] His first, *Lessons on Soil*, 1911, represented the substance of classes he gave at the village school in Wye. His College lecturers formed the framework of his enormously successful *Soil Conditions and Plant Growth* (1912) and were more directly developed in book form by M A Fayers in *Air, Water and the Chemistry of Plant Life*, 1928.

passing through six editions from Blackwood's. From 1900 for three years he was in charge of the Economic Zoology Section of the British Museum and during the decade wrote many technical monographs and reports on mosquitoes, aphids and other pests, including a long series in his institution's own *Journal of the South-Eastern Agricultural College*.

The textbook by Percival, *Agricultural Botany: Theoretical and Practical* of 1900 was a massive and original work of the greatest importance. Illustrated throughout by the author's own drawings, it was quite intentionally written in response to the growth of centres of agricultural education. Although prepared with a high degree of scientific authority, it never lost touch with the needs of the agriculturist, constantly stressing the necessity for practical work by a series of simple exercises and experiments to be performed by the student in illustration of the facts and principles explained. The book was translated into several languages and went through four English editions in its first decade, the final (eighth) one appearing in 1936. In 1903, however, Percival moved to Reading as professor of agricultural botany and Director of the department of agriculture, and there produced another important volume, his textbook of *Agricultural Bacteriology* in 1910. He was succeeded at Wye by a second St John's man, Albert Howard, who had achieved First Class Honours in the Natural Science Tripos in 1898 before working as a mycologist and agricultural lecturer to the Imperial Department of Agriculture in the West Indies. Howard remained at Wye for only two years, but had remarkable success in India from 1905 to 1931, first as Imperial Economic Botanist and then as Director of the Institute of Plant Industry at Indore, where he did most of his work in 'organic' agriculture. He wrote many research papers as well as books, perhaps his best known being *An Agricultural Testament* published in 1940.

We have already seen that Smith's influence on the South-Eastern College was early rewarded by his appointment as Vice-Principal, and it must have posed a severe test for the new institution when both he and Hall departed in 1902. Smith's contribution was, in its way, quite as original as that of his scientific colleagues, for it was he who insisted that efficient agricultural practice was more than the mere pursuit of a dogmatic routine established by long experience; 'good' farming, he implied, was farming that paid its way and, according to Hall, Smith's attempt to analyse the costs of the various farming operations was, in a very real sense, a foundation stone for the systematic study of agricultural economics.[33] Certainly, by the time he left (for a post in South Africa where he served as Secretary of Agriculture for the Union from 1910 to 1920 before returning to Cambridge as reader in estate management till 1928) the London University BSc incorporated a detailed syllabus[34] which was taken up and developed by Charles Stuart Orwin, one of the earliest students at the College who returned as lecturer in farm management and book-keeping in 1903 and went on to a most distinguished career as Director of the Institute for Agricultural Economics at Oxford (1913–45).

Principal Hall left Wye upon his appointment to the directorship at Rothamsted following the death of Sir Joseph Gilbert. Probably the most influential agricultural scientist and administrator of his day, Hall's contributions to the research and popular literature were legion, whilst his series of eloquent and highly successful textbooks (*inter alia*, *The Soil*, 1903, based essentially on his lectures at Wye; *The Book of the Rothamsted Experiments*, 1905;

[33] Hall, *loc cit*, p 4. See also his article 'Agricultural education and the farmer's son', *Journal of the Farmers' Club*, March 1907, pp 559-76 (p 564).

[34] See *London University Calendars*, 1901-02, Vol II, pp 352-3 and 1903-04, p 319.

Fertilizers and Manures, 1909; the comprehensive *Feeding of Crops and Stock*, 1911; *A Report on the Agriculture and Soils of Kent, Surrey and Sussex*, 1911, with E J Russell; and *A Pilgrimage of British Farming*, 1910–13) established for him an unassailable reputation as one of the greatest of all our agricultural writers.

Hall was followed as Principal by Malcolm James Rowley Dunstan, a contemporary at Oxford (Merton) who was already accustomed to pioneer educational ventures, having been Director of the Midland Agricultural and Dairy Institute in Nottinghamshire since 1896. He remained at Wye for twenty years before finishing his career as Principal of the Royal Agricultural College, Cirencester (and professor of agriculture at Bristol University) until 1927.

III

By Hall's own admission the scientific emphasis of the College's curriculum was at first overdone. It conformed to the conventional wisdom of the day (with the important addition that it was taught by highly qualified research scientists and consequently took on an even greater significance), namely, that technical education should be based almost exclusively on the principles of pure science. Although the primary objective of the College was officially to 'provide a thorough education in Agriculture and the Sciences applied to it, together with practical training upon the College Farm, for young men [of at least sixteen years] who intend to become occupiers of land, either as owners, tenants or agents',[35] it is clear that the presumption was in reality that the student would acquire the major part of his agriculture by subsequent experience, i.e. after leaving the College itself. Over the two years necessary for completion of the diploma there was a total of 2808 'contact hours', representing more than 42 for each week in residence (Table 1)[36]. An optional third year (for the diploma with honours) was available for those seeking specialization, and students could also be prepared for the examinations of the Royal Agricultural Society of England, the Surveyors' Institution, and for the Agricultural Diploma of Cambridge University. In fact during the first few years tuition was designed in particular with the prestigious diploma of

TABLE I
Synopsis of the Course for the Pass Diploma of the South-Eastern Agricultural College (1899–1900)

First Year	*Hours*	*Second Year*	*Hours*
*Chemistry	216	*Chemistry, organic and agricultural	252
*Botany	144	*Agricultural botany	180
*Agriculture	252	*Agriculture	252
Mechanics and Physics	144	*Land surveying	144
Surveying	72	Building construction	72
Zoology	72	Veterinary anatomy and medicine	144
Geology	72	Estate management	108
Engineering and machine drawing	144	Book keeping	36
Building construction	36	Geology	36
Book keeping	72	Entomology	36
*Dairying, poultry, fruit, farriery, carpentry	144	*Dairying, poultry, fruit, farriery, carpentry	144
		Forestry	36
Total	1368		1440

* Includes practical and field work, about one-third of the time indicated.

[35] *Journal of the South-Eastern Agricultural College*, 1, 1895, pp 3–4.

[36] *Board of Agriculture Annual Report on the Distribution of Grants...* for 1899-1900, *PP*, 1900, LXVIII, 19. See also early copies of the College Prospectus. I have examined in particular those for 1896, 1905 and 1914.

the 'Royal' (established in 1869) in mind, but Hall was severely critical of this, arguing that it forced students to acquire 'parcels of miscellaneous knowledge in which they can be examined, forgetting or unaware that the essence of education consists in learning how to use your tools . . .'. When his first scholar, Alexander Holm (later Director of Agriculture for Kenya) achieved honours in biology and carried off the Society's Gold Medal, 'the College retired from further competition, confident that its own diploma would in future be an adequate voucher for the training of its holder'.[37]

Includes practical and field work, about one-third of the time indicated.

Work for the diploma continued long after the South Eastern College became one of the first constituent institutions of the new federal University of London, under the Un8iversity of London Act of 1898.[38] A BSc in agriculture was instituted in 1902 for which students had first to matriculate and then pass the university intermediate examination in science, generally in chemistry, botany, zoology and geology (which could be studied at any college of the university recognized for such subjects). The final examination, after a further two years, was then taken in agriculture itself, in agricultural botany and agricultural chemistry, with evidence of attendance at two other courses selected from agricultural engineering, entomology or law, bacteriology, forestry, surveying or veterinary anatomy and medicine. The first stipulation was particularly important for it reflected the view that the status of agricultural science in the academic world could be enhanced only by demanding the same standards as for other natural science subjects. In this respect the policy of the University was entirely new, setting a precedent which Cambridge was to follow with conspicuous success some six years later.[39] Even when it was eventually argued that the intermediate syllabus needed to be given a definite agricultural bias, it was not suggested that agriculture itself should be a subject for examination, 'the standard of which in pure science it [was] not proposed for one moment to lower'.[40]

It is not clear, however, that the success at Wye was the result of this emphasis on science. Certainly the research papers and the authoritative textbooks could have been produced only in an atmosphere where original investigation and systematic scientific instruction were valued, yet the College had still to walk the notorious tightrope between theory and practice. No matter how high its reputation for agriculturally relevant science, it had still to persuade practising farmers that it was worthwhile to part not only with their sons just when they were contributing usefully on the farm, but also with £40–70

[37] Hall, *loc cit*, p 4.

[38] The original distinction between ordinary and honours diplomas became in due course that between the College certificate (2 years) and diploma (3 years), but Membership of the College was attained only by means of the latter or by the London BSc degree. The 1914 Prospectus lists 154 Members (15 by degree), and of these 38 had also obtained the Professional Association of the Surveyors' Institution, 15 the National Diploma in Agriculture (ratified jointly since 1900 by the Royal Agricultural Society of England and the Highland and Agricultural Society of Scotland), and three each the National Diploma in Dairying, the Fellowship of the Surveyors' Institution and the Cambridge University Diploma in Agriculture. Incidentally, Hall was no more enthusiastic about the National Diploma, saying that it 'sins against every canon of good examining... [and]... is the most serious hindrance to the progress of agricultural education our colleges are faced with today', See 'Agricultural education and the farmer's son', *Journal of the Farmers' Club*, March 1907, pp 559-75 (p 565). With these sentiments Dunstan evidently agreed (p 572).

[39] The questions of syllabus and academic standards were delegated to a committee (consisting of Hall, Major P G Craigie of the Board of Agriculture, Dr B Dyer, the agricultural chemist and a London University graduate, and a Professor J B Farmer of the Royal College of Science) by the Board of Studies in Agriculture at its first meeting on 1 February 1901, and their proposals discussed at subsequent meetings. See the Attendance and Minute Book, Board of Studies in Agriculture, University of London Library, Archives of the Central Office, AC8/3/1/1. I am grateful to Mr S Bailey for granting me access. The policy of emphasizing common standards in science was not pioneered at Cambridge as is sometimes believed. Under W Somerville and T H Middleton emphasis was strongly 'agricultural' – even to the extent of providing special courses (of modest quality) in science. It was T B Wood who strenghtened the science base in 1907. See Ede & Engledow, *loc cit*.

[40] Evidence by J M R Dunstan to the *Royal Commission on University Education in London, Third Report, PP*, 1911, XX, 517.

per annum in the shape of fees. The rural location of Wye ensured that the College would always be seen by its county sponsors primarily as an institution for teaching practical agriculture rather than as part of a university's Science Faculty, and this image must have been fostered by its ancillary ('extension') objectives. These included the provision of peripatetic tuition in agricultural subjects around the counties, with formal lectures and the operation of so-called migratory vans which offered instruction in dairying, farriery, poultry and bee keeping; the establishment of chemical testing and seed control laboratories for local farmers; the conduct of field experiments and demonstrations at various locations; and the organization of short courses of instruction in special subjects, including those for teachers in elementary schools. We have seen that E J Russell was involved directly in work at the Wye village school, and so had Hall been before him, giving 'nature study' a solid foundation and always confirming, with the children themselves, that the courses for teachers were sufficiently practicable.

Hall was undoubtedly a master communicator, at one with an audience of children just as he was at a scientific meeting, and during his time at Wye he scored a notable victory in the ceaseless struggle to foster and maintain good relations with the farming community. While his College was being refurbished, he had approached the influential Canterbury Farmers' Club (founded in 1793) with a request that he might address them on the subject of what the new institution hoped to achieve. He was not welcome. Nevertheless, before he left Wye he had become not only a member of the Club but its honoured Chairman, the larger farmers being now 'entirely on the side of the College', seeking 'the sciences that are taught inside' even more than the practical tuition on the farm. According to the testimony of one such individual (given to the Reay Committee of 1908 – see below) the College had proved to be 'most satisfactory'; he did not know of one among his colleagues who regretted having sent his son there.[41]

The growing trust of the farmers was reassuringly reflected in the rising number of students at the College. The original thirteen had almost trebled by 1896, reached 46 by 1900, 71 by 1909 and 124 by 1913. Corresponding figures at other publicly-funded centres of higher agricultural education, for example Aberdeen, Bangor, Durham (Armstrong College, Newcastle) and Cambridge were eight at the first three in 1900 and fifteen at Cambridge, then 10, 13, 17 and 52 respectively for 1909, and in 1913, 27, 18, 31 and 152.[42] During this same period, incidentally, the three private institutions were struggling desperately to survive. Thus student numbers fell at Cirencester from 104 in 1885 to 70 in 1906, and support from the Board of Agriculture was urgently sought after 1909.[43] The colleges at Downton and Aspatria (in Cumberland) were forced to close in 1906 and 1914 respectively.

This success at Wye was not achieved without some serious heartache over the financial problems of the first three years. The two County Councils were to establish and maintain the College in the proportion of 3:2 for Kent and Surrey, and together they had supplied more than £25,000 (from a combined technical education grant of about £37,000) before it was one year old. The Board of Agriculture also played a supporting role, giving

[41] See Dale, *op cit*, p 48; and *Report of the Departmental Committee Appointed to Inquire into the Subject of Agricultural Education in England and Wales. Evidence and Index*, *PP*, 1908, XXI, 1492, 899 and 924.

[42] Figures derived from Dale, *ibid*, p 43; *Board of Agriculture Annual Report, loc cit; Board of Agriculture and Fisheries Report on the Distribution of Grants...*, *PP*, 1910, VII, 561; and *Board of Agriculture and Fisheries Annual Report*, *PP*, 1914, XI, 717.

[43] See G H J Watkins, 'The Royal Agricultural College, Cirencester. Its origins and development as a specialist institute of scientific learning, 1844-1915', unpublished MEd thesis, University of Bristol, 1979, especially pp 87-93 and 99-100. A copy is held at the College; for access to it I am grateful to the Librarian, Mrs F Huckle.

annual grants which rose from £150 in 1895–96 to £1000 in 1899–1900 – the largest for any such institution.[44] But debts quickly accumulated, not least because many of the students, being residents in the counties, paid reduced fees, and it was estimated that by March 1897 the deficit would reach £8000. Drastic action was needed, and it was speedily taken. The major debts were paid off by the Councils, but the College grant was reduced by £1000 per annum and the staff entered upon one summer vacation without their salaries! Henceforward, the reduced income was somehow made to suffice; in any event, within two years full recovery had been achieved and funds could once again be borrowed to finance the urgently-needed expansion.[45] In its Report of 1897, the Royal Commission on Agricultural Depression concluded that of all the institutions founded by County Councils for agricultural instruction:

> Wye College [sic] . . . is the most important . . . Colleges situated in towns, and devoting only a portion of their energies to agricultural teaching, cannot be expected to compete successfully except perhaps in the comparative cheapness of . . . the education they offer. Time will determine which of the two systems is the fittest [sic] to survive, but as long as they continue to co-exist, they should supplant, and not clash with or overlap, each other.[46]

As it happened, both systems were to survive although, with the partial exception of the Midland Institute (which became the detached department of agriculture of the University College of Nottingham after the First War) the pattern at Wye was not repeated elsewhere. At the time of its foundation, there was no clear distinction between the two sorts of students with which it had to cope, those intending to enter farming itself, and those who aimed to be public officers in teaching or administrative posts at home or overseas. The nature of the course, far from ideal for either, was rather better suited to the second category, but when Hall conducted an enquiry in 1899–1900 he found nevertheless that of seventy-five students who had passed through the College, some thirty-five had taken up farming. A second investigation in 1904–05 evidently confirmed that most students gained good 'agricultural' positions, and published figures for 1911–12 indicate that about 61 per cent intended to enter into farming (despite the fact that no more than 22 per cent came from agricultural families) and 28 per cent into teaching (presumably of some aspect of agricultural science). The comparable (combined) percentages for four multi-departmental centres with agricultural interests (Aberdeen, Bangor, Durham and Leeds) were 59 (53) and 32, and those for the private Royal Agricultural College 96 (82) and 4.[47] It thus appears that in terms of the students it attracted and of its influence on the agricultural industry, the College (despite impressions and prejudices to the contrary) quickly established itself as essentially a 'university' institution rather than as a mere 'agricultural college'. It was in this way that the broad role for publicly-supported higher agricultural education was clearly established and the position of the College within it quite unambiguously declared. As Sir E John Russell was later to say, the College 'became one of the chief teaching centres for agriculture in Great Britain and its pupils have long held

[44] See Dale, *loc cit*, p 46.

[45] Dale, *ibid*, pp 44-5; Hall *loc cit*, pp 5-6; and the volume 'Day by Day' in the Wye College archive. It should not be forgotten that the Kent County Council at this time was already involved in the support of a similar institution, the Swanley Horticultural College, which had been founded in 1889 (and amalgamated with the South Eastern College in 1945, after suffering severe bomb damage during the war). See E Morrow, 'Swanley Horticultural College, 1889-1945', Wye College, 1984 (typescript, 102pp).

[46] *Royal Commission on Agricultural Depression, Final Report*, 1897, *PP*, 1897, XV, 154. Note that the College was not officially given its present name until, in 1948, it was incorporated in London University by royal charter.

[47] See E J Lewis, 'The South-Eastern Agricultural College and the sons of the tenant farmer', *Journal of the Agricola Club*, 1, 1902, pp 12-14 (p 12); Russell, *loc cit*, p 234; and *Board of Agriculture and Fisheries and Board of Education. Fifth Report of the Rural Education Conference, PP* 1912-13, XI, 143.

high positions in many parts of the world'.[48]

IV

Five years after the founding of the College, the Departments of Education and of Science and Art were amalgamated in the Board of Education. The original idea had been for the transfer of the existing educational powers of the Board of Agriculture to the new Board, although as it happened there developed a good deal of rivalry, no action was taken, and both Boards continued to make grants in support of agricultural education.[49] To prevent overlapping it was eventually agreed that the Board of Agriculture should support higher education and 'institutions of special character' (for example the Royal Veterinary College in London and the British Dairy Institute at Reading), while the Board of Education would support elementary agricultural schools and technical colleges.[50] But in 1912, in the wake of the Development and Road Improvement Fund Act of 1909 (see below), it was eventually decided to transfer the Board of Education's grants to the Board of Agriculture.[51] The latter then created the so-called Rural Education Conference. This, with the invaluable cooperation of the Royal Agricultural Society of England and the Agricultural Education Association, considered all questions relating to education in country areas and issued a number of reports which set out their findings.

The work of the Rural Education Conference was made a great deal easier by its having access to the exhaustive *Report of the Departmental Committee on Agricultural Education in England and Wales* which, under the chairmanship of Lord Reay, had been published in 1908.[52] The Reay Committee was a strong one. Its comprehensive review – the first since the enquiries of H M Jenkins (1884)[53] and Paget (1887) – reflected the progress of two decades, and its recommendations laid the foundations of official policy for the next thirty years.

Despite this progress, the national position still could not compare with the network of state-supported institutions in many other countries, for example the Danish folk schools, the German research stations, and the American land grant colleges. When the Committee sat, the Board of Agriculture supported six universities and university colleges in England and Wales (its role for Scotland having ceased in 1896 when the administration of grants was transferred to the Scottish Education Department), namely Aberystwyth, Bangor, Cambridge, Durham, Leeds and Reading. Oxford University was in the process of establishing an agricultural department but as yet received no grant, and the Universities of Birmingham and Manchester, and the University College at Bristol, had interests in applied science that it was thought might be developed in the direction of agriculture. In addition there were a number of agricultural colleges receiving grants from the Board. These included the South Eastern College (still treated as such despite its being already a School of London University), and the College of Agriculture and Horticulture at Holmes Chapel in Cheshire, the Midland Agricultural and Dairy Institute at Kingston, Nottinghamshire, and the Harper Adams Agricultural College at Newport, Shropshire, all three of which prepared a

[48] Russell, *op cit*, p 226.

[49] See L A Selby-Bigge, *The Board of Education*, 1927, pp 14 and 24.

[50] *Board of Education Memorandum, PP*, 1908, LXXXIII, 927. Also *Memorandum of Arrangement between the Board of Agriculture and Fisheries and the Board of Education, PP*, 1909, LXVII, 15.

[51] *Memorandum of Revised Arrangement between the Boards, PP*, 1912-13, LXV, 335.

[52] *Report of the Departmental Committee on Agricultural Education in England and Wales, PP*, 1908, XXI, 363; *Evidence and Index, PP*, 1908, XXI, 417.

[53] *Royal Commission on Technical Instruction, Second Report* (Vol. II), 1884, *PP*, 1884, XXX, 1; and *Report of the Departmental Committee on Agricultural and Dairy Schools*, 1887, *PP*, 1888, XXXII,6.

minority of students for the London external BSc.

Beginning with the premise that 'agricultural education is of such vital importance to the United Kingdom that no effort should be spared in making provisions for it as full and complete as possible',[54] the Reay Committee found that the institutions for higher instruction were, broadly speaking, sufficient in number. It therefore recommended that in future increased expenditure be aimed at improving the quality of their staff and facilities. In particular, it was stated, teachers of such subjects as agricultural chemistry and botany should have high qualifications, and an especially progressive opinion was that 'teachers of agricultural science should attempt to combine investigation with teaching' and that in the higher institutions 'original work should not only be encouraged, but expected'.[55] There were also innumerable suggestions relating to what the Committee identified as a thoroughly unorganized and inadequate system of lower agricultural instruction, the most notable being the proposal for some fifty or sixty farm institutes, which should not be left solely to the local authorities but funded in part by the Board.

The opportunity for implementing these recommendations came in 1910 when Lloyd George introduced the new Liberal Government's Bill to establish the Development Fund. The idea of the Fund was substantially without precedent in British political history. It sought to reverse the protracted rural depression by means of an enormously increased investment in the scientific development of agriculture, forestry and fisheries. A sum of almost £3m was raised and entrusted to eight Commissioners, including Daniel Hall who, in 1912 resigned his post at Rothamsted when the dual responsibilities became too heavy. Three aspects of their work were of particular relevance in the present connection. First, some £325,000 were set aside for the development of Reay's farm institutes (compared to a total grant of £12,300 in 1909–10 from the Board of Agriculture for all agricultural education and research) and schemes for six of these were approved before the outbreak of the Great War; associated with these institutes were the county advisers who were to represent the link between farmers and the teaching establishments. Second, the Fund provided for the creation of a network of agricultural research stations, each (on Hall's advice) with its own speciality and each devoted to the idea of a fundamentally scientific approach to agricultural problems; in this plan we see the emergence both of the profession of agricultural research in this country and of systematic cooperation between science and farming.[56] Third, there was instituted a system of scholarships (of £200 for each of three years) whereby graduates in a pure science – usually botany, chemistry or zoology – were enabled to undertake original research in any of the subjects covered by the experimental stations. Of forty-seven scholars elected between 1911 and 1914, all but three were, by 1930, still engaged in the service of agriculture as teachers, research workers or technical advisers, and they included several men of considerable eminence, such as A W Ashby, the agricultural economist, F L Engledow, who became the Drapers' Professor of Agriculture at Cambridge, and J Hammond, the reproductive physiologist.[57]

It was characteristic of Hall that his commitment to agricultural chemistry was not the myopic obsession of lesser men. In his evidence to the Reay Committee he had argued that the farmer could be convinced of the value of the new scientific

[54] *Report of the Departmental Committee on Agricultural Education*, *op cit*, p 38.
[55] *Ibid*, p 26.
[56] See Floud, *loc cit*, p 94; and Russell, *loc cit*, pp 268-72.
[57] See A D Hall, 'The research scholarship scheme', *Journal of the Ministry of Agriculture*, 37, 1930, pp 213-18.

knowledge only if it could be shown to increase his profits as well as his production. The traditional double-entry bookkeeping taught to agricultural students at the time was of scarcely any use as a guide to improved farm management because it could not separate the relative profitabilities of the several productive activities found on the typical mixed farm.[58] He had been hard at work developing an improved system and in 1902 wrote to his old Wye colleague F B Smith with news of his success.[59] Although his particular method of full costings was soon to prove too unwieldy for general application, it was Hall's interest in the role of accounting in farm management that led him, as Development Commissioner, to recommend establishment of the Institute for Research in Agricultural Economics at Oxford in 1913. As we have already seen, the first Director of the Institute was C S Orwin, who had also been the first student interviewed by Hall for the South Eastern College.[60] In this development the former Principal must have gained a special satisfaction, for superimposed on the the solid scientific reputation of his College there was now the fulfilment of his own and Smith's conviction that new farming methods must, in the nature of the agricultural enterprise, be seen to pay their way. Agricultural economics, therefore, was as worthy of state support as natural science.

At last the idea was accepted that only on the basis of sufficient state support could there be an effective national system of education and research. Any remaining reluctance in this respect on the part of government or in agricultural circles (and reluctance there still was, despite the principle's widespread application in other sectors of the economy) was shortly to be swept away by the alarming circumstances induced by the Great War, for by 1914 food production had declined to only one-third of the country's needs.[61] In the face of grave emergency, it was soon shown what central organization of productive activities could achieve despite a critical shortage of farm workers; it suggested, moreover, what undreamt-of standards it might attain in time of peace. The search for labour-saving machinery, the establishment of minimum standards of cultivation, the 'scientific' control of weeds and pests, and the acceptance of the likely need for import regulations – all dependent upon education in the shape of scientific and economic expertise – were carried over into the post-war period in the form of new attitudes and new legislation. Only through the medium of substantial and sustained public support had institutions such as the South-Eastern College been enabled to arise and thrive during the depression, and only through the services that they offered could agriculture regain the health and economic importance of half a century before.

[58] *Report of the Departmental Committee..., loc cit*, p 56.
[59] See Dale, *op cit*, p 61.
[60] Hall, 'The South-Eastern Agricultural College, *loc cit*, p 5.
[61] For a detailed account of the changes introduced, see T H Middleton, *Food Production in War (Economic and Social History of the World War)*, general editor, J T Shotwell, Oxford, 1923.

Gopher Tales: A Study in Western Canadian Pest Control

By THOMAS D ISERN

Abstract
The flickertail gopher was considered one of western Canada's worst agricultural pests. Its ravages were particularly severe when agricultural circumstances provided it with favourable conditions – during the early stages of settlement, or during periods of drought and field abandonment. Local and provincial governments mounted programs – including bounties, contests, and poison distribution – to combat the pest. The populace responded with enthusiasm, trapping, shooting, clubbing, snaring, and poisoning the gophers. Governmental officials and private citizens considered the pest control programs proper and effective; they also welcomed the economic relief conveyed through bounties.

THOSE who participated in the campaigns speak of them with some reluctance – not because of any sense of shame, but because the tales of drownings, clubbings, and shootings from the past seem out of place in the conversations of modern farm homes or suburban backyards. Yet the memories are there, if latent, in the mind of nearly every person with agricultural roots in the Canadian plains of the 1950s or earlier.

The object of these recollections is the flickertail gopher, or prairie gopher, or more properly, the Richardson's ground squirrel *(Spermophilus richardsonii)*. This rodent earned a reputation as one of western Canada's worst agricultural pests. The battles to eradicate or at least control the creature waged by generations of agriculturalists on the Canadian plains figure memorably in the common cultural experience of the region. They also pose a remarkable study in pest control, an agricultural acitivity that tells much of the relationship between farm folk and the natural environment.

To detail the homely and various methods of controlling a mammal pest, and to inquire what they reveal about agricultural folk on the land, are not customary historical approaches to the topic of pest control. In the first place, particularly since publication of Rachel Carson's treatise on DDT, *Silent Spring,* scholars have shared in the public preoccupation with chemical pesticides and their apparent dangers. Society in general, not the agrarian populace in particular, is the scope of such works. On the other hand, such specialists as Allen E Smith and Diane M Secoy have examined both chemical and non-chemical pest control methods in western civilization from ancient times forward and have concentrated on what farmers did. Their writing approaches the clinical, unlike that of Paul W Riegert, author of a splendid history of entomology in western Canada. Riegert writes that insect pests 'were the common experience of early settlers and immigrants'. So also, although not so noticed by historians, were mammal pests such as gophers.[1]

The flickertail gopher is one of the more common and commonly recognized wild

[1] Rachel Carson, *Silent Spring,* Boston 1962; Frank Graham, Jr., *Since Silent Spring,* Boston, 1970; James Whorton, *Before Silent Spring: Pesticides and Public Health in Pre-DDT America,* Princeton, 1974; Smith and Secoy, 'Forerunners of Pesticides in Classical Greece and Rome,' *Jnl Agric and Food Chem* 23, 1975, 1050-1055; Smith and Secoy, 'A Compendium of Inorganic Substances Used in European Pest Control before 1850,' *Jnl of Agri and Good Chem* 24, 1976, 1180-1186; Smith and Secoy, 'Organic Materials Used in European Crop Protection before 1850,' *Chemi and Ind,* 1977, 863-869; Secoy and Smith, 'Superstition and Social Practices Against Agricultural Pests,' *Environmental Review,* 5, 1978, 2-18; Smith and Secoy, 'Agricultural Pest Control in Colonial North America,' *Journal of National Agricultural Library Associates* New Series, 5, 1980, 71-75; Smith and Secoy, 'Plants Used for Agricultural Pest Control in Western Europe before 1850,' *Chemi and Ind,* 1981; 12-17; Secoy and Smith, 'Use of Plants in Control of Agricultural and Domestic Pests,' *Economic Botany,* 37, 1983, 28-57; Smith and Secoy, 'Pest Control Methods Practised by British Farmers During the 17th and 18th Century,' *Journal of National Agricultural Library Associates,* 10, 1985, 23-35; Paul W Riegert, *From Arsenic to DDT: A History of Entomology in Western Canada,* Toronto 1980.

mammals of the Canadian plains in southern Manitoba, Saskatchewan, and Alberta. A plump, stubby-tailed, full-cheeked ground squirrel ten to twelve inches long when full-grown, its colour varies with locality, but generally is tan or brownish-gray. The flickertail gopher closely resembles the black-tailed prairie dog, of more southerly reaches of the plains, in physical appearance; the gopher is a bit smaller. In its habits the gopher is less communal and more territorial than the prairie dog.

The active season for flickertails stretches from early spring into the fall. They commonly emerge from hibernation in late March or early April and mate during April or early May. Their young, born in May or early June, are precocious, emerging quickly from their burrows and exercising their survival instincts, such as chattering warnings and bottle-brushing their tails. Adult gophers begin their long hibernation in mid-summer, first the males, then the females. Juveniles remain active until cold weather in the fall drives them underground.

Above and below ground, the flickertails' behaviour is attuned to subsistence and security. Their food comprises both wild and domestic plants — roots, leaves, and seeds. Gophers eat a few insects, and they occasionally turn cannibal: they feed on road-kills of their own kind, at their own peril. Alert gophers, watching for predators, sit on their heels and stretch erect to full height, forelegs on chests, thus inspiring another folk name for them, 'picket pins'. When threatened, they dive for their intricate burrows.[2]

Historically, the flickertail gopher is second in prominence only to the grasshopper in the rogue's gallery of western Canadian agricultural pests. Reliable and comprehensive data are scarce, but it is certain that the creature did severe damage to crops over large areas of the Canadian plains and that farmers there regarded the gopher as a serious problem. Gophers ate just-planted seed in the ground; chewed up green, growing stems of crops; and pulled down mature heads of grain to eat and store it. Burrowing and trampling by the animals increased the destruction, so that folk wisdom estimated the economic cost of gophers at one bushel of grain to the animal per year. Consequently western Canadian historian Lewis H Thomas pronounced the gopher 'a pest of considerable economic significance', and mammalogist A W F Banfield termed it 'one of the most serious agricultural pests in Canada'.[3]

The comment by Thomas, 'It seemed to the early settlers that the gophers thrived and multiplied as grain growing increased,' was accurate as to perception and probable as to fact.[4] In 1889 a special committee of the Northwest territorial assembly determined that certain districts had suffered 52 per cent losses of crops to gophers. In 1894 twenty-six farmers of the Riversdale district bemoaned the gopher menace in a petition to the legislature: 'there are too

[2] My description of *Spermophilus richardsonii* and its habits is based on these sources: A W F Banfield, *The Mammals of Canada*, Toronto 1974, pp. 114-117; David R Michener, 'Notes on Home Range and Social Behavior in Adult Richardson's Ground Squirrels (Spermaphilus richardsonii),' *Can Field-Nat*, 76, January-March 1972; 77-79; Daniel R Michener, 'Annual Cycle of Activity and Weight Changes in Richardson's Ground Squirrel, Spermophilus richardsonii,' *Can Field-Nat*, 88, October-December 1974, 409-413; Gail R Michener and Daniel R Michener, 'Population Structure and Dispersal in Richardson's Ground Squirrels,' *Ecology*, 58, Early Spring 1977, 359-368; Gail R Michener, 'Spatial Relationships and Social Organization of Adult Richardson's Ground Squirrels,' *Canadian Journal of Zoology*, 57, January 1979, 125-139; Carl H Nellis, 'Productivity of Richardson's Ground Squirrels Near Rochester, Alberta,' *Canadian Field-Nat*, 83, July-September 1969, 246-250; Tim W Clark, Early Growth, Development, and Behavior of the Richardson Ground Squirrel (Spermophilus richardsoni elegans),' *American Midland Naturalist* 83, January 1970, 197-205; Richard I Yeaton, 'Social Behavior and Social Organization in Richardson's Ground Squirrel (Spermophilus Richardsonii) in Saskatchewan,' *Journal of Mammalogy*, 53, Feb 1972, 139-147; and John H Brown and G Douglas Roy, 'The Richardson Ground Squirrel, Citellus Richardsonii Sabine, in Southern Alberta: Its Importance and Control,' *Scientific Agriculture* 24, December 1943, 176-197.

[3] J H Grisdale, *Gopher Destruction*, Canada Department of Agriculture, Experimental Farms Service Bulletin No. 31, 1916, pp 2-3; Thomas, 'Local Government in the Northwest Territories,' *Saskatchewan History*, 2, Winter 1949, 8; Barfield, *Mammals of Canada*, p 116.

[4] Thomas, 'Local Government in the Northwest Territories,' p 8.

many in this county,' they said, 'and have destroyed about 50% of last season crop; some farmers had no harvest at all.' Later the same year one farmer from Grenfall wrote the *Regina Leader Post* that 'we shall soon be as badly off as the Australian colonies are with the rabbit pest'. An 'Ex-Farmer' concurred it was 'well known the gopher is the destroyer of thousands of acres of valuable crop year after year'. Gophers, wrote 'An Old Settler' from East Assiniboia in December, 1894, were worse pests than wolves. 'I have never heard of the whole of a rancher's crop of calves being eaten by wolves,' he observed, 'but the total loss of a year's crop of grain by gophers is no uncommon thing.'[5]

Subsequent pronouncements from the departments of agriculture in the Northwest Territories and later in Saskatchewan (created from the Northwest Territories in 1905) confirmed the gopher as a menace to the agricultural frontier. 'Season after season,' the Northwest territorial report noted in 1901, 'from one district or another, a cry for help is heard against that perennial pest and tax gatherer, the gopher.' Saskatchewan's report of 1907 scored that 'mischievous rodent, *Spermophilus richardsonii,*' for its 'very great' damage 'in the drier and more recently settled districts.' Again in 1908 it mourned 'considerable damage,' as 'usual in dry seasons,' 'in newly settled districts especially, by the flickertail.'[6]

I

No doubt these grievances were real, but the particular alarm expressed during the pioneer period owed to several circumstances. The first was that the pest was new to many settlers. Coming from Europe or from eastern North America, they were familiar with other burrowing mammals, but this creature of the northern prairies and plains seemed without peer as to prolificness and perniciousness. The second was that the pioneer period was typically a time of want, when every problem seemed critical. The third circumstance, however, was environmental, having to do with land use. The coversion of grassland to cropland obviously placed these two environments, grass and crops, in conjunction. The frontier by definition constituted a massive example of what later wildlife biologists would call 'edge' – undisturbed natural habitat, offering refuge and natural sustenance, adjoined by nutritious crop plants – ideal habitat for many types of wildlife, gophers among them. Ecological studies were to show that large expanses of cropland supported few gophers per acre; expansive grassland harboured a stable, comparatively low number, some eight to the acre; but grassland-cropland edge harboured concentrations of colonies that 'invaded' the crops to do their damage.[7]

Damage continued in succeeding years, but rhetoric subsided. Manitoba Agricultural College reported a 'bad' year for gophers in 1915, threatening an 'epidemic' in 1916. Gophers, college officials said, caused ten cents each in damage to crops. In 1918 the Saskatchewan Department of Agriculture reported that 'a quarter of a million acres of crop each year would be a conservative estimate' of damage. The following year it asserted (in suspiciously

[5] *Ibid.*; Petition from Farmers of Riverdale district to Legislature of the NW Terr.,' 1 May 1894, *Ordinances and Unpublished Papers of the Council and Legislative Assembly of the N.W.T.*, microfilm roll 2.95, Saskatchewan Archives, Regina; *Regina Leader Post*, 9 Aug 1894; *Regina Leader Post*, 23 Aug 1894; *Regina Leader Post*, 3 Jan 1895.

[6] Northwest Territories Department of Agriculture, *Annual Report*, 1901, p 65; Saskatchewan Department of Agriculture, *Annual Report*, 1907, p. 213, 1908, p. 185.

[7] Brown and Roy, 'The Richardson Ground Squirrel in Southern Alberta,' pp 183-184. I had helpful conversations on habitat and gopher populations with Lorne Scott, Naturalist for the Wascana Centre Authority and President of the Saskatchewan Wildlife Federation, in Regina, 5 August 1986.

round numbers) that damages were 750,000 acres at a cost of $7,500,000.[8]

Evidently as the country settled up, people still considered gophers a nuisance, but a routine and less critical one. During the 1930s, however, concern about gophers resurged, and not only because the times were hard economically. It may have been that drought was healthy for the animals, thereby diminishing mortality, but more important, it caused widespread abandonment of crop acreage. As this land grew up in weeds, then went back to grass, gophers once again found ideal edge conditions. Farmers were strident in their complaints: one wrote J G Taggard, Saskatchewan's Minister of Agriculture, that 1934 was the first year in twenty his district had no crop, and that 'it was more the gophers and cutworms which did for us, than the excessive dryness.'[9]

The connection among drought, field abandonment, and gopher proliferation became a commonplace in public and private statements of the Saskatchewan Department of Agriculture. Already in 1931 a rural municipality secretary informed Field Crops Commissioner S H Vigor that the gophers were rampant 'owing to several dry years in succession.' Vigor later wrote of them 'recurring in continued dry periods'; said that 'Drought years have been responsible for a large increase in the gopher population of the province' and for the spread of gophers from open areas even into parklands; and approved of a radio broadcast saying, 'The toll taken by gophers is especially heavy in dry years.'[10]

The department's *Guide to Saskatchewan Agriculture* for 1936 said gophers were worse than grasshoppers in some years; its *Annual Report* for 1939 said they were 'Favoured by depleted farm resources and other conditions' and 'particularly troublesome where there is waste or idle land.'[11]

Again, however, although concern continued, alarm diminished as prosperity and rainfall returned. The Saskatchewan Department of Agriculture's estimates of damages by gophers were 4½ million dollars in 1941 and 4⅔ million in 1942; still, Minister of Agriculture F H Auld advised Vigor not to make much of this. He said 'a good deal of tolerance' for gophers had developed, 'particularly in sparsely settled areas,' and that they should be portrayed as merely one of a number of pests deserving control in the province.[12] Since then gophers have been considered a persistent, somewhat costly, but not momentous pest.[13]

On first encountering the prairie gopher problem, some western commentators expressed the belief that private, individual efforts could handle it. The *Regina Leader Post* asserted in 1887, 'Private enterprise will do much toward abating the gopher menace,' and the paper went on to describe how the operators of a market garden had killed more than 400. The paper also suggested, however, that an agricultural society might stimulate such rodenticide among youngsters by offering prizes for exhibits of gopher tails.[14]

Others hoped human hunger would be a stimulus for pest control. In 1890 the Battleford *Saskatchewan Herald* reprinted an

[8] 'Get the Gopher,' *Canadian Thresherman*, 21, May 1916, 46; Saskatchewan Department of Agriculture, *Annual Report*, 1918, p 102; 'Re Gopher Damage Estimate,' undated typescript [1919], Ministerial Papers of the Hon Charles McGill Hamilton, GS 36, M 13, File 6 ('Weeds, Insect Pests. Apr. 26, 1920-Sept. 1, 1939'), Saskatchewan Archives, Saskatoon.

[9] George F Dacker to J G Taggard, 30 July 1935, Records of Saskatchewan Department of Agriculture, Field Crops Branch, Ag.3.63 ('Gopher Control, 1921-1947'), Saskatchewan Archives, Saskatoon.

[10] A W Phillips to S H Vigor, 31 Dec 1931, and Vigor to F H Auld, 15 Jan 1935, Ag.3.63, Saskatchewan Archives; *Regina Leader Post*, 3 Apr 1935; Transcript of radio broadcast No. 167, 6 Apr 1938, Bell's Limited, Prince Albert, in Ag.3.63, Saskatchewan Archives.

[11] *Guide to Saskatchewan Agriculture*, 1936, p. 85; *Annual Report*, 1939, p. 152.

[12] *Annual Report*, 1941, p. 48, and 1942, p. 131; Auld to Vigor, 18 Feb 1941, Ag.3.63, Saskatchewan Archives.

[13] This assertion is based largely on conversations with Diane M Secoy, University of Regina; Dan Harvey, Crop Protection Section, Saskatchewan Department of Agriculture; and interviews with farmers Harry and Iris Minifie, Vanguard, Saskatchewan, 9 Aug 1986, Jerry and Roberta England, Eastend, Saskatchewan, 8 Aug 1986, and Hartford A Lewis, Gray, Saskatchewan, 13 June 1985.

[14] *Regina Leader Post*, 2 Aug 1887.

article from a newspaper in North Dakota suggesting that gophers were delicious and that 'If the gopher can be made a regular article of diet its numbers would decrease rapidly.'[15] In his memoir of pioneer life in Saskatchewan, *Homesteader,* James Minifie recalled, 'Fresh meat was a rarity, for there were no storage facilities ... We tried gophers, and found them indistinguishable from rabbit.'[16] Ordinarily, regardless of culinary merit, settlers' prejudices forbade eating gophers, except perhaps in times of extreme hardship.

The majority rapidly concluded that the gopher problem was uncontrollable except through cooperation fostered by government programmes. An individual's efforts to fight the pests on his own property were useless if neighbours did not cooperate. Moreover, farmers desired not only coordination of their efforts but also financial assistance with them. Lobbying by farmers began with petitions to the Northwest territorial assembly at least as early as 1889.[17] A long letter to the editor of the *Regina Leader Post* in 1894 implied a coupling of pest cotrol with economic relief, calling for gopher control programmes to 'help the farmers, both in present cash and in saving to their crops in the future.' The same writer noted the problem of invasion of cultivated lands by 'fresh armies' from uncultivated lands, and suggested that while white settlers went after the pests on their farms, Indians should be employed to kill gophers in the grasslands. Then, he said, 'I believe we should hear little more of the Gopher nusisance.'[18] Another writer concurred that the government 'had no more important work' than pest control, and that with concerted action, 'the plague if not annihilated would be very materially checked.'[19] 'It is useless to ask emigrants to come to this country to have their crops destroyed either in whole or part year after year,' judged a third letter-writer, 'whilst the Government takes no step to abate the nuisance.'[20]

Such strident demands recurred during the 1930s. A farmer near Ravenscrag, for instance, complained to the Saskatchewan Department of Agriculture that holders of grazing leases on neighbouring pastures were failing to control gophers, which then destroyed his crops. Another Saskatchewan farmer said in 1935 that his neighbours never poisoned gophers and that the 'roads and highways are pock-marked with holes.' Something had to be done, he insisted; 'Our work is *entirely nullified* by the gophers hords which *continuously* sweep in on us from *unpoisoned* land,' land leased by graziers, 'owned by indifferent farmers,' or idle.[21]

II

Vigorously, if not always consistently, governmental authorities responded. Local governments acted both unilaterally and as conduits for territorial or provincial aid. Manitoba's original Municipal Act encouraged municipal councils to initiate gopher control programs, including bounties for gopher heads. Later legislative revisions encouraged poisoning and empowered the councils to compel railroad companies to destroy gophers on thier lands. It was in this context that the Manitoba Department of Agriculture and the Manitoba Agricultural College launched their 'Get the Gopher' campaign of 1916, with the colege's biology department providing poison and consultants to farmers.[22]

[15] Allan R Turner to Roy Shields, 9 July 1958, clippings file, Saskatchewan Archives, Regina; 'The Newspaper Scrapbook,' *Saskatchewan History* 13, Spring 1960; 31.
[16] James R Minifie, *Homesteader: A Prairie Boyhood Recalled*, Toronto 1972, p 135.
[17] *Regina Leader Post*, 10 Sept 1889.
[18] *Ibid*, 9 Aug 1894.
[19] *Ibid*, 23 Aug 1894.
[20] *Ibid*, 3 Jan 1895.
[21] Vigor to Auld, 15 July 1931, George F Dacker to Taggard, 30 July 1935, and Dacker to Vigor, 24 Aug 1935, Ag.3.63, Saskatchewan Archives, Saskatoon.
[22] *Revised Statutes of Manitoba, 1891*, Winnipeg 1892, Vol. II, p 1246; *Revised Statutes of Manitoba, 1913*, Winnipeg 1914, p. 1840; 'Get the Gopher,' p. 5.

The governments of the Northwest Territories built on the private precedents of the Bell Farm at Indian Head, which offered a half-cent bounty for gopher tails in 1884, and the *Moosomin Spectator,* which sponsored a gopher-tail contest for boys in 1894. In 1889 the assembly voted funds to buy 8000 gopher traps and distribute them through local agricultural societies. During the next few years the territorial governments also distributed small amounts of poison through postmasters, while municipalities supplemented these supplies and also offered bounties of up to 2½ cents per tail.[23]

The newly-organized province of Saskatchewan expanded such efforts. Its Department of Agriculture, beginning in 1907, began refunding to local improvement districts part of what they spent on gopher bounties, the first year's refunds totaling more than $2000 on expenditures of more than $6000; the next year's refunds were more than $6000; such refunds evidently then ceased. Nevertheless, with the Rural Municipality Act of 1909, the government affirmed the authority of rural municipalities to combat 'such animals as are found to injure or impede agriculture.' An amendent in 1911 provided more emphatically that should a landowner fail to take 'proper steps' to 'exterminate gophers,' the council of the municipality could send someone onto the infected property to do the job and bill the owner with taxes. Further legislation in 1917 specifically authorized the payment of bounties for gopher tails.[24]

By this time the provincial Department of Agriculture had re-entered the fray. In 1916 the department designated May 1 Gopher Day and asked rural municipal officials, farm organization officers, local weed inspectors, and most important, school teachers to encourage children to kill gophers. The municipalities offered bounties. One council opined, 'The destruction of gophers which do so much harm to the crops is a patriotic duty to the British Empire in these strenuous days of war when every bushel of grain produced helps to win the war. It has been said that every gopher destroyed is a bullet fired in the defence of the Empire.' The department provided plaques and medals as prizes to champion gopher-killers who turned in the tails to their teachers. The minister himself donated a gold watch as grand prize.[25]

Response, although not tabulated in 1916, was sufficiently good that the department repeated similar campaigns from 1917 through 1921. The prizes for both individuals and schools became grander, the point systems more elaborate each year. Six Shetland ponies headed the prize list in 1921, by which year the tail total topped two million (see Table 1).[26]

TABLE 1
Gopher Tail Totals for Saskatchewan, 1917-1921

Year	*Gopher Tails*
1917	514,140
1918	864,000
1919	no data
1920	1,236,000
1921	2,019,233

Sources: Annual Reports of the Saskatchewan Department of Agriculture

The competitions then ceased, although the rural municipalities continued paying bounties for tails for thirty years or more thereafter. The Saskatchewan Department of Agriculture meanwhile turned its attention to the province's local improvement

[23] 'Bounty on Gophers,' undated typescript by A R T [Allen R Turner], and Turner to Shields, 9 July 1958, Clippings File, Saskatchewan Archives, Regina; *Regina Leader Post,* 9 Aug 1894, 10 June 1890, and 9 Aug 1894; 'Petition from Farmers of Riversdale district,' 1 May 1894, microfilm roll 2.95, Saskatchewan Archives, Regina; Thomas, 'Local Government in the Northwest Territories,' p. 8.

[24] Saskatchewan Department of Agriculture, *Annual Report,* 1907, p. 213, 1908, p. 185; *Statutes of the Province of Saskatchewan, 1910-1911,* Chapter 21, pp. 3-4; *Statutes of the Province of Saskatchewan, 1917,* Chapter 14, p 154.

[25] *Annual Report,* 1916, pp 102-103.

[26] *Annual Report,* 1917, p 104, 1918, pp 102-103, 1919, pp 88-92, 1920, pp 10-12, 1921, pp 79-80.

districts, where there were no bounties. Here, beginning in 1919, as authorized by new legislation, the department distributed strychnine poison to farmers through grain growers' associations and postmasters. Such distributions of poison, along with directions and recipes for its use, continued through 1929, when the Department of Municipal Affairs took over the job. Certain hard-hit rural municipalities also received poison during the mid-1930s; most had to purchase their own. The Department of Agriculture renewed its encouragement and coordination of province-wide efforts in 1935. That year the department mailed out 10,000 posters urging citizens to 'Go for the Gopher.' It also partially reimbursed the rural municipalities that year for farmers' purchases of poison. Over the next few years the department's agricultural representatives frequently were involved in organizing the control campaigns of the municipalities.[27]

The gopher control policies of Alberta were patterned after those of Saskatchewan, but were applied more persistently. The province's legislation, in language lifted from that of its neighbour to the east, similarly authorized its rural municipalities to combat pests in general and gophers in particular. The municipal secretaries offered poison to farmers free or for cost and paid bounties for tails.[28]

The Alberta Department of Agriculture also offered prizes and conducted contests similar to those by the department in Saskatchewan, except that the Alberta contests were for adults, too, not just schoolchildren, and they ran for a longer period of years - 1924 to 1938 (see Table 2). The resulting mayhem, as reported by the Game Commissioner, never equalled the higher annual totals of Saskatchewan, but it racked up more than 800,000 tails in 1931. The campaigns ceased only with the discovery that gophers were carriers of sylvatic plague, whereupon the province no longer wished to encourage people to handle the animals. The same circumstances also discouraged rural municipalities from offering bounties.[29]

TABLE 2
Gopher Tail totals for Alberta, 1924-1938

Year	Gopher Tails		
	By Children	*By Adults*	*Total*
1924	(total only data available)		220,950
1925	(total only data available)		195,525
1926	192,528	13,783	206,311
1927	103,644	23,492	127,136
1928	63,858	20,745	84,603
1929	199,805	60,696	260,501
1930	410,254	94,747	505,001
1931*	486,248	549,917	836,165
1932	465,223	156,563	621,786
1933	564,739	160,514	725,253
1934	449,517	150,260	599,746
1935	447,517	223,009	670,616
1936	(no data available for this year)		
1937	338,139	123,127	461,266
1938	538,244	68,305	606,549

Sources: Annual Reports of the Alberta Department of Agriculture

*An error in reporting for 1931. The counts for children and adults do not add up to the total given. The conservative way to deal with the error is to accept the 836,165 total and assume one of the other counts (possibly the adult) was mistaken.

III

With all these government programmes in place, it still fell upon the citizenry to execute the control measures against gophers. The response was prompt, the methods direct. Neither scientists nor farmers discovered any cultural controls effective against gophers, and so the methods

[27] *Annual Report*, 1920, pp 12-13; 1921, p 79; 1922, pp 232-234; 1923, p 165; 1927, p 144; 1928, p 15; 1929, pp 17-18; 1930, p 240; 1940, p 6; 1941, p 50; *Regina Leader Post*, 3 Apr 1935; M P Tullis to Auld, 30 Jan 1922, Tullis to Auld, 18 Apr 1922, John Cameron To Vigor, 16 Dec 1927, Vigor to Auld, 5 Jan 1929, Vigor to Auld, 15 Jan 1935, Auld to Taggard, 11 March 1935, poster, 'Go for the Gopher in 1935,' and list of mailings, all in Ag.3.63, Saskatchewan Archives, Saskatoon.

[28] *Office Consolidation of the Public Statutes of the Province of Alberta, 1906-1915*, Edmonton 1915, p. 1047; *Revised Statutes of Alberta, 1942*, Edmonton; 1942, Vol. II pp 66-67; Brown and Douglas, 'The Richardson Ground Squirrel in Southern Alberta,' pp 176-177.

[29] Gopher tail totals are in the annual reports of the Alberta Department of Agriculture, 1924-1938; Brown and Douglas, 'The Richardson Ground Squirrel in Southern Alberta,' pp 176-177.

were of two kinds: mechanical and chemical.

Of mechanical means, a favourite among boys was snaring the animals at their burrow entrances. According to the explorer-turned-publicist John Macoun, the Metis boys of Manitoba snared gophers with string before white farmers settled in the region. James Minifie learned from the hired man how to snare gophers. His nephew, Harry, who grew up near Vanguard, Saskatchewan, recalled that during the 1950s he and his schoolmates snared gophers with their shoelaces while awaiting the schoolbus. The snaring craft required considerable patience, however — waiting for the gopher to put his head into the loop of twine or lace laid over his hole.[30]

Lacking such patience, and spurred by bounties and prizes, serious gopher hunters turned to drowning them out. Buckets of water poured down burrows flushed the creatures out, but not always from the hole where they were expected. The hunters went after them with clubs. A good dog was a great help.[31]

Traps were another mechanical means. Various folk inventors claimed to have built the better gopher trap. For example, one fellow from Avonlea announced in 1915 his invention of a fantastic, spring-loaded contraption which, if set in a dead furrow, would smack one hungry gopher after another a death-blow on the head and fling each into the air and out of the furrow. He nagged Saskatchewan Minister of Agriculture W R Motherwell for government funds to develop the invention, receiving courtesy, but no money, in return. Ordinary spring traps, commonly No. 0, were plenty effective.[32]

So also was the .22 rifle. 'I kept practising, and was able before long to tumble over a good many to save my garden,' recalled a pioneer farm woman from Findlater, Saskatchewan.[33] Harry Minifie bragged of shooting more than 460 gophers in one pasture on one afternoon, thereby earning forty-six dollars in bounty money.[34]

The enthusiasm with which youngsters implemented these mechanical methods was legendary. A common folksong, 'Knockin' Around the Yard,' commemorated a ragged boy who was determined to accummulate enough gopher tails 'To buy a hat, a fancy shirt, and pants what have a cuff.' The tail bounties, as the song implied, were to some extent a relief measure for impoverished farm families. Understandable, then, was the practice by some boys of wringing off the tails of live, captured gophers and freeing the animals to breed again. A common folk belief even contended that the creatures thus dismembered would grow new tails![35]

Understandable also, and often pathetic, were the stories told by teachers whose poor pupils participated in the gopher campaigns. Jesse Ewing of Clifton Bank district in Saskatchewan wrote in 1920 of how her pupils bought playground equipment with their bounty money, and how, inspired by the common effort, 'they came into school bright and happy in their school work.' The students of Mrs Thora

[30] John Macoun, *Manitoba and the Great Northwest*, Guelph 1882, p. 347; Minifie, *Homesteader*, p 95; personal interviews with Harry and Iris Minifie, 9 Aug 1986, and Hal Lewis, 13 June 1985.

[31] Minifie, *Homesteader*, p 103; Harry and Iris Minifie interview.

[32] Leonard Thompson to Provincial Government of Saskatchewan, 11 October 1915; W. R Motherwell to Thompson, 16 Oct 1915; Thompson to Motherwell, Nov 1915 (pencil sketches enclosed); and Motherwell to Thompson, 25 Nov 1915, all in W R Motherwell Papers, M 12, II.49 ('Gophers, 1911-1915'), Saskatchewan Archives, Saskatoon; John H Leslie to Hamilton, no date, GS 36, M 13, File 6, Saskatchewan Archives, Saskatoon.

[33] Allan R Turner, 'Pioneer Farming Experiences,' *Saskatchewan History*, 8, Fall 1955, 51-52.

[34] Harry Minifie interview.

[35] Folksong, 'Knockin' Around the Yard,' quoted as sung by Tim Rodgers (former President of the Canadian Folksong Society), University of Calgary; interviews cited above; Turner to Shields, Clippings File, Saskatchewan Archives, Regina.

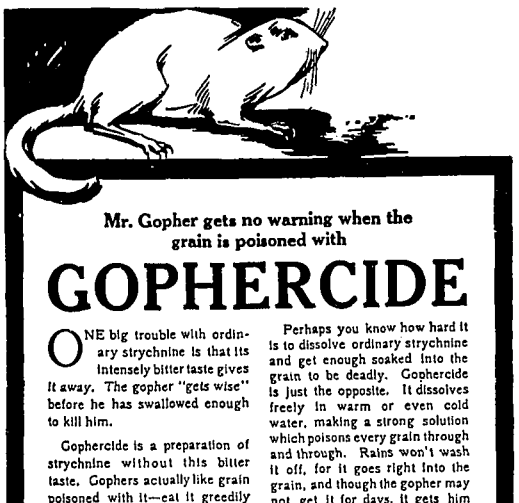


FIGURE 1
Advertisement for commercial gopher poison from the *Canadian Thresherman*, March 1914 (Courtesy of Saskatchewan Library).

Hansson at Amelia, however, were crestfallen when they learned they had won no prize – 'I even saw tears in some of the little eyes,' she wrote Minister of Agriculture Hamilton. The district had raised almost no crops since 1915.[36]

Adults generally used chemical controls, or poison, mainly strychnine. The Saskatchewan Department of Agriculture first gave out instructions for mixing strychnine bait in 1912 and did so frequently thereafter. Recipes for such bait included not only grain, strychnine, and water but also sweeteners and flavours to disguise the bitter poison. Molasses, saccharine, fruit juice, and oil of anise served such purpose. In the mid-1930s sodium arsenite also came into general use as gopher poison, mainly because it was being used in grasshopper campaigns at the same time.[37]

The poisons were effective, no doubt. The strychnine killed instantly. The sodium arsenite worked more slowly, but still surely, as tests by the Saskatchewan Department of Agriculture proved. There were two problems with poisoning gophers, however, the first of which was incidental effects on other animals, especially game birds. Complaints of this were frequent, but public officials discounted them. In 1918 the Saskatchewan Department of Agriculture released test results purporting to prove that strychnine would not harm prairie chickens (game birds, not domestic fowl) – that the birds 'have some power' to digest the poison. In 1942 Harold W Pope, President of the Saskatchewan Fish and Game League, publicly protested the widespread dissemination of gopher poison, only to be chided by federal entomologist K M King for hampering the pest control campaign.[38]

Loss of human life was not so easily dismissed. In 1941 a young girl died from drinking sodium arsenite, left over from grasshopper campaigns, that had been distributed as gopher poison. Municipal officials had given it to farmers in whatever containers they brought — including wine bottles. Still, no concerted protest arose.[39]

The general public acceptance of gopher poisoning prompted many entrepreneurs, and some charlatans, to offer commerical poisons for sale to individuals and to governments. Perhaps the most heavily advertised poison of the early twentieth century was Mickelson's Kill-Em-Quick, developed

[36] Miss Jessie Ewing to Hon C A Dunning, 16 Dec 1920, Mrs. Thora Hansson to Chas. M Hamilton, 15 Oct 1920, and Hamilton to Hansson, 22 Oct 1920, all in Gs 36, M 13, File 6, Saskatchewan Archives, Saskatoon.

[37] Saskatchewan Department of Agriculture, *Annual Report*, 1912, p 307; 1922, pp 233-234; 1936, p 139; 1937, p 81; 1938, p 90; Vigor to Stewart Criddle, 23 May 1936, Criddle to Vigor, 27 May 1936, and Vigor to Auld, 12 March 1937, all in Ag.3.63, Saskatchewan Archives, Saskatoon.

[38] *Annual Report*, 1918, pp 213-215; K M King to Harold W Pope, 13 June 1942, and King to Auld and Vigor, 20 Nov 1942, Ag.3.63, Saskatchewan Archives, Saskatoon.

[39] L Beal to Auld, 30 April 1941 (report from investigator G B Gilmour attached), Ag.3.63, Saskatchewan Archives, Saskatoon.

and sold by the immodest Anton Mickelson of Winnipeg. All such poisons were strychnine-based, and as government tests showed, were not much better or worse than bulk strychnine properly mixed, but the claims of the manufacturers were extravagant.[40]

In 1935 the Saskatchewan Department of Agriculture conducted a thorough survey of rural municipalities to find out what they were doing about gophers and how well it worked. The results were surprising. Most municipalities had tried distribution of strychnine, but the reports on this were distinctly mixed. Although some reported good success with it, others spoke of indifferent results, especially during drought, and many officials remarked on the dangers of the poison – 'dangerous stuff,' said one, 'a menace to children' said another. On the other hand officials whose main reliance had been on bounties were enthusiastic about their results. Children covetous of bounties hunted the varmints ruthlessly. 'After spending considerable money on different kinds of gopher poison, including strychnine,' wrote one municipal secretary, 'we finally adopted the bounty system, and the gopher disappeared until this past two years we have not even used the bounty.' Wrote another, 'In this way we find that we are actually killing the gophers and that the money is being spent among our own rate payers. We have instances where the amount of bounty paid has been used to purchase a pair of shoes for a child or other necessities of that nature.'[41]

IV

Long before the time this survey was taken, local and provincial governments had accepted gopher control as a customary function and as a legitimate object for public concern. They served to organize and subsidize the citizenry against the nuisance. It was remarkable, therefore, that to this time there had been no previous serious inquiry as to whether all the programmes instituted to deal with gophers had been effective.

One explanation for this is that the gopher control programmes were so direct and visible that it seemed unquestionable they were effective. Gophers poisoned or killed obviously were dead. The reports of provincial ministers of agriculture, in particular, give this impression when they total the hundreds of thousands of tails turned in. This concrete evidence, however, was not necessarily to the point. A count of gophers killed proved the control programmes effective only if it could be shown that the kill significantly decreased the gopher population and its depredations on crops. This may have been believed, but it never was proven, if it was susceptible to proof.

Another explanation is that public officials did not care whether gopher control programmes were, in the narrow sense, effective. Periods of severe gopher problems corresponded roughly to those of hard times economically. Perhaps economic relief, through the distribution of bounties, poison contracts, and other benefits, was the hidden purpose of the gopher programmes.

In all likelihood both explanations are true to a degree. Although entomological historian Paul Riegert has discounted bounties as worthless in insect pest control, this was not necessarily the case with mammal pests such as gophers. Given the documented evidence of massive killings of gophers for bounties and prizes, and the logical assumption that poison distribution accounted also for numerous gophers, then the gopher control programmes no doubt

[40] Advertisements for gopher poison are scattered throughout Canadian farm periodicals, including *Canadian Thresherman, Farm and Ranch Review*, and *Western Producer*, which I have perused. On Alexander Laboratories see numerous letters during the year 1933 in Ag.3.63, Saskatchewan Archives, Saskatoon.

[41] Letters and reports from this survey are in a folder labelled 'Questionnaire, 1940,' in Ag.3.63, Saskatchewan Archives, Saskatoon.

had marked effect, at least in localities. If economic relief was a side effect of the programmes, it was a welcome one.

Perhaps modern residents of the Canadian plains need not be sheepish about their recollections of the gopher campaigns. When they attacked the animals directly, with water, clubs, traps, guns, and dogs, they offered a natural and effective response to their pest problem. Their actions seemed not at all grotesque at the time. They were deadly, but certainly no more cruel than poisoning, and they had no harmful side effects. The gopher control methods of farm folk in western Canada were signs of personal mettle and of public responsiveness to governmental programmes for community benefit.

Notes on Contributors

DR M PATRICIA HOGAN is an Associate Professor of History at St Francis Xavier University, Antigonish, Nova Scotia, Canada. She has published in *Studies in Medieval and Renaissance History* and *Subsidia Mediaevalia*. Most recently, she has completed a detailed study of village labour: the numbers, specialization, quality, and inter-relationship between various agrarian and craft labour in an East Midlands village.

DR RICHARD BRITNELL is a Senior Lecturer in History at Durham University. He has written articles on markets and marketing in the Middle Ages and on the economic characteristics of small estates during the fourteenth century. He has also contributed sections on agriculture and rural society in eastern England (including Norfolk) to the forthcoming third volume of the *Agrarian History of England and Wales*. His recent book, *Growth and Decline in Colchester, 1300-1525* (Cambridge, 1986) relates the town to its agrarian context during the later Middle Ages.

ALEXANDER GIBSON is a Research Assistant in the department of Scottish History at St Andrews University. He has been working with Professor T C Smout on a project on Scottish wages, prices and living standards, 1580-1780. The results of this project, funded by the Economic and Social Research Council, are to be published in due course by Cambridge University Press. His other research interests include rural settlement, territorial organization and land assessment in medieval and early modern Scotland and computer applications in the Arts and Humanities.

DR PAUL GLENNIE is a lecturer in geography at the University of Bristol, having previously been Research Fellow at Jesus College, Cambridge. His interests lie in the commodification of late medieval and early modern English economy and society. His recent and current research concerns the geography of changes in agricultural productivity, long-term changes in occupational structure, and the composition of the domestic market for consumer goods.

DR STEWART RICHARDS studied zoology and physiology at Leicester, London and Yale Universities and now teaches physiology and science studies at Wye College, University of London. He has published two books on thermoregulation and a range of papers in the research journals. In 1982 he took the MSc degree in history of science at the University of Kent at Canterbury and in 1987 published *Philosophy and Sociology of Science*. Current research includes work for a book on the historical relations of science, agriculture and the universities.

THOMAS D ISERN The author is Associate Professor of History at Emporia State University, Emporia, Kansas. He is author of *Custom Combining on the Great Plains: A History;* University of Oklahoma Press, Norman, 1981, and co-author of *Plains Folk: A Commonplace of the Great Plains;* University of Oklahoma Press, Norman, 1987. Research comprised in this paper was performed under a grant from the Faculty Research Programme, Embassy of Canada, for a project entitled, 'Folk Technology of Farming the Canadian Plains.' The author expresses thanks to the Canadian Embassy and to the Canadian Plains Research Center, University of Regina, for their assistance in his studies.

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Book Reviews

DELLA HOOKE, *The Anglo-Saxon Landscape: the Kingdom of the Hwicce.* Manchester University Press, Manchester, 1985. viii + 270 pp, 53 maps, 4 plates. £30.

PAULINE STAFFORD, *The East Midlands in the Early Middle Ages,* Leicester University Press, Leicester 1985, x + 230 pp, 29 maps; 41 plates, £25 (hbk); £9.75 (pbk).

The term 'landscape' (with or without 'history' added) continues its insidious progress. Della Hooke's study is more truthfully titled than some which have emerged from authors and publishers seemingly afraid that 'historical geography' is offputting to readers, although her subtitle hints that a more accurate title would have begun with 'An' rather than 'The'. As would be expected from her earlier work the past landscape is principally perceived from topographical evidences found in her own searches among grants, writs and boundary charters in the style of Grundy and Finberg; the place-name evidence is more secondary; and – if one took only what is relayed here – Anglo-Saxon archaeology has not advanced the subject very far in the West Midlands.

Anglo-Saxon England was invaded from more than one direction, and in the same manner arrive these two most recent of its regional histories. Manchester is the more altruistic, since the former Hwicce territory – roughly the diocese of Worcester – lies far from the seat of its University Press while Pauline Stafford's East Midlands – stretching from Bedford to the Humber – do have Leicester near their centre. Her study forms the second of a series of projected regional studies which began with Wendy Davies' *Wales in the Early Middle Ages.* The series editor need not fear however that the core of the West Midlands has been already occupied, and there will not have to be a renewal of weapon shaking in the border wapentakes. Della Hooke's study is a substantial product of original scholarship, with much narrower objectives than the overview in *The East Midlands:* one notices twelve self-citations in her bibliography as against two by the author of *The East Midlands.*

Both University presses, it will be seen, have been exceptionally generous in providing for illustrations: they occupy about one-quarter of the pages. All but four of Della Hooke's fifty-seven illustrations are drawn figures, principally detailed local distribution maps (and occasionally too detailed, as in Fig.3 with its eleven separate miniscule symbols). Features as local as these do not appear in the distribution maps of the *East Midlands,* and the frequency of the 'after...' acknowledgements below them indicates that they do not arise, as in the case of *Hwicce* maps, from an author's original researches. However, Pauline Stafford's varied and well-reproduced plates – more numerous than her maps – are much more supportive of their text than Della Hooke's. It is the book with landscape in its title that has called in the camera to least advantage. Each has a long bibliography. The former has no footnotes but Della Hooke makes the worst of both worlds by exiling her footnotes from the feet of pages to the end of chapters where *op. cit.* references can be found to works not cited in that particular chapter as well as conventional abbreviations, such as 'B.' and 'S.', unexplained unless one has diligently read through the notes to chapter 1.

'Landscape' is a word that has gone up in the world with the inevitable risk of going down in estimation. At its zenith, as in Hoskins' title or in the work of C C Taylor, past landscapes were of interest as part of a process, a 'Making' indeed. By this standard a title such as Della Hooke's is bound to arouse expectations impossible to fulfill for her period and area. Her detection and interpretation do not concern the influence of Anglo-Saxon agriculture and settlement on the modern landscape. When present landscape features do occur it is usually to authenticate one or other of the successive stopping places recited in the ritual circumnavigations in the 137 West Midland charters that form her main documentary source. The minor role of the present landscape in this landscape study is well indicated by the fact that there are only five photographs as against fifty-three figures, and their choice has a rather desperate air. The strength of the book lies in its patient assembly and interpretation of topographical detail to create what is almost a Hwicce atlas with large- or small-scale maps, depending on the quality of the documentary information. In this atlas territorial administrative units are the main cartographical features; and from the geography of these to seek for signs of economic resources exploited and unexploited. There is a chapter on agricultural regions and another on those areas where most development can be discerned, but in them very little of general interest is added to what is already known: at best the details 'give colour' to older generalities.

For the long centuries before cartography, photography and printing combined to make landscapes available at the study desk, a reconstructed landscape of a small area at a single moment of time might seem to serve a local and limited purpose, akin to the recovery of a small body of fact from more traditional written or printed sources. Reconstructions of a larger area might serve, as a map or atlas

would today, as a distribution map of exploited resources, drawing attention to significant gathered clusters on the one hand and void spaces on the other. Yet for a period as remote as the Anglo-Saxon the problem with inferences drawn from distribution maps that are necessarily (but flimsily) based on a small haphazard documentary survival and on the other haphazardry of archaeological exploration is simply that in this sort of register an absence mark is inconclusive: as inconclusive, say, as making inferences about historians' busyness or idleness from an absence-list at conferences.

A series of reconstructed landscapes, on the other hand, might seem more promising for the study of those historical changes, such as the advance and retreat of settlement or the changing arable-pastoral ratio, which are most likely to have erased and re-etched landscapes: but here again it needs more substantial data coverage than Anglo-Saxon documentation allows, and when the book comes to conclusions its patient collection of reconstructed local landscapes seems to have added little to what is already known about historical processes.

Figures such as 41, 46, 47 and 49, which show 'Pre-Conquest settlement and land use' in five sub-areas, could profit by less ambitious labelling (as in the more accurate Fig. 43, 'Agricultural features recorded in charters') for actual charter evidence of land use is miniscule in relation to the area mapped, especially bearing in mind the admission (p 139) that 'the evidence for the settlement pattern is almost entirely lacking'. Sometimes, alas, many a mickle can make only another mickle.

Pauline Stafford's *East Midlands* is one of a series of 'Studies in the Early History of Britain'. Her remit, lucidly fulfilled, was thus wider than a landscape history although we learn on p xi that it is to be (quite properly) a 'history... rooted in its geography and landscape' and to that end the first page actually begins, 'The landscape...'. Subsequent chapters deal with The Land, The Agrarian Economy, and Towns, Trade and Industry, As a regional history it admirably marries the particular and the general, giving the reader an up-to-date account of Anglo-Saxon history, treating the chronology of settlement, political events and political institutions without mistaking the East Midlands for the whole kingdom. The chronological treatment is much clearer than in the *Hwicce,* and there is a much more awareness of the archaeological record. The illustrations are well selected and well reproduced.

'Landscape' is encountered again in the subtitle for the last and shortest of the book's three Parts, 'People in the Landscape', implying that the reader will have been traversing landscapes without people in the previous eight chapters but is now about to meet people in them. the author is doubly unfair to herself: her previous pages have not had landscape at their centre in either the Hoskins or the Hooke sense; nor were they dehumanized either in subject or in treatment, and I see people's artifacts and sculptured people among their illustrations. Conversely, what is Part 3? its two chapters turn out to be Social Structure, and Religion and Belief: all People and not a landscape in sight. Thus language is abused when buzz words are respected.

MAURICE BERESFORD

JOHN MCDONALD AND G D SNOOKS, *Domesday Economy: a New Approach to Anglo-Norman History.* OUP, 1986. xv + 240 pp. £27.50.

The novocentenary of the Domesday survey of England has witnessed a predictable plethora of publications, some of which have yielded a remarkable crop of new arguments, new ideas, and even new evidence. The country's most famous historical record is still capable of stimulating original research, as old orthodoxies face the challenge of new technologies. Nowhere has this challenge been posed more dramatically and more trenchantly than in this book, which methodologically marks a sharp break with the past century of Domesday scholarship. Part II of *Domesday Economy* (chapters 8-10) is a detailed presentation of the statistical methods that underpin the analyses and conclusions of Part I. We enter an unremittingly mathematical world of the least squares method, the Box-Cox extended model, heteroskedasticity, homotheticity, the Mukerji production function, and isoquants. To anyone who lacks training in modern economic and statistical methods, these one hundred pages will be quite literally and almost totally incomprehensible. This is not a criticism of the authors, who have arranged their material and argued their case with admirable lucidity; it is nevertheless a fair warning to the potential reader who has not seen this book and appreciated the technical challenge that it represents. The New History has come to stand up beside the New Archaeology, and to be counted!

Messrs McDonald and Snooks have a directness of approach that one might expect from scholars based in Australia: 'It is essential to confront and refute an established interpretation before further progress can be made' (p 82). Accordingly in the following pages H C Darby's claim that there is no systematic relationship between annual values and manorial resources is effectively demolished. It is demolished by means of a statistical analysis of all the data for two counties, Essex and Wiltshire. The samples are quite big: 861 lay and ecclesiastical manors in Essex and 532 in Wiltshire. The lay and ecclesiastical data are always presented separately, but we are given no lists of manorial units and we

are therefore not in a position to know how the authors have dealt with ambiguous and complex entries. Essex is recorded in Little Domesday and its demesne livestock figures have been used to suggest that this information by itself has little impact on annual values, when compared with non-arable resources of meadow, pasture, and woodland. Another result of the analysis is that the renders of watermills are not included in the total valuation at the end of each entry, a valuation that was supplied by the lord or his agent. Having been rescued from 'the long shadow of doubt cast by Round, Maitland, Galbraith, and Darby... quite clearly, the best indicator of income and wealth is annual value' (p 94).

These conclusions may be statistically valid for whole shires, but scholars whose sample is much smaller (e.g. an individual estate or fief) will still need to exercise caution. The authors are prepared to recognize some differences between shires and have selected these two as 'normal', i.e. relatively unscathed by natural and man-made disasters in the decades prior to 1086. One suspects that, were the analysis to be extended to the remaining Domesday shires, the definition of normality would prove to be more and more elusive. The other main conclusion of this analysis is equally problematic at a more localized level than the shire: that there is a close and positive relationship between tax assessments and manorial resources. Danegeld, it is argued, was not merely a land tax but a tax on all the resources of the manor. At this point the authors veer towards the unhistorical, for it is asserted that 'William I's administration was able to accurately assess and record the taxable capacity of English manors' (p 74). In fact the royal administration, through its officers the sheriffs, dealt in round numbers of hides or carucates for shires and for hundreds or wapentakes. It was within these local administrative subdivisions that there was scope for finer adjustments in a manorial context. Similarly the suggestion that 'a head of state who wishes to maximize his net tax revenue will attempt to apply the principle of capacity to pay' (p 46) is hardly supported by the present government's approach to the imposition of a poll tax. History is apt to confront the rational scientist with human irrationality.

It is at the level of humble historicity that one might quarrel with these eminently rational and technically proficient authors. Thus, for example, their assertion that manorial lords were endeavouring to maximize income needs to be demonstrated in relation to the much more detailed evidence of the extents and inquisitions of the late twelfth century onwards. Interesting statistical conclusions – that on lay manors in Essex in 1086 arable activities were 2.59 times as important as pastoral activities, or that the contribution of demesne plough-teams to net production was 2.56 times greater than that of the peasants' teams, or that villeins worked on average 36.4 per cent more hours a week on the demesne than bordars (cottagers) – should be tested against the later evidence. The argument that slaves were not closely associated with the lords' plough-teams seems to be based on a global comparison with other manorial personnel, rather than on an analysis limited to those manors that had any slaves at all. In other words, the retention of slavery on some manors and not on others was itself an historical circumstance that needs to be explained. The generalized statement that freemen and sokemen held their land directly from the king is both untrue and at variance with the practice of counting freemen and sokemen along with the villeins, bordars, and slaves as labour variables. The introductory scenario with its predominance of open fields, two-course rotation, and nucleated villages is painted in without any proof or reference to the recent literature on these subjects. There are, too, some worrying lapses and dubious concepts: Battle located in Kent, the heavy iron plough, that watermills were an industrial resource, and that urbanization had not proceeded very far before 1086.

Despite these and other reservations, *Domesday Economy* has to be accepted and indeed welcomed as a major pioneering work. It recognizes correctly that the central institution of the Domesday economy was the manor, though the concentration on two southern shires keeps the focus well clear of the frontiers of manorialization farther north and west. It provides us with a methodology for dealing with stochastic (non-exact) economic relationships. At the same time it gives due recognition to the use of sampling techniques by F W Maitland, who did not have the benefit of statistical theory or powerful computers. It tells us a great deal more about the economy of Domesday England than its traditionalist predecessor, R W Finn's *The Norman Conquest and its Effects on the Economy* (1971). With the latter, however, it shares a fundamental methodological weakness arising from the fact that the shire (Domesday or modern) was primarily an administrative unit rather than an economic one. Like all revolutionaries, Messrs McDonald and Snooks have found it harder to discard the baggage of the past than they may care to contemplate.

H B CLARKE

T H ASTON (ed), *Landlords, Peasants and Politics in Medieval England*. Past and Present Publications, CUP, 1987. viii + 446 pp. £25.

This is a second volume of medieval articles originally published in *Past and Present*, most of which

are of interest to agrarian historians, with five essays on landlords, five on peasants, and one on agricultural technology. They are of historiographical interest, because when we see essays written over a period of sixteen years assembled within the same covers, the difference between the old and new can be appreciated. At the peak of its development, the *Past and Present* essay had clear characteristics. It was willing to recognize connections between economics, politics and culture. It refused to be bound by national frontiers, identifying parallels between countries, and using differences to draw fruitful comparisons. It employed novelties in interpretation and method. It was humane in its approach, sympathizing with the underdog, and preferring literary to statistical evidence. It sometimes drew strength from a belief that the past had something to say to the present, and that the message was best conveyed to a wide readership in readable prose. Not every essay exhibited these qualities simultaneously, but many displayed two or three of them at once. In this collection the most striking examples of the genre are Holt's exploration of aristocratic property as a means of understanding the politics of the twelfth century, Maddicott's thorough exposure of the burden of taxation carried by the peasantry under the first three Edwards, Razi's lively defence of the flourishing fourteenth-century village community at Halesowen, and the very original demonstration by Gatrell of the cross-fertilization between Russian and English peasant studies. Some of the other essays, though of high quality in many respects, do not carry the distinctive *Past and Present* hall-marks, and could well have been written for other journals.

The editors – the plural must be necessary, because although only the late T H Aston's name appears on the cover, this volume has appeared two years after his tragic death – ought to have helped the readers to understand where each essay fits in the flow of historical writing. It would surely have been relevant to mention somewhere that Dodgshon on fields and Langdon on horses, as well as Raban on mortmain, were followed by books by the same authors on these subjects, and that King's thoughtful essay on the fortunes of thirteenth-century gentry families later appeared as a chapter in his book on Peterborough Abbey. Holt's essay belongs in the midst of a group of writings on aristocrats, land and politics in the twelfth century, and Dodgshon's important contribution forms part of a new wave of interest in fields and villages among archaeologists and geographers, and this could have been indicated. Only Coss, in a helpful addendum to his article on the thirteenth-century Langley family, explains that his article provoked a counter-blast from D Carpenter, and mentions other work on the same subject. The other contributors should have been encouraged to do the same. We are not even told the date of the original publication; some of us can remember when all of them first appeared, but students who were babes in arms in 1970 will have no such knowledge.

The articles are in their different ways controversial, as all challenging and innovative history will be. Some question current orthodoxies, like Britnell's analysis of the economics of small estates. All have provoked critical comments and replies; for example the responses to Holt's article published here. An important exception, which has produced few reactions, is Hatcher's article on English serfdom and villeinage. He seeks to show that the unfree peasants of the thirteenth century were not overburdened with seignorial exactions, because they received protection from custom sufficient to ensure that by 1300 demand for land had pushed leasehold rents well above villein's dues. It makes points of great importance, for example rightly stressing that the main burdens of servility were owed in cash rather than in labour, because labour was cheap and plentiful in the thirteenth century. The argument is almost entirely economic, expounded with a cool logic and supported by a wide range of sources. And yet it does not ring true, because it does not explain the persistence and passion with which peasants disputed their servile status, nor the vigour with which lords pursued their rights, and does not even fit the economic evidence that villeins paid large sums of money to convert their supposedly protected villein tenures into apparently vulnerable leaseholds. A missing ingredient in the argument is the psychological effects of the uncertainty of villeinage, because custom governed only a limited area of peasants' lives, and left them fearful of sudden financial demands or arbitrary acts. Perhaps, even in the new climate of the 1980s, someone will state a contrary view at length, in a *Past and Present* essay of the old-fashioned kind.

CHRISTOPHER DYER

MICHAEL ASTON, *Interpreting the Landscape: Landscape Archaeology in Local Studies*. Batsford, 1985. 168 pp, 71 figs, 23 plates. £9.95.

Michael Aston, not a man to need to quarry the *Shorter Oxford*, may not know that 'landscape', coming into English like so many Improvements from the Dutch, was not then a word for the terrain itself but for an artist's observation and recording of it. Yet, as his title shows, his instinct is exactly that. A landscape is there for interpretation.

While waves pound the coast of Holderness and diminish its low clay cliffs England is consoled by the build up of new saline mud further down the

North Sea coast: and while the masters of Geography and History inside the universities are these days eroding the pre-modern on more than one front it is consoling that students in Extra-mural classes are, by their tutor's researches and their own directed observations, likely to be better informed about the settlement and agrarian history of the English regions than most undergraduates. Now the metaphor must be abandoned, for the writing here is nowhere muddy if sometimes salty.

The flow of Aston's text and the apt and usually novel illustrations are like the succession of slides in a good adult class or weekend school, and the language of the exposition is pleasantly conversational and direct, with a concluding lecture (chapter), 'What does it all mean?', calculated to convince the classgoer that landscape archaeology is a humane subject, opening the traveller's eye in daylight hours and sending him back for more in the classroom as the autumn darkness descends.

The author, unlike this reviewer, is not given to trespassing, and he must have knocked on more farmhouse doors than anyone in the profession: usually in the Midlands and the South-west although the place-names in the List of Illustrations show that his examples are more widely drawn, and will be useful to workers in the field generally. The book covers all aspects of agricultural history that have left impressions on the landscape, with an unusual extra on communications.

Aston's book, unlike some other recent books on landscape history is far from being Hoskins reserved. Its aim is not to send the student to documents – only a quarter-page of 'How do we Know? is about written source materials although hardly a topic in the text could have been treated without the author's prior labours in such sources. Its archaeology is field archaeology, It is not oblivious of others' work with trowel and spade but realistically assumes that there is a body of readers with energy, enthusiasm and curiosity but without a taste for the trowel and spade. The tools are large-scale maps and strong boots.

The publishers, praised by the author for their patience in awaiting his manuscript, should be blushing for another reason. The line figures are well drawn and well reproduced but too many of the photographs are over-inked as if some second Black Death has descended on the landscape. If this is the price to pay for modern printing processes that keep a well-illustrated book within the means of ordinary readers it begins to look self-defeating. On the other hand the limp cover has as good a coloured air photograph of a church amid village earthworks as has been published anywhere, and the shadows here are for real. The author's photograph (in black and white) decorates the backcover, looking like some impish rainswept gargoyle: perhaps it is impishness that makes the front cover a problem picture, for it has no caption and does not appear in the list of illustrations, a reticent list altogether since no page numbers are given.

MAURICE BERESFORD

TIMOTHY DARVILL, *Ancient Monuments in the Countryside: an archaeological management review*. English Heritage, Archaeological Report No. 5, Historic Buildings and Monuments Commission for England, 1987. viii + 188 pp. 145 Figs. £12.50.

This well produced and extensively illustrated monograph is primarily an attempt to understand the occurrence of ancient monuments in diverse landscape settings and to present a strong case for sympathetic management strategies. The final aspect or recommendation is only touched upon briefly, namely the development and promotion of a firmly secured future for ancient monuments throughout the countryside as a necessary consequence of recognizing their cultural importance. The author's conclusion is urgent but hopeful.

The history of ancient monuments in England as recognizable indicators of society's past development and change occupies the first quarter of the monograph. A broad survey ranges from the early antiquaries to the most recent techniques of geophysical recording. The discussion of the culture resource management emphasizes one aspect which prompted this present survey: the quality and finite quantity of ancient monuments and the accelerating threats to their survival and successful care when less than 2 per cent of sites are protected in public guardianship.

For readers of this journal the most valuable aspect of the report should be the review of the various landscape categories, both 'natural' and man-made, providing an assessment of their development and utilization over many centuries extending from the last glacial incursion to World War II. For all categories the author is able to identify characteristic uses and settlements as well as to highlight the most serious threats in the rural 90 per cent of England's land surface. Within the natural landscapes he emphasizes the dynamics of change in past and current use, the desiccation of the wetlands, the acceleration of coastal erosion and the vulnerability of river gravels and alluvial plains to commercial exploitation and housing growth. Important as these natural landscapes are, especially when their waterlogged conditions preserve organic remains so completely, they do comprise only 6 per cent of land surfaces.

Far more extensive and typical of man's activities are the arable and pasture areas of England. Here the majority of human settlers lived and worked

from the Neolithic period to the Victorian age. The past developments of these landscapes and their present fragility in the face of deeper ploughing and prairie farming is well illustrated. The evidence from woodland and heathland is more difficult to record but is equally necessary in order to understand how these areas supported agrarian economies. Paradoxically the most artificial landscapes are the best protected: the parks which surround Tudor and later country houses have mostly survived into the present century with their leisure function unimpaired and with their relict landscapes unscathed. The upland moors are jointly the product of human interference and climatic change. They provide obvious evidence of past human exploitation, often justifying the designation 'areas of special cultural interest' rather than to be protected as individual unrelated sites. This theme was well explored in Darvill's previous monograph.

Throughout this well-presented survey the main theme is man's agrarian development. Typing errors are few though the final section of the bibliography is omitted. The caption to Fountains (Fig 119) needs improvement and Fig 144, apparently shot in gathering dusk, merits replacement. Understanding the landscape and preserving it for posterity is here defended as a desirable and necessary discipline.

LAWRENCE BUTLER

D A CROWLEY, (ed), *Victoria History of Wiltshire*. Vol. XIII OUP for Institute of Historical Research, 1987. xx + 280pp. Illus. Maps. £60.

This latest volume of the Victoria History deals with nineteen parishes in the southwest of Wiltshire, situated along the valley of the Ebble and in the Vale of Wardour. Throughout the Middle Ages this area was dominated by the nunneries at Shaftesbury and Wilton, and after 1539 came into the posession of a few wealthy gentry families, notably the Herberts of Wilton and the Arundells of Wardour. Much of the region consists of chalk downlands where for many centuries the traditional sheep-corn husbandry flourished; it remains predominantly agricultural, with Tisbury as the only major settlement, and it is also one of the most beautiful parts of Wiltshire. The one major industry has been stone quarrying, and from the Roman period fine-quality stone has been extensively quarried at Chilmark, Teffont Evias and Tisbury, as well as greensand at Donhead St Andrew and Donhead St Mary. Chilmark stone was used at Wilton, in the cathedrals at Old and New Salisbury, at Wardour and Longford castles, and in the many fine parish churches, gentry mansions and manor houses of the region. Local stone was also used in the medieval farmstead at Place Farm, Tisbury, part of the possessions of the nuns of Shaftesbury, where the largest medieval barn in England remains as a tribute to the scale of monastic farming.

The strengths and weaknesses of the familiar *VCH* approach are both apparent in this volume. The closely-packed wealth of information does not make for easy reading, but to the assiduous local historian it provides a model of meticulous documentary research and a lesson in the use of a vast range of different sources. The complex histories of manors and manorial descents are traced with authority and clarity, as is the pattern of land-holding, tenurial changes, ecclesiastical arrangements and the economic history of each parish, while the good, brief architectural descriptions of churches and houses, together with well-drawn maps are admirable. The printing and production are excellent, and the well-chosen illustrations admirably complement the text, although plans of some major buildings such as Wardour Castle or Place Farm would have been a welcome addition.

The agricultural history of the district has to be hunted through the section on each parish, but the search is rewarded with good detailed material on the medieval field systems, details of the large sheep flocks and common-field farming, on changing land use, and post-medieval enclosures, conversion to arable of much of the downlands, the consolidation of holdings and on the spread of dairy farming during the twentieth century. We are given a good account of the settlement patterns along the chalk valleys and of the contrasting situation in Semley parish where common pastures still survive on the heavy clays. Useful information is also provided on the influence of the great estates, on woodland management and on farm buildings. Disappointingly little evidence has been found, however, concerning the construction and working of water meadows along the the Ebble and the Nadder, although reference is made to the construction of numerous watercress beds.

The tight VCH formula, however, leaves little scope for detail, and the enforced brevity of the entries sometimes masks their full significance. It would have been interesting to know more of the slow break-up of the large pre-Conquest parish of Chalke with its minster at Broad Chalke, a process evidently still not complete by the early fourteenth century, or about the late-medieval desertion of so many farms and hamlets all over the chalkland. The account of Bowerchalke mentions that from 1882 to 1922 the energetic high-church incumbent produced and printed a weekly parish newspaper which he sold for ½*d* per copy, but the brief reference hardly does justice to this remarkable achievement, nor to the incomparable source for all aspects of local life and history which the newspaper provides. For Fonthill Gifford this volume provides an excellent succinct account of the remarkably complex series of mansions that were successively built in the

parish, including a good description of Fonthill abbey, its construction and the masive landscaping associated with it. But we are given scarcely any information about its builder, William Beckford, nor about the source of his enormous wealth; and we are not told that it was his homosexuality and consequent exclusion from society which led him to indulge in ever more fantastic architectural extravagances. Likewise, the reference to Beckford's 'collections of antiquities and early furniture' is hardly an adequate description of one of the greatest private displays of works of art assembled in England.

But notwithstanding such brevity, this volume provides an immense store of factual information, and provides for researchers great quantities of reliable material on economic, social and religious life, nonconformity, local government, charities and educational provision, as well as the necessary references from which more detail can be obtained. It takes its place alongside the other excellent topographical volumes for Wiltshire as the essential starting point for any historical research on the county, and provides a welcome work of reference to this interesting and attractive part of Wiltshire.

J H BETTEY

PETER WARNER, *Greens, Commons and Clayland Colonization: the Origins and Development of Green-side Settlement in East Suffolk*. Leicester U P, Dept of English Local History, Occasional papers, 4th series, 2, 1987. vi + 66pp. 12 figs. £5.95.

As an illustration of the truism that every part of England has not just its own but its idiosyncratic local history, Dr Warner's microscopic study of one aspect of the landscape history of a tucked-away patch of Suffolk is both exemplary and interesting. His actual area of study is quite difficult to place in default of a small-scale location map if, as for this reviewer, it is unfamiliar terrain; but it is centred upon the country *c* 20-35 miles south of Norwich around Halesworth between Ipswich and Lowestoft, in part related to the R Blyth valley. Indeed the booklet arises from the author's doctoral research on Blything hundred.

The relationships between solid and drift geology, soils, land carrying capacity, and settlement pattern and forms are the themes running through the study. Their context is appropriately outlined in Chapter 1, 'The Topography of Clayland Commons in East Anglia', where the crucial factor of localized differences in drift geology, for example in defining locally 'marginal land', is emphatically brought out. Chapter 2, 'Clayland Colonization in the Eleventh Century' discusses several interpretative options and offers a model for understanding how the present landscape of nucleated and dispersed settlements and often fragmentary greens comes to bear its present appearance in the study area. The model is examined in the light of several detailed case studies, specifically in relation to the emergence, survival and, in many cases, disappearance of green-side settlement, in Chapter 3, with a short, pithy and, I would suggest, seminal final chapter laying out some firm 'Conclusions'. The booklet ends with an Appendix briefly discussing 'Some Fifteenth-century Tenurial Suffolk Surveys or "Dragges"', followed by fourteen pages of footnotes.

Since the publication is both short and tightly-argued, with understanding dependent on grasping much local detail, far better to read it than rely on a summary in a brief review. Two quotations indicating key concepts are plucked out to encourage such action: '(in the Domesday survey) We are presented with a well developed landscape .... indeed an "old country" (p 44); 'the formation of new tenements ... led to a style of leap-frog settlement pattern ...' (p 45). Dr Warner has probably successfully sorted out his own local history, and fair enough; the wider significance of his work is that, in defining the idiosyncracy of his obscure patch, he offers a methodology and a model to test elsewhere.

P J FOWLER

ANGUS J L WINCHESTER *Landscape and Society in Medieval Cumbria*. John Donald, Edinburgh, 1987. x + 178pp. £20.

Despite being 'loved to death' as one frustrated conservationist has put it, the Cumbrian landscape is far from being understood. Yet surprisingly, what stands out about Angus Winchester's study of its development during the medieval period is the extent to which he demonstrates how the gaps in our understanding have been due to neglect rather than an absence of suitable documentary material. Through his resourceful exploitation of such sources, he has reconstructed layers of landscape history that have hitherto been only dimly perceived yet which are crucial to any understanding of what we see today.

After an opening chapter that stresses the region's distinction from southern Britain in terms of its isolation, poverty and pastoral bias and its role as a front-line area that bore the brunt of hostilities with Scotland, the author provides a series of thematic surveys covering the period 1100-1600. In many ways, the most challenging is that on lordship and territory. A circumstantial case is made out for seeing large pre-Norman estates as the basis for both Norman baronies and administrative wards like Allerdale and Copeland and even for seeing the larger parishes as having a pre-Norman origin. In a

most successful discussion, Winchester elaborates on the crucial contrast between lowland areas and the forest areas (e.g. Derwentfells) that occupied the upland core. In the former, a great deal of settlement formation occurred over the century or so prior to the Norman conquest of the region in 1092, with subsequent growth being channelled into their enlargement. In the latter, temporary shielings were in use as early as the Norse period, but permanent settlement did not begin to invade the valleys that radiate from the upland core until the twelfth and thirteenth centuries, when small hamlets were created in the valley bottoms and a scatter of more dispersed farmsteads were subsequently founded on the surrounding fell slopes. A combination of war with Scotland and livestock disease added to the local impact of the Plague over the fourteenth and early fifteenth centuries. Though growth renewed itself over the late fifteenth century and though further colonization led to intakes at the limits of cultivation, the process did not spawn new settlements unless one includes the forest settlements split between co-heirs.

Winchester relates these phases of growth to field patterns and tenures. The older settlements of the lower ground comprised a bovated core of open fields, whose constituent holdings were held by customary tenure. Twelfth- and thirteenth-century expansion added blocks of *forland* (land outside) whilst the assarts and riddings colonized over the fifteenth and sixteenth centuries formed the basis for outfield cropping systems. By comparison, the settlements and 'grounds' of the upland core were, from the outset, held on a free, non-customary tenure, giving their inhabitants 'the look of frontiersmen'. His treatment of the successive changes affecting fell pastures is especially valuable, their supposed early use as common grazing within a multiple estate system slowly giving way to their partition between townships, first in the form of recognized grazing areas, or heafs, and later through the physical demarcation of heafs with stone walls. At the same time, the use of shielings declined and the vaccaries present during the thirteenth century gave way to sheep farming by the sixteenth century. Winchester's discussion of woodlands is similarly pivoted around a boldy-defined shift, with the clearance of woodland or their destruction by stock during the high middle ages giving way, by the sixteenth century, to a more protective, conservationist policy as local iron working and bobbin-making helped to re-value the area's depleted reserves. A final thematic chapter on rural industry and towns contains useful maps but is not so successful in turning early documentation into a sense of landscape and its development.

Writing on medieval Cumbria has always had something of a threadbare appearance. Winchester's book remedies this deficiency, dressing the problem with a richness of theme and detail. It impresses as much by its juxtaposition of well-researched local examples and regional surveys as by its awareness of the wider national debate on particular themes. It has its gaps, notably the lack of comment on vernacular building styles, walls or buildings. Nor am I convinced by the decision to incorporate local examples of landscape evolution into appendices rather than the text. Yet despite such points, it can be recommended as a most satisfying book.

R A DODGSHON

M J DOBSON, *A Chronology of Epidemic Disease and Mortality in Southeast England, 1601-1800*. Institute of British Geographers, Historical Geography Research Series, no 19, November 1987. 110 pp. £4.95.

This volume, slim but satisfyingly pithy, is likely to become an invaluable reference tool for all historians enquiring into short run fluctuations in local populations in early modern England. Dobson traces annual mortality fluctuations between 1601 and 1800, and their possible causes, in 165 parishes located in Essex, Kent and East Sussex, an area she categorizes surprisingly as a 'geographical region'. Two simple but carefully considered statistical measures enable her to do two things. First she charts the extent to which burials in any calendar year throughout the area as a whole varied above or below a statistical mean, a device which enables her to place individual years into one of seven categories ranging from 'crisis mortality' years through to those that were 'exceptionally healthy'. Secondly, she assesses the geographical extent of 'crisis mortality' by assigning each year to one of four categories that depend on the percentage of observed parishes exhibiting defined burial leaps. Thus crises could be 'widespread', 'extensive', 'diffuse', or merely 'local'. This quantitative material is then matched with qualitative information about prevalent diseases drawn from a variety of sources – poor law records, medical chronologies, letters, diaries and so on.

The results are rendered in several forms: in graphs and statistical tables, in a year-by-year chronology that draws attention to possible causes of these local and regional burial leaps, and in a brief introductory summary of methods and findings.

Dobson discerns two contrasting patterns of crisis mortality: 'One in which moderate peaks in mortality were present across a wide distribution of parishes and another in which isolated and intense epidemics affected only a few parishes'. The latter pattern she associates with diseases such as bubonic plague, whilst the former is linked strongly with 'fevers' of various kinds, amongst which Dobson

elevates the enteric fevers (typhoid, paratyphoid, and dysentery) into prime position. Smallpox, somewhat surprisingly, she associates with severe local outbreaks rather than moderate but extensive ones.

The South-east, Dobson insists, escaped comparatively lightly in this period, though until comparable work is undertaken on other localities we obviously cannot be sure of this. In only three years – 1625, 1638 and 1679 – did aggregated regional burials reach 'crisis mortality' levels. Not only were local crises then also widespread, but each was contained in a cluster of high mortality years, with the last (1678-81) being by far the worst episode of the entire period. The calendar year may not of course be the most appropriate unit of measurement for those epidemics that straddled succeeding years, producing 'high mortality' in several rather than a 'crisis' in one of them. The period 1727-30 might provide examples of this.

Although it looks as if oscillations in aggregated mortality diminished after 1678, and no single year thereafter ever produced such widespread high mortality, information on the overall frequency of local crises can only be derived with effort from Dobson's tables. Did local crises diminish in frequency after the years 1678-81? Even if they did, this does not necessarily mean that life chances improved. What one really wants is information about mortality rates and how these interacted with other demographic variables such as nuptiality and fertility. These limitations apart, however, the work must be warmly welcomed.

R B OUTHWAITE

ALAN ARMSTRONG, *Farmworkers: A Social and Economic History 1770-1980*. Batsford, 1988. 302 pp. 26 Tables. £29.95.

Professor Armstrong has produced a clear account of the principal changes which affected the lives and working conditions of farmworkers over the course of more than two centuries. He brings together much recent research by other historians and summarizes the significance of their contribution. The book is divided into ten main chapters, arranged chronologically, plus a brief 'retrospect'. Each begins with a short discussion of the major developments in agriculture during the period under consideration before concentrating on the position of the labour force *per se*. Much attention is devoted to variations in employment levels and in the real wages of the workers, along with their associated regional trends. Particularly in the earlier chapters, covering the French wars and their immediate aftermath, he weighs the views of both 'optimists' and 'pessimists' in the standard of living debate, before coming down largely in favour of the 'optimists', for the war period at least. He concludes that 'it is difficult to agree with the well-entrenched view that the real remuneration of farmworkers' families tended to decline systematically during the war years' (p 55). However he does qualify this later by pointing out that with '14 out of 22 grain harvests' in the years 1793-1814 'characterized as deficient in varying degrees', agricultural workers, like other sections of society must have 'suffered considerable privations in certain years'.

Unlike many books on the subject, this examines the position of the female members of the labour force and assesses the significance of their earnings to total family income, as well as chronicling the general decline in their numbers over the period. The incidence of rural crime, the effect of poor law changes in the nineteenth century, and the growth of the trade union movement are likewise examined in some detail. Also useful is the survey of farm employment during and since the Second World War, with a decline of more than a third in the size of the wage labour force between 1949 and 1979, despite increasing state intervention to regulate wages and conditions.

Less attention is paid to questions of housing and diet (except in Chapter 4, which deals with the 'golden age' from *c*1850-1872). And, indeed, one of the weaknesses of this otherwise valuable book is its failure to convey what it felt like to be a farmworker during these momentous years, when agriculture was toppled from its erstwhile pre-eminence in the nation's economy, and the number of men employed in it shrank dramatically. The arduousness of the daily round for much of the period, the nature of family relationships, and the role of religious and leisure activities are surveyed only briefly in an account concerned primarily with the broad general outlines of the worker's economic and social situation. Also missing is a systematic analysis of his relations with other members of village society, save for his employer.

Inevitably in a book covering such a wide timespan a few small errors have crept in. Thus, contrary to Professor Armstrong's assertion (p 95), the total of farmers' and graziers' wives does appear in the 1871 census; according to the official report there were 187,029 of them. It was from 1881 that they were omitted. Similarly, in 1908 (p 142) the amount of the old age pension for married couples was set at 10*s* not 7*s*. 6*d*, But these are minor points. Overall, the book can be warmly recommended as a useful addition to the literature on rural life, and a reliable text to be consulted by students of agrarian history. The inclusion of a number of *Punch* cartoons to illustrate some of the points made by the author is a pleasant additional feature.

PAMELA HORN

R UNWIN, *Wetherby: The History of a Yorkshire Market Town*. Leeds UP for the Wetherby Historical Trust, 1987. xi + 251 pp, 12 maps; 58 illustrations. £8.95 incl. p+p from Wetherby Historical Trust, Castlegarth, Wetherby, W. Yorks.

Robert Unwin's attractive and informative history of Wetherby from the Bronze Age to modern times is excellently done. A chorus of witnesses indicate the challenge he has set himself, for the ancient Wharfedale settlement of *Wederbi* or *Werrebi* has remained modest in size and status throughout many subsequent centuries.

It was 'a famous little place with nothing much to see', decided *The King's England;* a 'small market town on a hill', reported Leland in the 1530s; 'small', suggested Defoe; 'poor', added Richard Pococke in 1751; 'a small, gloomy and ill-built market town', superadded the irascible John Byng in 1792; many properties were 'delapidated', wrote the *Leeds Intelligencer* thirty years later; many residents were 'indifferent' to culture and improvement, absorbed only in 'money and cattle', concluded the *Wetherby News* in 1870; while locals recalled the place in the 1930s simply as 'a quiet country town, where everybody knew everybody else'.

Yet the challenge to interpret small town life is surmounted triumphantly. Dr Unwin does not claim too much for Wetherby; nor yet too little. It was important precisely for its very long continuity as a very small market centre, and staging post on the great road to the north. One of the often-unsung 'Banburys of England', it constituted a nodal rather than a growth point on the country's economic and transportation network. Dr Unwin documents the life of such a localized settlement with great skill. Agricultural historians might perhaps wish for fuller information about the scale and nature of its market transactions and farming hinterland; but historians of all persuasions will be indebted to his unusually detailed material on the range of occupations in Wetherby from medieval right through to modern times.

Continuities in economic role, furthermore, did not entail a history without excitements or hazard. There were onslaughts from plague and baronial warfare in the thirteenth and fourteenth centuries; as well as military skirmishes in rebellions and civil war under the Tudors and Stuarts. Nor did continuity preclude economic depression. Eighteenth-century Wetherby faced difficulties in the devastating aftermath of 'a dismal accident by fire' in 1723, compounded by sluggish trade and an indifferent landlord. Little wonder that there was local excitement, when the freehold of the entire market town, plus all manorial rights, was sold off by the Duke of Devonshire in 1824. But many former tenants subsequently struggled, having paid inflated prices for their properties in a tense public auction.

Nor, finally, did economic continuity preclude internal disputes and dissention. Dr Unwin points to religion and education as the social battle-fields of modern times. He provides much highly interesting material on Church/Chapel rivalries over schooling in the Victorian era, and a rather more circumspect account of twentieth-century political conflicts over the many (and still continuing) educational reorganizations. It all makes for a fasinating account of Wetherby's evolution from a small market village on a traditional river crossing, into a confident modern urban centre. Above all, and most felicitously, Dr Unwin demonstrates that local history can be analysed with affection but without sentimentality.

PENELOPE J CORFIELD

VANCE HALL, *A History of the Yorkshire Agricultural Society 1837-1987*. Batsford, 1987. 240pp, 4 maps, 36 plates. £14.95.

In writing this sesquicentennial *History* of the Yorkshire Agricultural Society (YAS) Professor Hall states that his intention is also to contribute to the broader history of nineteenth-century agriculture and science. Indeed, the author makes some bold claims about his work, indicating at the outset that it is as much 'reinterpretation as interpretation' not least in that 'our understanding of what was happening within English agriculture during an apparent paradigmatic few years *c*1835-60, needs heavy revision'. In conformity with this objective, the greater part of the book (113 out of 182 pages of main text) is devoted to the pre-1914 period which is a fair recognition of the fortunes of agricultural societies as their Victorian prosperity was not generally regained until the revival of agricultural fortunes which followed the Second World War.

The primary sources for this *History* are the Society's recently rediscovered records and accounts of shows which have appeared in Yorkshire local newspapers. There is also some interesting, if rather inconclusive, correspondence between H S Thompson (the dominant figure in the early affairs of the YAS), J H Gilbert, and Philip Pusey taken from the Rothamsted Archives and presented in a short appendix. The author has not, however, found it necessary to consult the nineteenth-century agricultural press (other than the *TYAS* and *JRASE*) for comment and observation on the Society's proceedings. This may explain why his particular heroes of 'the scientific reform movement within English

agriculture' are T D Acland, Pusey (whose paper 'On the progress of agricultural knowledge during the last eight years' in *TYAS* and *JRASE* for 1850 is held to be 'possibly the most masterly and influential piece of mid-century English agricultural analysis'), Spencer, and Thompson, as opposed to various other opinion leaders then committed to 'scientific' agriculture. As Professor Hall's account is based on what appears to be a narrow reading of nineteenth-century sources and, indeed, more recent secondary accounts of the period he wishes to reinterpret, his presentation of the intellectual *milieu* of early Victorian agriculture is unbalanced. Most attention is given to aspects of agricultural science – especially the view that Thompson and others took of Liebig's work – but the attitudes of YAS's promoters to the economic and political dimensions of their project are accorded little space.

A prime example of the sort of 'reinterpretation' that we are offered by Professor Hall is his theory that the proliferation of local agricultural societies in early Victorian England coincided with the hiatus in new railway ventures between 1837 and 1842 and so benefited from the capital which was available (p 27). Given the author's initial claims, it is surprising that Professor Hall takes a largely uncritical view of the concept of a 'Golden Age', typically relying on a retrospective assessment in support of its agricultural profitability.

When we turn to the more recent period of the YAS *History*, the circumstances leading to the establishment of the permanent showground at Harrogate are related, but more emphasis might have been placed on the innovative nature of this venture, in that it provided a model which was to be followed by a number of other major agricultural societies not least – and belatedly – the RASE. The difficulties which have since attended some of the affairs of the YAS – and have restricted its sphere of operations – are rightly not ignored, but the author's treatment of the Society's recent history is for the most part confined to a factual account. It would have been interesting to learn something more of, for example, the membership profile of the YAS – past and present – the show audience, and the recent trend of show policy.

This book may be welcomed as a contribution to our information about agricultural societies but the welcome must be heavily qualified. The work fails to deliver what is promised – there is really very little which is new here regarding the broad context of early Victorian agricultural history, and some of the (re)interpretations provided verge on misinterpretations. Finally, whether the present members of the YAS will be pleased to see their *History* adorned with a Marxian quotation, however apposite, this reviewer is inclined to doubt.

NICHOLAS GODDARD

HARRIET RITVO, *The Animal Estate: the English and Other Creatures in the Victorian Age*. Harvard UP, 1987. xii + 347 pp. 53 illustrations. £14.95.

Harriet Ritvo's interesting and wide-ranging volume explores aspects of the relationship between people and animals in nineteenth-century Britain. Although these relationships conformed to no single pattern, and cannot be attributed to any one cause, Ritvo believes that the diverse 'animal-related discourse' was not chaotic or unstructured, but took domination and exploitation as its central themes. Animals fulfilled a double rhetorical function. On the one hand, they celebrated and reinforced human power. On the other, they allowed domination to be expressed in disguised forms. The faint-hearted were offered an oblique mechanism for the exercise and expression of hegemony. The prominence of animals in the imaginative life of the nineteenth century reflects the strength of these functions.

The notion of a moral hierarchy in the animal kingdom, analogous to the orders of human society, is traced in an introductory chapter which surveys the changing content of popular zoology from Bewick to Darwin. Evolutionary theory dethroned both God and humankind, but in such a way that man was able to appropriate some part of God's glory. In effect, the Darwinian view was no less hierarchical than its predecessors, conferring simultaneous support on human ascendancy and the established social order. Such rhetorical structures underpinned human dealings with animals.

Ritvo then develops her argument in six loosely-connected thematic chapters, which illuminate three different features of nineteenth-century social history. The activities of élite cattle breeders (Ch 1) and the breeders of prize dogs and cats (Ch 2) show how animals could be used to support and celebrate Britain's internal social hierarchy. Dogs and cats appealed to those whose economic power and social aspirations were of more modest proportions than was customarily found among pedigree cattle breeders.

The emergence of humanitarian concern for animal well-being, as reflected in the work of the RSPCA (Ch 3), and recognition of the need to control animal-borne diseases, particularly rabies (Ch 4), is seen as part of a much larger debate about the maintenance of social order and the control of society's dangerous classes. Maltreated and disease-prone animals were associated metonymically with the lower orders who were normally their owners.

The growing popularity of menageries and zoological collections (Ch 5), and the development of

game hunting in the colonial territories of Africa and Asia (Ch 6) are both interepreted as celebrations of the triumph of imperial enterpise. Collections of captive exotic species gave the lower orders opportunities both to admire and 'in a shadowy way' to participate in the conquests of their more fortunate countrymen; zoos were not meant for mere diversion. The images and spoils of big game hunting presented an even more powerful evocation of the conquest and domination of exotic territories. 'Dead wild animals ... symbolized the British suppression of the Afghans or the Ashante more compellingly than their pampered captive cousins.' The book ends without the benefit of a concluding chapter.

Much of Ritvo's material could only be considered marginal to the interests of agricultural historians. However, this does not argue against either the overall plausibility of her general thesis or the direct relevance to agricultural historians of some parts of the evidence which she deploys in supporting it. There are two respects in which this volume represents a highly significant contribution to British agricultural history, one general and one specific. First, in a general sense Ritvo ably demonstrates that action and motive are conceptually inseparable. To acquire a true understanding of the past requires that they be perceived and treated as inseparable. The book's methodology implicitly presents an elegant plea for sensitivity to context. This message is important to all of us.

Second, the chapter on cattle breeding provides an example of the way sensitivity to context can sharpen our interpretation of specific substantive themes in agricultural history. In Ritvo's view, élite breeders 'appropriated the rhetoric of utility', not utility itself. They had no shared identity of interest with the objectives of non-élite commercial breeders, despite their claims to that effect. Contextual analysis of early nineteenth-century evidence shows how the élite employed their overweight and costly cattle as symbols of leadership and social prestige. The book is worth its modest price for this single thirty-five page chapter alone.

JOHN R WALTON

MALCOLM JONES AND PATRICK DILLON, *Dialect in Wiltshire*. Wiltshire County Council, Library and Museum Service, Trowbridge, 1987. xxv + 206 pp. £7.95.

Malcolm Jones had originally meant to make a contribution to a series of local history booklets, but from that project grew his collaboration with Patrick Dillon finally resulting in this attractive work. This final version has a layout partly following Dr Martyn Wakelin's *English Dialects: An Introduction* and it was Dr Wakelyn who helped in checking the typescript and who wrote the Foreword.

Much of the material is culled from Leeds University's *Survey of English Dialects* (ed H Orton et al, E J Arnold, Leeds, 1962–72). Sadly they acknowledge permission from Edward Arnold for reproducing parts, but it is a common mistake, one supposes.

However, there is a wide spectrum of additional material for the county, collected by and specially for the authors, and while they give a swift review of the historical development and some of the collection of the *Dialect Survey's* work in the county, it is perhaps the comments on the survivals and of the additional material that are most entertaining and useful here. The mention of names collected by the *Survey* for agricultural terms does not make clear that they were culled from elderly speakers in the 1950s, and there is no information as to whether the variant words for the 'weakest pig of the litter' heard then are still alive. Probably there are still people in Wiltshire who talk about a *nisgal,* or a *nestle-tripe*. There is evidence, however, in what seems to be a modern photograph of a pair of scarecrows in a Pewsey allotment, of the survival of *gally-bagger* for a scarecrow.

Other sections of the book have put together information on plant-names and bird-names from authorities in earlier publications and there is a useful suggestion in an appendix of questionnaires that could be used by teachers in schools for helping children to collect any survivals of the words first mentioned in these, and such as the 1959 Opie's book *The Lore and Language of Schoolchildren*.

In the section devoted to birds in place-names the authors try to see how far there may be a contribution to the history of the language in this area. They quote from Ekwall's *Oxford Dictionary of English Place-Names* the name *Stintford* equated with the name with the bird, *stint*. This seems to be rather stretching things and since another interpretation has already tentatively suggested that it could be a 'ford where people were accustomed to take rest', a further even likelier one could well be the meaning expressed in a word at least as old as the bird-name; the element *stint* could well be 'the division or allotment of land' adjacent to the ford.

See how the book can inspire futher thought and lead to more inquiry and collection! Nothing less could be expected; pleasure and inspiration for any country lover abound here, most particularly, of course, to any who know Wiltshire and the surrounding counties well. The authors and the County Museums Service are to be complimented on putting out such a compendium, so well produced, illustrated and bound.

STANLEY ELLIS

ROYAL COMMISSION ON THE HISTORICAL MONUMENTS OF ENGLAND, *Houses of the North York Moors*. HMSO, 1987. xi + 256 pp, 434 figs. £19.95.

With this book the revolution in Royal Commission policy which has seen the replacement of prohibitively expensive Inventories by cheaper thematic volumes may be considered complete. The inventory element, already pared down to a point where it satisfied nobody, has finally been abandoned so that plans and plates now appear juxtaposed at appropriate points in the text. The new approach however, while easing the task of the reader, challenges the authors to construct a coherent analysis in which the evidence of buildings is interwoven with that of documents to further our understanding of the area's economic and social history. They have certainly assembled the tools for the job, recording over 800 buildings and working through an impressive range of documentary sources including over 600 probate inventories for the period 1690 to 1780. The outcome is a considerable work of scholarship, beautifully illustrated with over 300 plates and 200 plans of quite remarkable quality and surpassing the already high standards of previous volumes.

The survey area covers some 1500 square kilometres and embraces eighty townships in the moorlands proper and on the limestone plateau to the south. Although the district is agriculturally quite varied, its buildings display a remarkable uniformity. The earliest surviving farmhouses, of seventeenth-century date, were originally single-storeyed, cruck-built longhouses which differed from medieval longhouses (known by excavation from other parts of north-east Yorkshire) only in possessing a timber firehood instead of an open hearth. During the eighteenth century these houses were adapted and new ones were built to provide some extra domestic and service accommodation without altering the basic plan very much. Major innovations such as kitchens and compact planning were not widely adopted much before 1800. The uniformity and simplicity of these houses, coupled with a paucity of gentry residences, have afforded the authors scope to devote a major part of the volume to some important categories of building usually neglected in studies of vernacular architecture. The houses of three very ordinary market towns – Helmsley, Kirkbymoorside and Pickering – have been studied in great depth and with stunning results. The late eighteenth- and early nineteenth-century cottages which proliferate in all three towns are shown to have originated largely from the subdivision of older properties usually built to the rural farmhouse plan – mostly longhouses or near-derivatives! Painstaking research, mostly into title deeds and newspaper advertisements, has enabled the authors to link new compact types of house appearing about the same time with different layers of the aspiring commercial and professional classes, while work on special types of buildings, such as inns and public houses, reveals subtle adaptations of the traditional plan rather than anything innovatory.

Farm buildings, the subject of another major study, are described and analysed in a long chapter dealing with every type of structure from barn to dog-kennel. In addition farm complexes are discussed and classified with the help of a delightfully lucid series of drawings. Most of the farm buildings are thought to date from a few decades either side of 1800 and they illustrate the pace of agricultural change much better than the farmhouses themselves which were often adapted rather than rebuilt.

The only serious criticism one can offer of this generally admirable book is that it raises a number of questions of wider historical significace without attempting to answer them. In the study of market towns for example – perhaps the most valuable part of the book – the pressures which may have led to the subdivision of older urban houses into cottages are not examined. No estimates of population and total houses are given – even the nineteenth-century census figures are missing – and urban inventories, unlike their rural counterparts, are not used to provide information about the scale of local business activity. Instead the authors suggest enclosure and the subsequent relocation of farmhouses as the main factors. But surveys show that even in the early seventeenth century the townsmen of Helmsley and Kirkbymoorside had little in the open fields beyond common grazing rights. Why then did they require sizeable farmhouses in the first place? However, if the authors have failed to answer these and other questions, they have at least provided a fascinating and well-organized body of material for others to develop further.

One relatively minor point concerns the terminology used in the text. The meaning of 'longhouse' is nowhere defined and we are far into the book before the significance of 'false longhouse' and 'vestigial longhouse' become apparent, 'linear plan' and 'centralised plan' are not self-explanatory either. A glossary of such terms would have been very helpful for the reader who is not an expert in vernacular architecture.

BARRY HARRISON

GERALLT D NASH (ed), *Journal of the Historic Farm Buildings Group*, Vol 1, 1987, 42 pp, including 5 pp of plans and diagrams. No price stated.

Interest in the study of historic farm buildings has been developing apace during the last few years but publication of articles on the subject has been scattered in journals of medieval and post-medieval archaeology, vernacular architecture, industrial

archaeology, architectural history and agrarian history generally. The formation of a society to bring together students and enthusiasts of the subject has been under consideration for quite a long time and the Historic Farm Buildings Group was established in 1985. It has held conferences in East Anglia and South Wales, publishes a Newsletter and has now produced the first volume of what is to be its annual *Journal*.

The first article, by Nigel Harvey, is a comprehensive account of the development of study and publication of material on historic farm buildings in this country. Although one might quarrel with one or two items, such as the omission of the thesis by Davies on farm buildings in Shropshire, completed in 1952, and the confusion of the Vernacular Architecture Group's conference of 1977 with that of 1967 which was the first devoted to vernacular farm buildings, the account is indeed comprehensive and interesting to read. As one of the pioneers of the subject and the author of the first national study of historic farm buildings in England and Wales Nigel Harvey is well qualified to write this introductory article.

There follows a provocative article by Eurwyn Wiliam, the authority on Welsh farm buildings, challenging the simplistic view of the use of the familiar three-part 'English' barn. He agrees with the conventional view that such a barn normally has a fixed threshing floor with flanking storage bays but suggests that we should look at the many barns in which this arrangement is modified and ponder on the reasons. He repeats both recent and contemporary assumptions on the use of opposed double doors to allow the draw-through of carts but does not mention the appreciable number of instances where the lie of the land prevents this – let alone that draw-through is impossible in the bank barn arrangement. However he reminds us of the practice of threshing and winnowing outside, of the use of stacks or ricks of corn, the use of barns for shearing and accommodation of cattle, and generally of the long confused period when tradition suggested the continued use of the large capacious storage barn and common sense suggested that a small barn and a large stack yard would be better.

There is a vigorous account by John Severn of the restoration of a dovecot and conversion of a cowhouse into a restaurant. There is rather a brief but well-illustrated note by J Kenneth Major on a farmhouse smoking chamber. Susanna Wade Martins raises questions on the use of farm buildings emerging from the Norfolk Farm Buildings Survey. A fully-illustrated survey of a farmstead in Wales by Anthony Parkinson introduces what one hopes will be a regular feature.

The journal is neatly produced to A4 size, though the proof reading of one or two articles could be better. Plans and line drawings are well reproduced though the process does not allow for photographic illustration. Altogether it is a welcome addition to the scattered literature on the subject. It is to be hoped that as the Historic Farm Buildings Group develops in strength and numbers so the journal will develop to the size and quality of production which the subject deserves.

R W BRUNSKILL

ROTHAMSTED EXPERIMENTAL STATION, *Catalogue of Records in the Station Library compiled 1985-7*. Rothamsted Experimental Station, 1987. viii + 178 pp. Unbound, £10.

Anyone who undertakes research into the history of agricultural science in this country, especially for the period before 1920, sooner or later has to take Rothamsted Experimental Station into account. With this catalogue scholars are introduced to a fairly substantial body of archival material that has been virtually inaccessible for many years, stored unlisted in the strong room of the library at Rothamsted. A grant from the Leverhulme Trust enabled the work, extending over two years, of checking the contents of the archive and compiling the catalogue to be completed.

The archive mainly covers the period *c*1840-*c*1940, and by far the largest part of the collection comprises papers relating to the work of Sir John Bennet Lawes and Sir John Gilbert from the 1840s onwards. There are personal and working papers, especially of Gilbert's, a good proportion of whose letters with correspondents at home and abroad survives. There is also a large body of papers relating to the experimental work at Rothamsted and Woburn, much of it studies and data used in preparing published articles and lectures. A few of the better-known articles by Lawes and Gilbert, such as that on the production and consumption of wheat published in the *Journal* of the Royal Agricultural Society for 1893, have no specific supporting papers in this archive, but researchers will still find material relevant to such articles.

Although Lawes and Gilbert appear predominant in this collection there are no less valuable papers from their twentieth-century successors. The work of Sir Daniel Hall and Sir John Russell, at Rothamsted and elsewhere, is well represented; so, too, are several other prominent members of the Rothamsted establishment, including Edwin Grey, R Warington and M D Glynne.

As well as the work of the individual scientists, the archive contains a good collection of records from Rothamsted Farm, covering the period from the 1840s to the 1950s. These, together with similar

records from the experimental farms at Woburn, promise scholars a wealth of detail on the operation and experimentation on these farms.

The catalogue well repays the Leverhulme Trust's grant, for it is a thoroughly organized research tool. Full indexes guide researchers to the documents that are likely to be of value to them. With so much change taking place in the structure of agricultural research, here is a timely reminder of what has been achieved in the past, and of how much of that awaits historical study.

JONATHAN BROWN

ANDREW F FRASER, *The Native Horses of Scotland: Scottish Breeds of Horses and their Folk*. John Donald, Edinburgh 1986. 186pp. £12.50.

In a book which contains such a wealth of well-assembled information, there is one startling omission. There is no mention of grass sickness. This devastating disease, almost invariably fatal, was first described in 1909 following an outbreak at an army remount depot at Barry, in the county of Angus. Perhaps it had occurred sporadically before. In any case, hundreds of victims, mainly draught horses, died annually from grass sickness in the 1920s, and the financial loss and the sheer grief caused by the disease accelerated the change from horses to horsepower on the land. Moredun Research Institute in Edinburgh, a centre for investigation of the disease, puts the present incidence in Great Britain as high as six to seven hundred cases a year.

The author also gives less than fair credit to the Shire for its effect on the Clydesdale. William Dunlop, the great breeder, described the Clydesdales and Shires as 'of practically one breed. The kings and queens of Clydesdale to begin with were nearly all first cousins with the Shire.' Not to be laid at Mr Fraser's door, but surprising in one of John Donald's scholarly publications ... there are more than sufficient irritating misprints, reaching the nadir on p 109, where Stranraer becomes Stranaer, Cambuslang becomes Cambusland, and Scotland's biggest agricultural show becomes the Higland Show. The pictures are too small, but it would be difficult to choose which to throw out so that the others might be enlarged.

Those points apart, this is a really remarkably good book. One feature which makes it unique is the detailed description of the anatomy and musculature of each breed. Breed points evolved because horses with those points were better workers and therefore worth extra money. It is a reminder of the plasticity of animals in domestication. The Clydesdale, the garron, the Sheltie are all artifacts.

Because of the way the use of the horse has changed, the natural assumption is that Clydesdales were primarily agricultural workers. This book is a corrective to this. Coalmining was the original impetus to the breed's development. As coal began to be mined in quantity, packhorses were not enough. Mr Fraser elegantly traces the steps. 'Loads on wheels were needed and haulage of cartloads of coal was what resulted. The better the roads, the bigger carts they could support. The heavier the loads to be drawn, the bigger and stronger the horse must be. The taller the horses, the faster they could travel. So the essential link in the chain of production, supply and consumption of industrial power became big, strong, quick horses.'

Flanders stallions – not Flemish stallions, he points out, but the Flanders breed – and others were put to the good local mares. In time, the result was the Clydesdale. Mr Fraser, who is director of Animal Care at the Memorial University of Newfoundland, puts the Scottish native breeds in their world context, but is himself a Scot and worked with horses in Scotland as a youth. It is clear that his real love is the Clydesdale. It is a lover and an enthusiast who says that no other working horse could be so huge, stylish, perky and colourful, or describes the metallic music made by a thousand tons of moving horseflesh in the streets of Lanark. This is a valuable source-book for those whose interests lie in agricultural history. But it is far better than that. It is a readable book, mercifully free from rosy sentimentality, but appreciative of Scotland's native horses and the men who tended them.

DUNCAN GILLESPIE

J LUCASSEN, *Migrant Labour in Europe, 1600-1900*. Croom Helm, 1987. ix + 339 pp, 20 plates. £35.00.

The notion that European society in the early modern period was composed largely of static self-contained communities has recently been replaced by one that emphasizes dynamism and fluidity. Demographic historians in particular have revealed both the complexity of migratory patterns and the importance of in-migration from the countryside for urban growth. Indeed, most of the research on the structure of European migration before 1900 has focused on the demographic aspects of urban expansion and has highlighted the temporary nature of urban in-migration. Recent contributions to English demographic history, for example, have maintained that a large proportion of migrants to London in the seventeenth and eighteenth centuries were destined for the British American colonies and only stayed in the capital temporarily. While the migrant worker is an important feature of contemporary European societies, little attention has been paid to the history of this phenomenon.

Jan Lucassen's book is clearly an attempt to redress the balance and to establish the historical study of migrant labour in Europe as a vital area of research. In Part one – the core – of the book, the author illustrates the features of migrant labour in the northern region of the French Empire in 1811. The North Sea system, as the author describes it, was an area of labour migration which comprised a receiving zone in a coastal strip from Calais to the Elbe, and a source zone to the east and south of this strip. Many aspects of the migrant labour system are described in this book, including the geography of migration, the enabling transport mechanisms, and the occupational structure and household characteristics of migrant labour. The second part of the study compares the North Sea system with other contemporary European labour migration systems; and part three offers a long term view of all of the labour migration systems in Europe over the period 1600 to 1900.

Despite fascinating detail about migrant workers in the North Sea system, this is a disappointing study. Not only does the unique 1811 survey provide the only substantial source of information, but the analysis presented can only be described as self-evident. The author assiduously indicates that labour migrates only under specific conditions; namely where a free labour market exists; where there is a real wage differential between receiving and source regions; or where a demand exists for seasonal labour in the receiving region with a corresponding supply of labour in the source region. In the discussion of long term changes in labour migration, the author claims that migration systems come and go, that the level of migration rises and falls and that migratory labour often becomes permanent. This book provides a great deal of descriptive detail, some of which is most welcome, but offers very little in the way of fresh insight.

KATRINA HONEYMAN

JAN BIELEMAN, *Boeren op Het Drentse Zand 1600-1900: Een nieuwe visie op de 'oude' landbouw*. A A G Bijdragen, 29, Wageningen, 1987. xxiii + 834 pp. 138 tables, 82 figs, 35 maps, 27 appendices. No price stated. In Dutch with English summary *Agrarian Change in the Dutch Province of Drenthe*.

The development of farming in the Dutch province of Drenthe from 1600-1910 falls into several phases. Against a backcloth of an inhospitable environment of infertile sandy soils, open field farming developed in a landscape described as almost empty steppe and blanket bog. Density of population in the early seventeenth century was low, and farming had more than the usual insecurity attached to it. As a way of spreading risks an extensive and diversified agriculture developed. The open-field arable amounted to only 6 per cent of the landscape and the breeding of horses and cattle formed the cash 'crops'. An infield-outfield system developed based on a two-course rotation with the most peripheral parts of the outfield lying in almost permanent fallow. The alternation of winter and spring rye meant that effectively half the open field was available for grazing practically the whole year.

In this environment the economy expanded and animal numbers rose, but from *c.*1650 to 1730 a scissors crisis occurred of falling agricultural prices but rising costs. The farming response was towards more intensive activity with increased output of rye, a more permanent use made of the outfield, and in consequence a decline in communal grazing. This engendered a spirit of individuality, of long term increases in arable productivity, and, into the nineteenth century, an increase in population. From the 1820s, with the demand for meat and dairy products from the early industrializing countries, the prices' terms of trade moved back towards animal products and the pattern of farming swung back to livestock. The arable sector shifted out of the rye cash crop into fodder. A new and final reorientation of local farming developed from the 1870s as the European market for cattle and pigs closed behind tariff walls, while free entry into Britain helped the pig trade to flourish. Allied to this was the development of creameries with which better to compete in Britain with other butter producers and which provided buttermilk and skimmed milk byproducts to feed the pigs. These phases produced a wave-like alternation from large extensive to small intensive farm structures.

This tale of three centuries of enormous structural change for what is a small area of Holland takes nearly 850 pages to tell and is the publication of the author's doctoral thesis. The reader can imagine just how much valuable detail there is which one day might usefully be compared with other parts of north-west Europe.

MICHAEL TURNER

PATRICK O'FLANAGAN, PAUL FERGUSON AND KEVIN WHELAN (eds), *Rural Ireland 1600-1900: Modernisation and Change*. Cork U P, Cork 1987. xiv + 187 pp. IR £12.

These proceedings of a conference of geographers, historians and 'other cognate species' held at Trinity College, Dublin in 1985, define modernization as: 'the impact of forces, of exogenous and endogenous origin on Ireland' during three hundred years. This is a much wider definition than Irish historians have previously employed and, given the different disciplines, it is scarcely surprising to find that the scope and direction of the papers is wide ranging,

sometimes at the expense of the theme of modernization. This volume should not be read primarily for enlightenment about modernization; what it does offer are contrasts between historical and geographical method and, more rewardingly, several innovatory essays.

The former is most apparent in two papers, J H Andrews on the struggle for Ireland's public commons and T Jones Hughes on landholding and settlement in Counties Meath and Cavan. The fate of common land was a matter of indifference to the Irish public, in contrast to the English, and enemies of the common enjoyed 'a walkover'. The real struggle was between two kinds of single tenure: the conventional landed estate and the non-rent paying freeholder. In a discussion which would have gained from being related to the wider literature on property rights, Andrews shows how settlers on common land created rights of owner occupancy and awarded themselves 'the 3 Fs' long before Gladstone saw these as a solution to the land question. Andrews uses 'a sample' of 290 townlands that carried the name 'Common' on Ordnance Survey maps; T Jones Hughes uses these plus Griffith's valuation and field evidence to create a data set with which to compare the rural geography of the Meath-Cavan border, a contrast between the northern edge of a market oriented economy in Leinster and the peasant world of south Ulster. The geographer's method of interrogating a data set reveals spatial differences but will leave economic historians dissatisfied about the behavioural implications. It is, for example, one thing to use landlord residencies in 1876 as an indication of areas considered more desirable for residential purposes and quite another to infer that this points to regions of better farm management without some additional criteria.

Innovation is most apparent in three papers: Bell on Irish farming techniques; Gailey on rural housing; and Fitzpatrick on the modernization of the Irish female. Bell explores Solar's argument that Irish agriculture was more productive than conventionally believed by comparing 'improved' and 'common' systems of cultivation and uncovers both integration and rationality. Gailey is concerned with the modest housing of the mass of the population and utilizes an impressive range of skills to overcome deficient documentary evidence. Assistance with technical terms would, however, have been helpful. Fitzpatrick rescues the Irish female from undeserved obscurity but his study of her life-cycle presents a grim and depressing picture.

Two papers, Macafee on pre-famine population in Ulster and Whelan on the religious factor in the 1798 rebellion, produce new, local evidence on important topics. The remaining paper by Connolly is wholly faithful to modernization, providing an overview of violence and order in eighteenth-century Ireland which will be greatly appreciated by undergraduates overwhelmed by studies of particular organizations.

RON WEIR

RAMON GARRABOU, CARLOS BARCIELA AND J I JIMÉNEZ BLANCO (eds), *Historia agraria de la España contemporánea*, volume 3, *El fin de la agricultura tradicional (1900-1960)*. Editorial Critica, Barcelona, 1986. 568pp. n.p.

Most scholars who have attempted any comparative surveys of European economic development agree that until the 1950s Spain differed from the general European pattern. Given its wealth of primary exports and its easy access to rapidly-growing markets it should not have remained so poor. The inadequacies of the agricultural sector have provided the most persistent explanation. Specifying what these inadequacies were, though, has not proved so easy and has led to widespread disagreement. Climate (too dry), soil (too thin), fertilizer consumption (too low), the pattern of land distribution (too skewed towards large estates), the forms of land tenure (too restrictive) and tariff protection (too high), have all had their advocates as the basic problem. Until relatively recently it was in fact possible to argue almost anything without being refuted, so little reliable information about Spanish agriculture was there. Even now estimates of Spanish national income before the 1960s vary extraordinarily and the figures for the agricultural sector are the weakest. Agricultural historians are painstakingly piecing together production and price series for the main crops. As they succeed the arguments gradually become better specified. The main contribution has been made by a group of scholars in Barcelona whose work has been drawn together in the series of which this is the third volume. The title of the volume, with its implication that in Spain it has only been in this century that 'traditional' agriculture has disappeared, indicates the intellectual origins of the enquiry, the belief that the process of change in the primary sector was abnormally delayed in comparison with other European countries.

The book reflects another dominant concern of Spanish historiography, its obsession with the problem of the Franco regime. The book is divided into two parts, pre- and post-1936. To the first there is a long, valuable 'introduction' amounting to one-third of the whole section by Jose Jiménez Blanco which sets out the statistical evidence for the whole period as far as it is known. The introduction to the second part is more of a polemic, concentrating on estimating the costs of the Franco regime's policies to agriculture and the economy as a whole. The remainder of the volume is made up of separate

essays. In the first part these are on state forests, technological change, Catalan viticulture, cork production, sugar production and refining, and new settlement. In the second part there is a detailed analysis of wheat prices combined with two general essays on the relationship between agriculture and economic development, whose gist is partly that the Franco regime delayed the process of change in the primary sector even more abnormally than earlier governments. That the agricultural disasters of the period 1936-1950 have much to do with the policies of Franco's government seems indisputable. But Franco inherited what had already become a long tradition of high protection. In Spain foodstuff prices seem to have increased in a steep secular trend after the mid-1890s and it is difficult to find any explanation for this movement, which seems quite out of step with overall European trends and is even remarkable in comparison with the increase in Germany, unless it be the fact that Spanish grain tariffs were higher than elsewhere. An increase in grain output was being generated by government policy before 1914 and in this case, as under the Franco regime, the main concern of government policy was wheat. Over Spain's dry-farming area wheat remained therefore in spite of developments in the New World and Russia the most important crop, more important by area and by value than wine or olive oil whose output was more determined by export demand. Had the wheat sector, as it was in North America, been based on capital-intensive rather than labour-intensive methods of farming this might still not have held back development. But tariffs retained labour on the land while restricting its income gains by slowing down the process of technological innovation. Palafox has recently argued that the effect of the tariffs was actually to reduce textile consumption and so retard the development process throughout the economy. Another way of looking at this is to say that the absence of land reform, breaking up the large units of landholding in the dry-farming area, was responsible for maintaining the excessive importance of over-priced wheat in total output and for keeping textile consumption low by diverting the profits from the tariff into too few pockets. In either case Franco was but the inheritor of previous attitudes, because agricultural policy under his regime continued the earlier tradition of putting the socio-economic interests of the landlords first. Furthermore the pace of economic change in the 1950s was much more rapid than before, because of the changes elsewhere in the economy, in spite of Franco's policies.

Whatever the complex arguments in favour of and against grain tariffs in France or Germany in the last third of the nineteenth century the Spanish case seems to be one in which the defensive reaction did extensively damage the capacity for economic change at a crucial moment. But real proof of this is still wanting. It depends on a more measured assessment of the absorptive capacity of European (and other) markets for exported cash crops. Cork was a success story. So was citrus fruit, but the value of the output in this second case was very small by the side of the problems needing to be solved. Catalan wine was a boom and bust story of such dramatic proportions as to show vividly the dangers of over-reliance on success in competition on European markets. About the olive oil trade we still know little. And these are problems relating to a wide network of international trade in food products, not just to Spain. It depends, too, on a more measured assessment of the true levels of productivity in Spanish arable farming, taking into account not merely wheat yields but yields throughout the rotation cycle which included the wheat crop. Without the last figure it may even be that the condemnation of Spanish wheat farming has been excessive. The current vigour of economic history in Spain, of which this volume is a good example, suggests that we shall not have to wait long for answers.

ALAN S MILWARD

Shorter Notices

ALEXNDER FENTON, *Country Life in Scotland, Our Rural Past*, John Donald, Edinburgh, 1987. v + 194pp, illus, £7.50.

The first impression on reading this book is that there would have been enough material available to fill several volumes and that Alexander Fenton would be first in line to win a prize for précising. The main theme is social history and this is reflected in the choice of illustrative material, which is both effective and comprehensive. The impact of the great changes effected since 1750 on the people of Scotland are charted, with also much information on the processes of change themselves.

The early chapters in the book look back to the old systems, describing the estate based units and the transhumance or shieling systems. The displacement of these through the conversion of grazing areas to arable and enclosure of common land is

then looked at, and the influence this had on social structure through the creation of a new paid workforce and the consequent movement of surplus workers to new villages or to marginal crofting areas.

On a more detailed level the buildings in the landscape are reviewed in chapters on old building styles, the new estate inspired rebuilding and the provision of hearths and chimneys.

In the following chapters agricultural equipment is looked at and the new introductions, starting with ploughs and spades and going through to harvesting equipment. In all cases not only are the technicalities of the tools and machines touched upon but also their influence on the workforce required. Following the harvest there is an interesting chapter on the stacking of corn and then progress in the processing techniques. A chapter is then devoted to 'neeps an tatties', leading into the final areas of dairy products, meat and bread, the emphasis here being on the actual diet of the workforce.

In all a myriad of themes, and despite the great interest the book offers, one can't help but have a passing wish that when *Scottish Country Life,* its predecessor, was being revised the opportunity was not taken to expand it.

ANNIE HOOD

J CROWTHER, *Enclosure Commissioners and Surveyors of the East Riding,* East Yorkshire Local History Society, Beverley 1986. 55 pp; two plates, £1.50.

This work serves as a useful follow-up to the author's previous listing, with Barbara English, of the Yorkshire enclosure awards. To the bare details of commissioners' names given there, she has added for the East Riding some of the essential details of background, activities and personalities without which our understanding of their role in the process must remain incomplete. Information about personal relationships and their business connections both with each other and with the promoters of enclosures offers some interesting insights into the reality behind the official record, and she has uncovered some telling examples of dubious and even downright illegal practices. Her analysis of the patterns of work of individuals, and of the surviving account books, makes a useful addition to the available evidence on the process and its costs, and the directory of commissioners and surveyors provides a helpful reference source.

There are a few minor errors, as in the confusion of the two John Flintoffs, and the rather cavalier treatment of, for example, Joseph Butler, one of the most widely travelled of the early commissioners, is perhaps an inevitable reflection of working at a local scale. Such a scale of investigation is however essential, for many of the questions about the part played by individuals can only be tackled realistically at this level; Jan Crowther has provided us with some answers from the East Riding.

JOHN CHAPMAN

STEPHEN COOPER, *A House Divided,* Bridge Publications, Penistone, 1987, xv + 89 pp. 5 maps; 9 illustrations; 8 facsimilies of documents, £8.95 (hbk). £4.50 (pbk).

This is a beautifully produced booklet. The artistic cover is card but the binding is firm and the printing is excellent. Even so weight for weight it makes volume v of the *Cambridge Agriarian History* seem cheap.

It is an unusual combination of local history and biography researched and written by an unusual combination of historian and solicitor. The legal papers which form the basis of the book were discovered in the author's own office and led him into a search for supporting material in record offices. The context of the story is Thorpe Hesley in David Hey country of farmer/metalworkers in South Yorkshire. The author has used the documents skilfully to illuminate a tragic case of madness brought about by marital misery and alleged trickery over a will which drove John Billam, a yeoman, linen weaver and shopkeeper, to attempted suicide and a madhouse in York.

Much of the interest comes from the depositions of Billam's neighbours who give their views of a turbulent marriage and the characters of Billam and his wife. History does not usually give insights into the insignificant who usually remain mere statistics. Cooper gives interesting sidelights into aspects of the eighteenth century; the Marquis of Rockingham as an enthusiastic improving landlord, instead of an incompetent politician; a small man, Billam, building up a fortune by seizing his opportunities; and not least the treatment of the mad and the way the law worked.

DAN BYFORD

LEN SHARMAN *Working the Land: reminiscences,* Salient Press, Ipswich, 1987, 68 pp, illus. £3.50.

It is curious how poignant are recollections of lives spent in hard work. Len Sharman's memoirs here published were prompted by the interview he gave to the BBC series, *All Their Working Lives.* He was born in south Norfolk, in a village of scattered farms different in nearly every respect but the poverty of its working-people from the Norfolk celebrated in the improving fables of nineteenth-century agronomes. His earliest recollections, however, are of the country best known to Rider Haggard, of Mundham, Kirstead and the Ilketshalls in Suffolk. In 1927 he followed his current employer into a substantial

farm at Kelsale in south-east Suffolk and thereabouts he worked for the rest of his life. It was not a working life of much incident, but his graphic evocation of people and places in a past that is stranger and more remote to us than the world that appeared to Defoe would have been to his parents is so striking that it could have been composed by Adrian Bell. Mr Sharman's commentary on his times testifies to the precision of George Ewart Evans' distillation of early twentieth-century rural life in Suffolk. It also sets into context, in specific human terms, the historical sociology of Howard Newby and Alan Howkins in whose hands somehow the soft clay of the oral tradition has been distorted by over-much kneading. For although Mr Sharman evidently did not write his memoirs direct on to paper the *rédaction* of his thoughts has been accomplished with unobstrusive sympathy by Mrs D Durrant. Moreover the numerous illustrations have been chosen with care to underline the text of his reminiscences, although most pictures are obviously not of Mr Sharman himself at work.

For those who saw the television series this little book will be an invaluable memento. For others its accuracy and honesty of purpose will serve as a guide to the increasingly articulate annals of the poor. Len Sharman's life has mirrored that of his fellow farm workers in the first two-thirds of this century; but his explication of the experience is more accomplished than his contemporaries customarily achieve. Moreover, Suffolk County Council is to be congratulated for publishing the book. In Mr Sharman the Museums Service has found a quarry of good stone: perhaps he has more to tell.

B A HOLDERNESS

ALAN CARTER & SUSANNA WADE MARTINS (eds), *A Year in the Field,* Centre for East Anglian Studies, University of East Anglia, Norwich, 1987. 77 pp, many maps, diagrams and photographs, £3.95 (incl. p&p).

This substantial booklet serves two purposes. It relates the experience of a research organization dependent mainly on MSC funding in setting up a study of historic farm buildings in Norfolk. At the same time it sets out the conclusions which had emerged at the end of the first year of research.

Although Alan Carter and Susanna Wade Martins were experienced in the study of old buildings, including farm buildings, the research workers recruited under the MSC scheme were not. It is a tribute to the skill of the organizers and the enthusiasm and adaptability of the research workers that an efficient team was quickly established. In order to deal with the problem of gaining an overview of something like 10,000 farmsteads in a large county of a sample of some 300 farms (involving field recording of some 1200 buildings) was made based on several estates spread about the different farming areas of the county. The field work was systematically conducted and the team was large and diverse enough for library and archive work to be done simultaneously. The results have been manually sorted though computer handling is intended for later stages in the study.

The first year's work has shown that a substantial proportion of the historic farm buildings survive, though small buildings, such as shelter sheds are more vulnerable than the large barns. The 'Great Rebuilding' of farmsteads after about 1780 is confirmed with model farms on the great estates leading the way. Very few dated buildings were discovered but use of documentary materials and dating by analogy e.g. of Norfolk carpentry with that of Essex has enabled a convincing chronology to be started.

We look forward eagerly to future volumes in the series as the survey continues and to a concluding report which will be a major addition to the small number of published regional surveys of historic farm buildings.

R W BRUNSKILL

KEVIN FITZGERALD, *With O'Leary in the Grave,* Oxford Paperbacks, 1987. 175 pp. £3.95.

For vivid writing, memorable characters, evocative description, and good stories well told, this book will stand comparison with any of the memoirs of farming in the 1920s which have been published in recent years. It is mostly concerned with the author's experiences as a farm pupil in Ireland, agricultural student at Seale-Hayne College and the Kilmarnock Dairy School, and farmer in his own right in County Tipperary. He also worked on a Canadian farm. Some of the character sketches are excellent: there is Mr Willington, 'without question the best all-round farmer in Ireland'; Mick Barratt, the champion ploughman of Tipperary; Professor Drummond, 'a bully and the best cheesemaker in the world'; the Dean of Cashel and his Black Bottle, the contents of which had been distilled in the 1820s and lain buried in a Mayo bog for eighty years; and, especially, his father, a fascinating and charismatic man, by turns overwhelmingly generous or pointlessly mean, at times exasperating, embarrassing and preposterous.

It might perhaps be argued that his accounts of farming could have been more detailed and systematic, although this would hardly be a fair criticism, for Kevin Fitzgerald has not set out to provide source material for the agricultural historian. But if we want to know what it was like to lift turnips by hand on frosty mornings, or feed a thrashing

machine, or learn to plough with horses, there are vivid accounts to be found here. The major omission, for this reviewer, was any explanation of the meaning of the title.

PAUL BRASSLEY

R E PEARSON and J G RUDDOCK, *Lord Willoughby's Railway: The Edenham Branch*, Willoughby Memorial Trust, Grimsthorpe, Lincs, 1986. 120 pp. Illus. £4.50 (+ 0.65p p & p).

Lord Willoughby's Railway is an attractive little book which closely examines the brief existence of a small private railway from its conception in the early 1850s to its closure in 1873. The Edenham Branch Railway in south Lincolnshire was the inspiration of Baron Willoughby de Eresby and was built to serve as a connection between Willoughby's estate and the Great Northern Railway's Peterborough-Grantham line. The railway evolved almost by accident, stemming from Willoughby's love of Victorian steam technology on the one hand, and his desire to service his estate on the other. The original intention was to construct a road suitable for a traction engine but as this scheme met with problems, the alternative idea of building a railway was adopted. The main freight of the railway was coal but agricultural produce was also carried and there was a limited passenger service. Like so many small railways, the Edenham Branch had little hope of either profitability or a long life despite the optimism of its creator. Lord Willoughby died in 1865 and shortly after competition from lines of large railway companies forced the branch to be closed.

The authors provide a detailed insight into both the motivation for and the impracticability of Lord Willoughby's railway. The book is well written, if somewhat anecdotal, and is amply supported by photographs and maps. Some of the illustrations and accompanying comments are a little difficult to follow as the authors seek to unravel the complicated details. However, the book provides yet another useful illustration of the Victorian preoccupation with steam and the impractical schemes which that preoccupation generated.

C S HALLAS

FRANCESCO CALCATERRA, *Gli agrumi nella storia del Meridiome – Origini, sviluppo e peripezie di una coltura*, Led, Rome, 1987. 95 pp. ill. L12000.

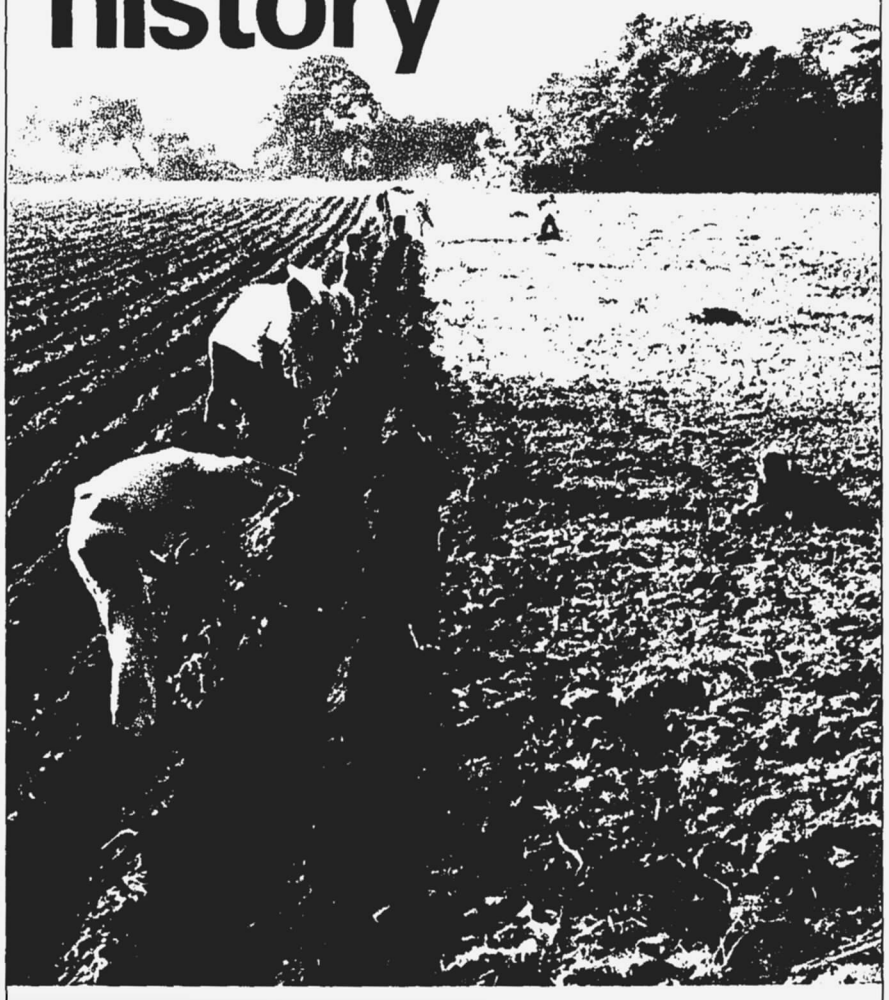
Agricultural historians have paid little attention to the production and distribution of citrus fruits, a neglect important in the history of southern Italian agriculture where oranges and lemons have played quite an important role. Calcaterra confines himself to nineteenth-century Sicily, though he outlines the previous history of his subject in an introduction. It was only after the independence of southern Italy under the Bourbons (1734) and above all in the nineteenth century that the area planted with oranges and lemons began to expand and foreign demand to increase. Further expansion followed the political unification of the peninsula (1860), a period when many areas of Sicily previously devoted to corn and mulberry trees were turned into citrus orchards and plantations, attracting wide investment from the local economy. There was little demand in Italy and expansion depended almost entirely on exports controlled by foreign merchants who retained the lion's share of the profits, as they had done with corn and silk in previous centuries.

This dependence on foreign markets, coupled with the complete lack of planning by the central government, made the citrus fruit industry very vulnerable. Crisis began in the 1880s when some markets, such as France, were lost to Spanish competition, the freights charged by the English shippers rose and the United States became more and more self-sufficient. Calcaterra maintains, however, that crisis was caused not only by foreign competition but also by the alliance at home between corn producers and industrialists which resulted in the 1887 protectionist tariff. This provoked reaction from the corn producing countries who were the greatest importers of Sicilian oranges and lemons.

This short book is valuable mainly for its contribution to our knowledge of an almost totally neglected topic and for its documentary sources. Its structure is somewhat lacking in rigour and cohesion, while many of the ideas hinted at by the author are not developed with the clarity they deserve.

GIGLIOLA PAGANO

agricultural history



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Conference Report: Spring Conference 1988

By JOHN BECKETT

Around Easter-time each year stalwarts of the British Agricultural History Society meet to deliberate on the latest findings and ideas about the subject. This year the gathring was at Plaxtole House, a residential hostel of the Norfolk College of Arts and Technology in King's Lynn, and it took place 6-8 April. 'A load of stuffed shirts' was what the young lady receptionist said she was expecting, unaware of the Society's annual efforts single handedly, and with or without EEC blessing, to promote sales of barley and hops. Fifty perennials, and not so perennials, gathered for the event – or at least forty-nine since one inadvertently turned up a day late – and as always this was an opportunity to meet old friends, and to make new ones, to watch the older generation even less able than last year to stay awake for the after dinner deliberations, and to listen to younger research students with new ideas and perspectives on agricultural history.

Two themes emerged from, rather than dominated, this year's conference: Norfolk, and 'margins'. The first of these is easier to explain that the second. Since we were gathered in Norfolk it was only natural to hear something of the county's agriculture. However, with the 'bucolic heroes' view of the agricultural revolution now firmly relegated to a distant backburner the Society was anxious to show its modern image and thus – whatever the regrets of a few sentimentalists – there was to be no visit to Holkham to see if Thomas William Coke was still singing his own praises, and no searching for 'Turnip' Townshend at Rainham. Susannah Wade-Martins, although an expert on the varied activities at Holkham, steered us well clear of the famous estate. She talked to us instead about the Norfolk Historic Farm Buildings Survey, a two-year community project which looked at 400 farms scattered across the county. One of those farms, Park Farm, Bylaugh, near Dereham, was where she took us for the obligatory field trip on the second afternoon of the conference.

The field trip is a vital part of the annual conference, and it is essential that it combines something serious (such as a farmstead) with something rather less mentally taxing – this year the Norfolk Museum of Rural Life – and something edible or drinkable. In the absence of the Society's preferred resort – a brewery – we took 'tea' at the Norfolk Museum, Gressenhall. Despite various blandishments from the organizer about returning to the coach, conferencees were not to be hurried, so it was left to the driver to ensure that we were back in King's Lynn for dinner. Finally, the Norfolk connection was sustained by the final paper at the conference in which Alec Douet surveyed agricultural practice and its changes between 1921 and 1939, as well as discussing the development of agricultural education and advisory services in the county.

The 'margin' is more difficult to describe, but it kept reappearing from the moment Mark Bailey introduced it on the Thursday morning with a vigorous discussion of marginal land in medieval England. Too much emphasis on grain growing had, in his view, produced a one-sided view of the medieval economy, especially after the fourteenth-century crisis, in which the significance of alternative occupations – and the role of the ubiquitous rabbit – were too often overlooked. The use of marginal land reappeared with two papers on eighteenth-century landscape and aesthetics. Stephen Daniels and Charles Watkins discussed the work of Uvedale Price at Foxley in Herefordshire, and Susanne Seymour took us to two of those great estates on the sandlands of north Nottinghamshire, Clumber and Thoresby. Both papers suggested that while aesthetic considerations were important in the laying out and development of parks and woodlands, they have to be ranked alongside economic and social pressures. The conference seemed sceptical, but the ideas themselves were well worth considering.

Common rights in Northamptonshire brought us back to the margin on the Friday morning as Jean Neeson suggested that here in the eighteenth century were the small land occupiers – the peasantry – which a conspiracy of historians led by Chambers and Mingay had sought to suppress in their desire to lend support to Marx's account of the subject. In Dr Neeson's view these individuals were a significant group in the countryside tenaciously hanging on to their common rights. She suggested that they have been too easily overlooked by historians convinced that fully-fledged capitalist relationships had arrived in English rural society by the second half of the eighteenth century. Dr Neeson's argument partly hinged on the significance of enclosure, and this was the theme of Bridget Taylor's demographic, economic and agricultural survey of a number of Oxfordshire parishes. Her study suggested that the term 'enclosure' was often used to suggest a pivotal date for the history of a parish whereas in reality the process of enclosure may have been the result of long-term economic and social changes

which only a full study of the local society and economy could reveal.

Finally, fitting neither of these categories – although he did mention 'margins' at least once – came Dr Alun Howkins, who read a paper which was alternately serious and lighthearted on the cultural divisions between labouring men in the north and south during the nineteenth and early twentieth centuries. Even those who thought the thesis might lack a little weight could not fail to be impressed by the wealth of quotations from plough plays and other contemporary sources which made his talk one of the delights of the occasion.

The conference never fails to surprise. Poor Uvedale Price, we discovered, was thought by none other than William Marshall to be a 'blockhead'. Coke's improvements (the man had to come in somewhere) were described at one point in the proceedings as 'a weeklong garden party with sheep', and one potential heresy was presented to the conference with the suggestion that 'the term enclosure could perhaps be dispensed with'. To these memorable suggestions was added the incontestable fact – at least to this reporter – that barley bread can be bought at Waitrose's in Reading.

As usual with this conference there was fun, and there were serious moments, and by Friday lunchtime we had seen and heard this year's offerings. After yet another meal designed for agricultural labourers rather than agricultural historians it was time to disband once again. With a new committee in place to look after the affairs of the society for the following year, and with grateful thanks to this year's organizer Dr B A Holderness, we set off on our separate ways, resolved to meet up again next year on, or under, or somewhere near, Clifton suspension bridge in Bristol. Perhaps next year Alun Howkins will sing to us.

ANNOUNCEMENT–SUBSCRIPTION INCREASE

A motion was passed at the Annual General Meeting of the Society held on 7th April 1988 to raise the membership subscription to £10 with effect from 1 February 1989.

The Society's Treasurer, Dr Collins, outlined the background to the increase. In rough terms, the annual cost of printing and distributing the *Review* is now £9000, of administering the Society £1200, and (up to 1989) repaying a debt of back postage owed to the University of Leeds, £1700. With a membership of about 900 each paying £5 per annum, the income from subscription covers less than 40 per cent of these costs. In the past, the difference has been made up principally by sales of journals and income from investments, but in recent years by progressively larger transfers from the now rapidly diminishing reserve balances. Under these circumstances the Executive Committee saw no alternative but to recommend to the Annual General Meeting that the subscription, which has been unchanged since 1977, be raised to £10. The higher subscription will allow the present size of the *Review* to be maintained, and a cumulative index and supplement on *Fenland Worker Peasants* to be published next year.

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THE BRITISH AGRICULTURAL HISTORY SOCIETY

Articles and correspondence relating to editorial matter for the *Agricultural History Review*, and books for review, should be sent to Dr J A Chartres, Editor, *Agricultural History Review*, School of Economic Studies, The University, Leeds LS2 9JT.

Correspondence about conferences and meetings of the Society, and about more general matters, should be sent to Dr M Overton, Secretary BAHS, Department of Geography, The University, Newcastle upon Tyne, NE1 7RU.

Correspondence on matters relating to membership, subscriptions, details of change of address, sale of publications, and exchange publications should be addressed to E J T Collins, Treasurer, BAHS, Museum of English Rural Life, The University, Whiteknights, Reading, Berkshire.

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Membership is open to all who are interested in the subject and the subscription is £5 due on 1 February in each year. Details may be obtained from the Treasurer.

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Contributions and letters on any aspects of the history of agriculture and rural society and economy should be sent to the Editor. Articles should not normally exceed 8000 words in length, but, very exceptionally, manuscripts of up to 15,000 words can be considered. Proposals for Supplements, of length intermediate between the long article and the book, normally not exceeding 30,000 words, should also be sent to the Editor. Intending contributors are advised first to obtain a copy of the *Review*'s 'Notes for Authors and Reviewers' from the Editor. The Society does not accept responsibility for the opinions expressed by contributors, or for the accidental loss of manuscripts, or for their return if they are not accompanied by a stamped addressed envelope.

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