

# The Economics of Horses and Oxen in Medieval England<sup>1</sup>

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## I

DESPITE some argument to the contrary,<sup>2</sup> it has generally been assumed that the ox was the dominant draught animal in medieval English farming.<sup>3</sup> This opinion is based mainly on demesne accounts, which show oxen as almost always outnumbering horses.<sup>4</sup> This is particularly the case in the key matter of ploughing, where the horse seldom made much impression beyond its inclusion in the mixed plough-teams of horses and oxen popular on demesnes in the south-eastern part of the country.<sup>5</sup> As expected, the horse was commonly used for hauling and harrowing, but, despite its theoretical advantages of speed, stamina, and longer life, total conversion to the animal for all facets of demesne farming was comparatively rare.<sup>6</sup>

This state of affairs was reflected in the agricultural treatises of the time, which were firm in their preference for the ox, particularly as a plough-beast. The case was put most clearly in Walter of Henley's *Husbandry*, written towards the end of the thirteenth century.<sup>7</sup> Walter admitted a possible advantage for the horse in ploughing stony ground where oxen would tend to slip, but countered the advantage of speed by saying that the 'malice' of the ploughmen would not allow the horse plough to go any faster than if it were pulled by oxen. He also pointed out that when ploughing hard or heavy ground the horse was almost useless, repeatedly coming to a standstill while the slower ox managed to pull through.

But the keystone to Walter's argument was economic: horses were simply more expensive to keep than oxen. They consumed more of the expensive fodder, oats, and cost more to maintain, particularly in shoeing. To prove his point, Walter drew up a crude comparison of costs, itemized in Table 1.

TABLE 1  
Walter of Henley's Horse/Ox  
Cost Comparison (per animal)

	Horses	Oxen
Oats (in winter)	8s 2d	2s 4d
Pasture (in summer)	1s	1s
Shoeing	4s 4d	—
Total (per year)	13s 6d	3s 4d

Much is missing from this list of costs. Although he mentions hay, straw and chaff

<sup>7</sup> Oschinsky, op cit, particularly p 319, cc 36-41.

<sup>1</sup> I am indebted to Dr C C Dyer and Professors R H Hilton and P D A Harvey for kindly reading over and commenting on various drafts of this paper.

<sup>2</sup> Notably Lynn White, Jr, *Medieval Technology and Social Change*, Oxford, 1962, pp 57-69.

<sup>3</sup> J Z Titow, *English Rural Society 1200-1350*, 1969, p 38; E Miller and J Hatcher, *Medieval England — Rural society and economic change 1086-1348*, 1978, p 227; H S Bennett, *Life on the English Manor*, Cambridge, 1937, p 90; Lord Ernle, *English Farming: Past and Present*, 6th edn, 1961, p 13; J H Moore, 'The Ox in the Middle Ages', *Agriculture*, XXXV, 1961, pp 91-2; G E Fussell, *Farms, Farmers, and Society*, Lawrence, Kansas, 1976, p 111.

<sup>4</sup> For example, of the 77 manors used to construct Table 2 below, the ratio of oxen to adult horses approached 3 to 1 (1342 oxen as against 532 horses), ranging from 9 to 1 in the north to about 6 to 4 in the south and east. Only 5 of the manors had gone completely to horses.

<sup>5</sup> For specific examples of mixed plough-teams, see R Lennard, 'The Composition of Demesne Plough-teams in Twelfth-Century England', *Eng Hist Rev*, LXXV, 1960, pp 201-2.

<sup>6</sup> See note 4. For the various merits of the horse, see White, op cit, p 62; R J Forbes, *Studies in Ancient Technology*, II, Leiden, 1955, pp 83-5; N Harvey, 'Walter of Henley and the Old Farming', *Agriculture*, LIX, 1953, p 491; Dorothea Oschinsky, *Walter of Henley*, Oxford, 1971, p 162.

as part of the feeding regime, Walter obviously considers them as being of a minor nature and does not assign a value to them. Nor does he try to assess depreciation, although he was clearly aware of it since he does mention that when a horse gets old he loses all but the worth of his hide, while the ox, with 10*d* of summer grass for fattening, can be sold for as much as he originally cost.

Nevertheless, Walter's figures, incomplete as they are, carry considerable weight. If the 4 to 1 ratio in costs represented anything close to reality, they must have given a sizeable boost to the continued use of oxen on the demesne. How much faith should we put in Walter's figures, though? At least one commentator has suggested that they were probably inaccurate and may in fact have been made up to suit his argument.<sup>8</sup> Also, there is the curious fact that, although oxen were dominant on the demesne, in some areas at least they seem to have been almost completely eliminated from peasant agriculture. This is particularly noticeable in the Suffolk and Bedfordshire lay subsidy studies of E Powell and A T Gaydon, where the demesnes clearly held the majority of oxen and the peasants the majority of horses.<sup>9</sup> In short, we have not only to investigate the precision of Walter's remarks, but also to explain this relative lack of enthusiasm for the use of the ox by that very sector which seemingly had most to gain from the economic advantages that Walter so clearly attributed to the beast.

The investigation will be accomplished in two stages. First, I shall attempt a detailed cost analysis to determine to what extent Walter's figures were correct. With one exception, this will be done using demesne accounts centred around the late thirteenth century, in order to bring the analysis into

chronological line with Walter's remarks. Second, through the use of a suitable manorial example, I shall attempt to explore how much influence this economic consideration had in shaping peasant and demesne policy as regards the medieval use of the two animals.

## II

Proceeding with the first stage, the cost of keeping horses and oxen falls into three main categories: (a) feeding; (b) general maintenance, that is, shoeing, harnessing, stabling, and so on; and (c) depreciation.

### (a) Feeding

Essentially, this involved only four items: oats, hay, straw and pasture. Chaff, although mentioned by Walter, is rarely entered in the accounts as a feed and so is ignored here, and the same applies to more extravagant fodders, such as bran and various types of horse-bread, which were generally fed only to riding horses or privileged household cart-animals.<sup>10</sup> Notably excluded, too, are legumes, that is, peas, beans and vetches, which, although used on occasion, do not figure largely as a feed for draught animals in the accounts until after 1350.

Of the commonly employed feeds, however, the major item was oats, and the reeves, bailiffs, or other manorial officials were very careful to enter the amounts consumed on the dorse of each account. Table 2 contains a region by region summary of these entries for 77 manors, covering the period 1250–1320.<sup>11</sup> For the purposes of this analysis,

<sup>10</sup> As in the c1270 Beaulieu Abbey stable accounts; S F Hockey (ed), 'The Account-Book of Beaulieu Abbey', *Camden Soc*, 4th ser, XVI, 1975, pp 260–3. I would also like to express my gratitude to Mr Kyle Rae for drawing my attention to this use of high-grade feeds for horses.

<sup>11</sup> The manors sampled, in order of region as they appear in the table, were Thornham and Hanworth, Norfolk; Peasenhall, Cratfield, Framlingham, Stonham, and Clopton, Suffolk; Newport, Birdbrook, Kelvenden, and Borley, Essex; Meldreth, Cambs; Houghton and Sundon, Beds; Standon, Berkhamsted, Wheathampstead, Wymondley, Amwell, and Ashwell, Herts; Iver, Cippenham, and Turweston, Bucks; Isleworth, Ashford, and

<sup>8</sup> *Ibid*, p 163.

<sup>9</sup> E Powell, *A Suffolk Hundred in the Year 1283*, Cambridge, 1910; A T Gaydon, 'The Taxation of 1297', *Beds Hist Rec Soc*, XXXIX, 1959, especially p xxviii. Animal heriots in the south and east of England often indicate the same trend, as, for instance, in the case of Cuxham discussed below.

the horses have been subdivided into cart-horses (*equi carectarii* or occasionally just *equi* in the accounts) and plough-horses (*affri*, *stotti* and *jumenta*). Although inevitably there was some overlapping in function — affers, stotts and *jumenta*, for instance, often did harrowing and carting as well as ploughing — this distinction between horses for carting and horses for ploughing is a common convention in the accounts, especially in the south and east.<sup>12</sup>

As expected, horses consumed considerably more oats per year than oxen. There is, as well, a very sharp distinction between cart- and plough-horses, the former consuming over three times as much of the grain as the latter, partly because carting was a year-round occupation compared to the somewhat seasonal nature of ploughing. Finally, a strong regional trend is evident with the oats consumption for both horses and oxen tailing off towards the west and north. Presumably this was because of increasing availability of pasture, but there is also the factor of reduced labour, particularly in the case of horses as they became increasingly excluded from ploughing towards the north and west, and even from hauling and harrowing on occasion.

Also to be noted from Table 2 is that the oats rations for plough-horses and oxen suggested by Walter were seldom followed in practice; as can be seen, none of the regional

Hayes, M'sex; Battersea, Morden, and Croyden with Cheam, Surrey; Hampstead Ferrers, Berks; Westerham, Gillingham, Lyminge, Saltwood, and Charing, Kent; Chalvington and Tangmere, Sussex; Stretton, Rutland; Pury, Wellingborough, Radstone, and Naseby, Northants; Bingham and Wheatley, Notts; Holywell, Lincs; Cuxham, Watlington, Launton, and Whitchurch, Oxon; Bourton-on-the-Hill, Hardwicke, and Todenham, Glos; Sutton-under-Brailes and Knowle, War; Pershore, Worcs; North Waltham, Bishop's Sutton, and Crawley, Hants; Mere and Cowesfield, Wilts; Exminster, Tiverton, Hemyoock, Topsham, Plympton, and Honiton, Devon; Skipton, Holme, Roecliffe, Howden, Burstwick, Cleton, Easington, Keyingham, and Little Humber, Yorks; West Derby, Lancs; Finchale, Durham. Space prevents a detailed list of sources; several of them, however, are referred to later in the article.

<sup>12</sup> For example, see J A Raftis, *The Estates of Ramsey Abbey*, Toronto, 1957, pp 129–30.

TABLE 2  
Yearly Oats Consumption by Horses and Oxen

Region (No of manors)	Cart-horses (qrs/animal)	Plough-horses (qrs/animal)	Oxen (qrs/animal)
East Anglia (12)	7.04	3.03	0.87
Home Counties (18)	8.28	2.59	0.46
Kent & Sussex (7)	4.92	3.37	0.06
East Midlands & Lincs (8)	6.11	1.29	0.25
West Midlands & Oxon (10)	6.64	1.29	0.22
Hampshire & Wilts (5)	3.63	0.83	0.32
Devon (6)	1.05	0.70	0.01
The North (11)	1.42	1.13	0.16
National average <sup>13</sup>	6.65	2.02	0.34
Average cost (@ 2s 4½d/qr) <sup>14</sup>	15s 9½d	4s 9½d	9¾d
Walter of Henley's rations (qrs/ animal) <sup>15</sup>	—	4.08	1.23

averages reaches his figures for either animal. However, it must be said that the regional averages do hide some quite high totals for individual manors. Nine of the 77 manors making up Table 2 did in fact exceed Walter's rations for plough-horses, and another five exceeded or at least equalled those for oxen. So, although Walter's rations were very seldom followed to the letter, they do seem to have formed a reasonable upper range. Possibly Walter was describing a situation that might have existed on a well-run demesne in East Anglia or the Home Counties. Nevertheless, even in ordinary circumstances annual oats costs could be quite heavy. Those for a cart-horse were parti-

<sup>13</sup> That is, the average of all 77 manors, *not* of the regions.

<sup>14</sup> The average price of oats for the period 1276–1300 (D L Farmer, 'Some Grain Price Movements in Thirteenth-Century England', *Econ Hist Rev*, 2nd ser, X, 1957, p 212). No price distinction is made between the threshed oats fed to horses and those on the sheaf generally given to oxen.

<sup>15</sup> As calculated from Walter's figures; Oschinsky, *op cit*, p 319, cc 38–40.

TABLE 3  
Detailed Draught Stock Feeding Costs for  
Certain Archbishopric of York Manors, 5 November 1373 — 6 May 1374

Manor	Affers and Jumenta						Oxen				
	No	Cost/animal (d)				Total	No	Cost/animal (d)			
		Oats	Peas	Hay	Straw		No	Oats	Hay	Straw	Total
Sherburn, Yorks	3	5½	—	21¼	—	27	27	3½	21¼	27¼	52
'Coughous', Yorks				No horses			8	—	19½	33¾	53¼
Cawood, Yorks				No horses			30	4¼	21¼	39	64½
Beverley, Yorks	4	—	—	16¼	—	16¼	18	—	16¼	51¼	67½
Skidby, Yorks	4	17¼	20	11½	—	48¾	27	—	11½	46¾	58¼
South Burton, Yorks	6	—	26½	22½	—	49	26	3½	22½	48½	74½
Wetwang, Yorks	8	15¼	32½	—	2½	50¼		No oxen			
Southwell, Notts	4	—	7½*	—	—	7½	18	—	—	30	30
Laneham, Notts	4	—	—	20	3	23	6	—	20	3	23
Scrooby, Notts	3	30½	—	10¼	—	40¾	18	5	10¼	39¼	54½
Average		8½	10¾	12¾	¾	32¾		1¾	15¾	35½	53
Percentage		26.0	32.8	38.9	0.2			3.3	29.7	67.0	

\*Peas and beans

cularly onerous, virtually equal to the value of the beast itself.<sup>16</sup>

The next important items of feed, hay and straw, have been lumped together for convenience in this analysis. In any case, they were largely interchangeable, straw being used to save on hay or even oats whenever possible, especially for cattle.<sup>17</sup> Evidence about the draught stock consumption of this mainly home-produced hay and straw is unfortunately very scarce, since only the extra-manorial purchase of these fodders is normally entered in the accounts. However, we do have some indications. The best I have found come from a set of archbishopric of York accounts covering a six months' vacancy from 15 November 1373 to 6 May 1374.<sup>18</sup>

During this period all the hay, straw, oats and peas used as draught stock feed on 10 manors in Yorkshire and Nottinghamshire were recorded, perhaps as a charge to the incoming archbishop. As a result we have a uniquely detailed breakdown of all feeding costs except pasture, which, when separated from the accounts and with some adjustments made, were calculated in terms of cost per animal as shown in Table 3.

The figures are startling. Here in the north hay and straw make up the lion's share of feeding costs, nearly 40 per cent for horses and over 95 per cent for oxen. The very high cost of straw for oxen is especially noticeable, but accords well with Fitzherbert's statement that 'oxen wyll eate but straw, and a lyttell hey'.<sup>19</sup>

Other accounts for hay only show similar results, and on the basis of these and the archbishopric of York accounts above educated guesses as to the average hay and straw

<sup>16</sup> Cf the cart-horse purchase and selling prices used in the depreciation calculations below.

<sup>17</sup> The use of straw as a feed, sometimes mixed with hay, is well supported by Walter and his colleagues (Oschinsky, *op cit*, pp 327, 333, 339, 397, 439), wheat and oats straw both being mentioned.

<sup>18</sup> PRO SC6 1144/10.

<sup>19</sup> *The Book of Husbandry by Master Fitzherbert*, 1534 edn, ed by W W Skeat, 1882, p 16.

portion of the total feeding costs (excluding pasture) for each animal across the country were made as follows: cart-horses, 20 per cent; plough-horses, 30 per cent; oxen, 85 per cent. These are pitched somewhat lower than the archbishopric accounts would indicate, but take into consideration other areas of England, particularly the south and east, where oats played a greater part in the total feed in place of hay and straw. Using these proportions, then, and extrapolating from the national average oats costs in Table 2, we obtain average cost figures for hay and straw across the country of 3s 11½d, 2s ¾d and 4s 7¼d for cart-horses, plough-horses and oxen respectively.<sup>20</sup> In view of the scarcity of direct evidence, these costs of course are highly conjectural, but at least should provide a guideline by which we may be able to judge medieval performance in these matters.

The cost of pasture is much easier to ascertain. Walter estimates its cost at 1s per animal per summer term, and this seems more or less right, although normally such charges do not figure in the accounts unless it is pasture outside the manor that is used. Where such charges are given, however, the agreement is usually good.<sup>21</sup>

#### (b) *General Maintenance*

The primary cost here was for shoeing horses, for which Walter assigned a charge per animal of 1d per week, or 4s 4d per year. Even a casual glance at the accounts shows this to be wildly inflated, and a more detailed look confirms it. The average shoeing cost per animal for 47 manors across the country was as follows:<sup>22</sup>

	<i>Average Shoeing Cost per Year</i>
Cart-horses	14d
Plough-horses	9d

<sup>20</sup> Thus  $(20/80) \times 15s 9\frac{1}{2}d = 3s 11\frac{1}{2}d$  (cart-horses);  $(30/70) \times 4s 9\frac{1}{2}d = 2s \frac{3}{4}d$  (plough-horses);  $(85/15) \times 9\frac{1}{2}d = 4s 7\frac{1}{4}d$  (oxen).

<sup>21</sup> Eg Oschinsky, *op cit*, p 162n.

<sup>22</sup> The manors being Thornham, Norfolk; Monks Eleigh and Clopton, Suffolk; Bocking, Hadleigh, Birdbrook, Feering, Kelvenden, and Borley, Essex; Sundon, Beds; Cippenham

Unlike oats consumption there was no clear regional trend, although there was often a great variation from manor to manor, depending on the work required of the animals. Oxen were also shod on occasion but at such a low cost (generally 1d or 2d per animal per year) and on so few manors that for all practical purposes the average outlay was nil.

Other maintenance costs, such as harnessing equipment, repairs to stables, and bedding, were of a minor nature, and a survey of the accounts indicates a charge of 6d per animal per year would adequately cover them all. Care of the animals was normally part of the ploughman's or carter's duties, and consequently only an occasional charge for extra labour was involved here.

#### (c) *Depreciation*

The annual depreciation of the demesne draught animals can be calculated using the formula:

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Purchase price at start of demesne career —  
selling price at end

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No of years active service in between

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The most difficult variable to determine is the number of years active service, or average demesne life, but this can be worked out from a series of consecutive or nearly consecutive accounts by simply dividing the average number of animals on the demesne by the average number replaced per year. The results

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and West Wycombe, Bucks; Isleworth, Knightsbridge, and Ashford, M'sex; Wymondley, Aldenham, and Ashwell, Herts; Battersea, Surrey; Avington, Berks; Hollingbourne and Westerham, Kent; Elton and Slepe, Hunts; Stretton, Rutland; Radstone and Naseby, Northants; Wheatley, Notts; Long Bennington and Holywell, Lincs; Cuxham, Oxon; Knowle, War; Pershore, Worcs; Garway, Hereford; Hambleton, Beauworth, and Old Alresford, Hants; Mere and Cowesfield, Wilts; Roecliffe, Howden, Burstwick, Skipton, Keyingham, and Little Humber, Yorks; Bamburgh, Northumberland; Cockermouth, Cumberland.

TABLE 4  
Average Demesne Life of Various Draught Animals

Manor	No of Accounts	Average Demesne Life (yrs)		
		Cart-horses	Plough-horses	Oxen
Crawley, Hants	17	8.5	4.5	6.2
Cuxham, Oxon	8	9.6	6.4	4.7
Forncett, Norfolk	10	—	5.6	4.7
Bourton-on-the-Hill, Glos	15	6.0	7.1	5.8
Knightsbridge, Middlesex	20	6.9	5.0	5.1
Birdbrook, Essex	21	4.7	5.7	5.3
Westerham, Kent	10	6.0	4.1	3.8
Average		7.0	5.5	5.1

for a sample of manors across the south of the country are shown in Table 4.<sup>23</sup>

Using these figures, we can now calculate the various depreciations. The purchase and selling prices employed are those of Farmer, averaged for the period 1276–1300.<sup>24</sup> Thus we have:

Average Depreciation of Cart-horses =

$$\frac{16s\ 10\frac{3}{4}d - 7s\ 10\frac{1}{4}d}{7.0} = 1s\ 3\frac{1}{2}d$$

Average Depreciation of Plough-horses =

$$\frac{10s\ 10\frac{1}{2}d - 4s\ 11\frac{3}{4}d}{5.5} = 1s\ 3\frac{3}{4}d$$

<sup>23</sup> Sources as follows: N S B and E C Gras, *The Economic and Social History of an English Village*, Cambridge, 1930, pp 373, 377, 383 (Crawley, 1276–1300); P D A Harvey (ed), 'Manorial Records of Cuxham, Oxfordshire', *Oxfordshire Rec Soc*, L, 1976, pp 181–314 (Cuxham, 1289–98); F G Davenport, *The Economic Development of a Norfolk Manor 1086–1565*, 1906, pp 33–5 (Forncett, 1272–1300); Westminster Abbey accounts WAM 8239–8256, 8230 (Bourton, 1287–1308); WAM 16380–16402 (Knightsbridge, 1289–1313); WAM 25398–25424 (Birdbrook, 1295–1319); WAM 26389–26402 (Westerham, 1296–1306). Where possible, the inclusion of heriots, waifs, and confiscations was avoided. These animals were almost always sold very quickly after being received and consequently would reduce the figures significantly.

<sup>24</sup> D L Farmer, 'Some Livestock Price Movements in Thirteenth-Century England', *Econ Hist Rev*, 2nd ser, XXII, 1969, pp 2–5.

Average Depreciation of Oxen =

$$\frac{11s\ 6\frac{1}{2}d - 9s\ 10\frac{3}{4}d}{5.1} = 3\frac{3}{4}d$$

Two points stand out from these calculations. First, oxen, as expected, fare much better in terms of depreciation than horses. Second, depreciation costs in general are patently of minor consideration compared to those of feeding.

### III

Totalling up all the above costs, we can now construct a more or less complete economic comparison between the animals under consideration. This is shown in Table 5.

As expected from Walter's figures, horses, and particularly cart-horses, did cost more to keep than oxen. They consumed more in the way of oats and also cost more in general maintenance and depreciation. The difference, however, particularly between plough-horses and oxen, was nowhere near as marked as Walter would have it. The cost of keeping an ox in real terms was fully 70 per cent that of a plough-horse, perhaps more given the uncertainty of the hay and straw figures. Only when hay and straw are excluded does the relative difference between the cost for

TABLE 5  
 'Operating' Costs of Horses and Oxen in Medieval England

	<i>Cart-horses</i> (cost/animal/yr)	<i>Plough-horses</i> (cost/animal/yr)	<i>Oxen</i> (cost/animal/yr)
(a) <i>Feeding</i>			
Oats	15s 9½d	4s 9½d	9¾d
Hay and Straw	3s 11½d	2s ¾d	4s 7½d
Pasture	1s	1s	1s
Total	20s 9d	7s 10½d	6s 5d
(b) <i>Maintenance</i>			
Shoeing	1s 2d	9d	—
Other Costs	6d	6d	6d
Total	1s 8d	1s 3d	6d
(c) <i>Depreciation</i>	1s 3½d	1s ¾d	3¾d
GRAND TOTAL	23s 8½d	10s 2d	7s 2¾d
Walter of Henley's figures	—	13s 6d	3s 4d
Grand Total excluding hay and straw	19s 9d	8s 1¼d	2s 7½d

plough-horses and oxen approach that 4 to 1 ratio that gave such force to Walter's argument.

Does this lack of agreement between the foregoing analysis and Walter's argument totally invalidate his figures? Did he deliberately ignore hay and straw in order to improve his case? It seems unlikely, since Walter's figures appear to be sincere. Except for the wildly inflated shoeing costs (which, as Dorothea Oschinsky suggests, may have been intended by Walter to include depreciation as well),<sup>25</sup> his figures do often agree more or less with those found in the accounts. It is curious, though, that hay and straw consumption is so widely ignored, both in Walter and the accounts. One possibility is that, due to transportation costs, there may have been an inclination among manorial officials to think of hay and straw as being essentially without market value and hence more suitably treated as a virtually free source of food for the demesne animals. This was not

strictly correct, of course. Even ignoring the potential worth of labour services, there were, for example, associated costs of hay-making — mainly extra labour — that were a direct drain on manorial cash reserves. Also, there were possibilities of selling hay and straw locally, to both tenants and outside customers, which gave them some value at least. Nevertheless, in terms of decision making, the concept of hay and straw as being essentially without accountable worth is one that Walter and his manorial colleagues seem to have considered valid, and as such it gave a decided bias to the demesne use of oxen rather than horses.

#### IV

On the other hand, this does not explain the presence of a horse-oriented peasantry that could be found as far west as Oxfordshire. At demesne cost levels the horse would have been ruinous to the average villein's budget. To show how the peasant got round this difficulty and managed to fit the animal into his

<sup>25</sup> Oschinsky, op cit, p 163.

pocket-book, so to speak, I have chosen as an example the Merton College manor of Cuxham in south-east Oxfordshire, for which the records have largely been made accessible through the excellent work of P D A Harvey.<sup>26</sup>

Cuxham after 1293 had a demesne arable of about 270 standard acres, for which there was a working stock of around 3 cart-horses, 4 affers (or plough-horses), and 12 to 16 oxen.<sup>27</sup> Two ploughs, each probably with a team of 2 horses and 6 oxen, were the norm, although very occasionally a third plough, drawn mainly by horses, was employed as well.<sup>28</sup>

On the peasant side, 1 freeman and 13 families of customary tenants holding a half-virgate of 12 acres apiece had land sufficient to require their own draught animals and ploughing equipment.<sup>29</sup> With the exception of the freeman, who, it appears from trespass presentments, had both horses and oxen, the rest had only horses, generally 2 to a holding according to the trespasses.<sup>30</sup>

From the evidence, slight as it is, there was little co-aration. In 1288–89, for instance, when there were only 8 half-virgate holders on the manor (5 were added from 1290 to 1293), bread was supplied for a plough-boon involving 16 men with 8 ploughs.<sup>31</sup> Since only half-virgaters ever owed full ploughing services at Cuxham, it seems likely that these 8 ploughs coincided with the 8 half-virgate holdings then in existence, and that each holding was thus self-sufficient in ploughing stock and equipment, even though, as seen above, these plough-teams must have been very small indeed.

<sup>26</sup> In his *A Medieval Oxfordshire Village*, Oxford, 1965, and 'Manorial Records of Cuxham', op cit.

<sup>27</sup> Harvey, *Med Ox Vil*, pp 39–46, 164–5.

<sup>28</sup> *Ibid*, pp 57–9.

<sup>29</sup> Demonstrated most clearly on the holding of Robert Oldman, the reeve, who definitely had his own plough and ploughing animals. *Ibid*, pp 69–70; 'Manorial Records of Cuxham', p 639.

<sup>30</sup> Harvey, *Med Ox Vil*, pp 131, 174–5.

<sup>31</sup> Harvey, 'Manorial Records of Cuxham', p 172.

Nevertheless even 2 plough-horses, if maintained at the demesne level, would seem an almost insupportable drain on a holding as small as the Cuxham 12-acre half-virgate. Clearly some accommodation had to be made, particularly in the matter of feed. Fortunately the Cuxham material provides some clues as to how this was done. First, in regard to the ploughing stock at least, it is virtually certain that the peasants' draught animals were used much less intensively than the demesne animals. As mentioned above, the Cuxham demesne totalled some 270 acres, which were cultivated under a three-field system. Allowing for a double ploughing of fallow (the normal practice), this meant that 360 acres needed ploughing every year. The tenant contribution to this ploughing was negligible, a quarter of an acre for each of the 13 half-virgate holdings or  $3\frac{1}{4}$  acres in all. Consequently, if 2 demesne ploughs are assumed, each plough-team was responsible for nearly 180 acres per year. Even with an optimistic ploughing rate of an acre a day, this still meant 180 days ploughing.<sup>32</sup>

On the other hand, peasant animals were put to the plough for a much shorter period of time. Assuming again a double ploughing of the fallow, a Cuxham half-virgate would require 16 acres of ploughing, or  $16\frac{1}{4}$  including the rood owed to the lord. Even if co-operation between neighbours did occur, doubling the size of the plough-team from, say, 2 to 4 animals, a peasant's horses would still only be required at the plough for  $32\frac{1}{2}$  acres, or, at the above acre a day,  $32\frac{1}{2}$  days' work. Harrowing and carting would have to be added to this, of course, whereas on the demesne this would largely be handled by the cart-horses, but even so it is doubtful that this would make up the yearly work load to anything like that for the demesne animals.

In consequence, peasant animals had a much easier life than those on the demesne

<sup>32</sup> Probably more, since even the normally sanguine Walter indicates that seven-eighths of an acre a day was a more likely figure for most of the year's ploughing (Oschinsky, op cit, pp 315, 317).

and this enabled the tenant to cut down considerably on his costs for keeping them, especially those for feeding. For one thing, it appears that the Cuxham peasants scarcely bothered at all with oats.<sup>33</sup> Instead they grew vetches which, for them at least, were a much more flexible crop suitable for all animals, although perhaps less specifically good for horses. A detailed tax assessment for 1304 shows the Cuxham peasants growing up to 3 acres of vetches each, although how much of this was fed to their horses as opposed to the other animals they owned is debatable.<sup>34</sup> Instead it would seem they relied more on the cheaper fodders of hay, straw, and, in particular, pasture.

Of the first two, certainly the most available was straw, something that almost every tenant had as a residue from the harvest. Although more likely to be fed to his other animals, particularly any cattle he had, it did have some value as bedding for his horses and perhaps as an emergency feed for them if needed. Straw could also be bought from the demesne.<sup>35</sup>

Hay, though, was another matter. Never was it sold to the Cuxham tenantry. In fact, there seems to have been a chronic shortage of the fodder on the manor, since the demesne purchase of hay from outside the manor occurs regularly in the accounts. Presumably the Cuxham peasant largely did without, although he may have had a little of the 'allotable' meadow referred to in the 1356-57 account.<sup>36</sup> And, of course, he might have had the same opportunities for outside purchase as did the demesne.<sup>37</sup>

Pasture was distinctly more promising. Again it could be bought from the demesne, but it is likely that the Cuxham peasant looked to cheaper sources. First among these must have been the commons, but un-

fortunately the Cuxham records throw almost no light on them. Certainly they were not inexhaustible, since even demesne animals were often forced to go outside the manor for pasture.<sup>38</sup>

More intriguing is the question of trespasses, which seemed to go well beyond the bounds of occasional infringements. Altogether 413 cases were recorded against the lord's corn, pasture, and meadow from 1279 to 1358, an average of 7 trespasses per court. Some of the trespasses were quite determined, the most prolific examples occurring over two courts in 1343 and one in 1346, when 82 instances were brought involving 53 horses, at least 40 sheep (probably a great many more), and undisclosed, but quite likely large, numbers of cattle, pigs, ducks and geese.<sup>39</sup> The transgressors represented almost all levels of the Cuxham tenantry: half-virgaters, freemen, *famuli*, and even a few people from outside the manor. Yet there is no sense of outrage at this mass infringement; all were fined at the usual levels of *1d* or *2d* per horse, less for smaller animals. In fact, the number of trespasses in the court rolls often approaches that appropriate for licences rather than fines, like the assize of ale, and perhaps they were considered as such, condoned as long as they did not get out of hand. If so, as a source of pasture, trespasses on the demesne must have ranked alongside the commons.

The diet of the Cuxham peasant's horses, then, appears to have been heavily loaded towards the cheaper staples of pasture and perhaps straw. This is consistent with the low amount of work expected of the animals. When periods of high exertion did occur, vetches, rather than oats, were used; hay probably much less, simply because it was scarce at Cuxham. Finally, it is almost certain that this diet would have remained essentially the same whether the peasant had horses or oxen, and thus the economic bias in favour of

<sup>33</sup> Harvey, *Med Ox Vil*, pp 130-1.

<sup>34</sup> Harvey, 'Manorial Records of Cuxham', pp 712-14.

<sup>35</sup> Eg 'Manorial Records of Cuxham', p 214.

<sup>36</sup> *Ibid*, p 562; *Med Ox Vil*, p 29.

<sup>37</sup> As in the 1378 case of John Lacheford, who was killed while fetching hay (presumably for his own use) from nearby Wheatfield. Harvey, *Med Ox Vil*, pp 101-2.

<sup>38</sup> *Ibid*, pp 99-101.

<sup>39</sup> Harvey, 'Manorial Records of Cuxham', pp 681-6.

the ox which Walter saw and of which feeding costs formed the major portion would largely evaporate in the case of the Cuxham peasant.

In any case, any economic disadvantage still accruing to the horse would have been swallowed up by the other benefits the peasant saw in the animal. For example, horses were much more versatile than oxen. They could pull a cart; they could be ridden; they could be used as pack-animals — all functions that an ox performed awkwardly or not at all. Also, with its use in smaller teams, the horse was better suited for things like ploughing little bits of land in closes or in awkward corners of the open fields. And then there was the increase in ploughing speed promised by the horse, which no doubt could be very useful at times, particularly on level ground and light soils.<sup>40</sup>

With respect to their purchase horses were much more flexible as well. For instance, while it was virtually impossible to buy a cheap ox because of its ever present value as meat, it was very possible to buy a cheap horse. It seems inevitable, for instance, that the demesne cast-offs would be bought by peasants and, as we can see from the figures used in the depreciation calculations, the average selling price for plough-horses in particular was less than half that for oxen. The range of prices for these horses was much greater as well. Demesne affers, for instance, could be bought for as little as two shillings or as much as ten, or even more.<sup>41</sup> Consequently the peasant could chop and change; if he wanted to increase his cultivation beyond his single plough or to free himself from the need to co-operate with a neighbour, he could do so by buying a horse or two, adjusting the quality of his purchase to suit his budget. The comparatively stable price of an ox during its adult life tended not to allow this sort of flexibility.

<sup>40</sup> Fitzherbert (ed Skeat), *op cit*, p 16.

<sup>41</sup> As at Knightsbridge, M<sup>x</sup>sex, where an affer was sold for 2s in 1309-10 (WAM 16399) and another for 10s 4d in 1312-13 (WAM 16402).

## V

In conclusion, economic factors played a major part in determining the distribution of horses and oxen in medieval England, and certainly no more so than on manorial demesnes. As Walter of Henley indicated and as the preceding analysis confirms, the manorial officials found they paid out less when they used oxen instead of horses. The tendency to discount hay and straw encouraged the use of oxen even more. This did not mean, however, that this policy could not at times be overturned by technical or environmental considerations. There were some demesnes which did go to all-horse farming despite the higher costs involved, such as those in the Chilterns, where stony soils seem to have encouraged the use of horses.<sup>42</sup> But demesnes of this type were few in number, and even if conditions did allow manorial officials to take advantage of the greater ploughing speed of the horse, most preferred to follow the economic line and use some oxen at least.

The position was markedly different for the peasant. For one thing, hay and straw costs were much more of a reality for him than for the demesne, and consequently it reduced the economic attractiveness of the animal which mainly fed on them, that is, the ox. Second, not having to employ his draught animals as intensively as on the demesne he could dispense with some of the more expensive fodders, like oats, which horses in particular consumed. This cut the economic gap between horses and oxen even further. Third, on holdings as small as the Cuxham half-virgate, where draught animals would often have to perform all sorts of tasks, the horse was eminently more versatile. All in all, even as the demesne was persevering with the ox, it is not difficult to see why the peasant, for equally sensible reasons, would cheerfully switch to the horse. In many parts of medieval England, it appears he was doing precisely that.

<sup>42</sup> D Roden, 'Demesne Farming in the Chiltern Hills', *Agric Hist Rev*, XVII, 1969, p 14.