Section IV : Specialization for trade and exchange

COMMERCIAL DAIRY PRODUCTION ON MEDIEVAL ENGLISH DEMESNES : THE CASE OF NORFOLK

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Summary

Of the various pastoral types which may be recognized at the close of the thirteenth century, by far the most productive per unit area of food, and most intensive per unit of capital and labour, was cattle-based dairying. Prominent among the counties where dairying assumed its most developed form was Norfolk, a county also marked by high population densities and strong urban demand. Within this county the characteristics of dairy herds are described, the distribution of dairying demesnes considered, and the commercial production of cheese and butter demonstrated. The picture which emerges is shown to have important implications both for established views about the nature and role of pastoral husbandry within the medieval agricultural economy and for longer-term explanations of agricultural change.

Key Words

Medieval Agriculture, Dairying, Demesnes, England, Norfolk

Résumé

Production et commerce laitiers dans les domaines médiévaux d'Angleterre : le cas du Norfolk.

Des diverses activités pastorales connues à la fin du XIII^e siècle, l'exploitation des produits laitiers d'origine bovine est de loin celle qui produit le plus de nourriture par unité de surface et la plus intensive, en terme d'investissement et de travail. C'est dans le Comté de Norfolk, par ailleurs caractérisé par une importante densité de population et une forte demande urbaine, qu'elle fut la plus développée. Les caractéristiques des troupeaux laitiers de ce Comté sont décrites ici, la répartition des domaines de production laitière examinée et la production commerciale de fromage et de beurre démontrée. L'image qui en émerge semble avoir d'importantes implications, tant vis à vis des conceptions classiques du rôle et de la nature du pastoralisme au sein de l'économie agricole médiévale, que pour la compréhension de l'évolution agricole sur un plus long terme.

Mots clés

Agriculture médiévale, Lait, Domaines, Angleterre, Norfolk

I^st^ Part

A general feature of medieval English agriculture as compared with that of virtually all later centuries was the relatively undeveloped character of its pastoral husbandry. As A. Grant has recently emphasized, (documentary evidence) generally shows a very low productivity by modern standards" (GRANT, 1988 : 176). Thus, archaeozoological evidence indicates that animal size was small and there is little evidence of selective breeding (GRANT, 1988 : 176-7 ; ARMITAGE, 1980). Thirteenth-century manorial accounts and agricultural treatises demonstrate that milk yields and fleece weights were both correspondingly low (TROW-SMITH, 1957 : 119-23 ; BIDDICK, 1989 : 94-5, 109 ; STEPHENSON, 1988 : 370-81 ; OSCHINSKY, 1971 : 431). Pastoral farming remained heavily reliant upon forage rather than fodder, which depressed stocking densities and ensured that extensive, prevailed over intensive, forms of management. Stocking densities on medieval demesnes were generally consistently lower than those prevailing in the same localities in the seventeenth century and after (OVERTON and CAMPBELL, 1992), and there is a widespread belief that stocking densities on medieval peasant holdings were lower still - the reverse of the situation pertaining in later centuries (POSTAN, 1962 : 219-49 ; 1966 : 553-5 ; ALLEN, 1991 : 246, 253).

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In the absence of artificial grasses, clover, and turnips, and without water meadows, ley farming, and other forms of improved grassland, which collectively were to revolutionize livestock husbandry from the seventeenth century on (KERRIDGE, 1967 ; OVERTON, 1991), M. M. Postan believed that medieval stocking densities were largely a function of available supplies of temporary and permanent pasture (POSTAN, 1966 : 554). As a result, and with certain notable exceptions, there was only limited integration of arable and pastoral husbandry within medieval agriculture.

Yet it was through the development of mixed-farming systems that the path to greater productivity ultimately lay (OVERTON and CAMPBELL, 1991 : 35, 42-44). By alternating land between arable and grass, growing more leguminous fodder crops, and maximising the manure that was returned to the soil, the circulation of nitrogen - the principal limitation to plant growth - was enhanced to the mutual benefit of both sectors (SHIEL, 1991 ; OVERTON, 1991 : 285-297). The perfection of such mixed-farming systems provided the key to the organic revolution which English agriculture underwent during the eighteenth and early nineteenth centuries. Although integrated mixed-farming systems certainly existed within medieval English agriculture, and examples may be cited of fodder cropping, stall-feeding, and convertible husbandry (CAMPBELL, 1983 ; MATE, 1985 ; BRANDON, 1971 ; SEARLE, 1974 : 272-99), these were outnumbered by those in which arable and pastoral husbandry were conducted as more-or-less separate enterprises. K. Biddick believes that this was the case during the early thirteenth century on the estates of the bishops of Winchester in southern England (BIDDICK, 1991 : 115-119). It shows up even more conspicuously in much of northern England, where lowland demesnes were frequently stocked with working animals only and the rearing of replacement stock was confined to specialist livestock farms located around the upland margins (BLANCHARD, 1967 : 168-74 ; CAMPBELL and POWER, 1989 : 36). It is therefore no surprise to find that at this date there was often little correlation between stocking densities and yields (OVERTON and CAMPBELL, 1991 : 35, 43).

Circa 1300, therefore, pastoral husbandry stood in a decidedly inferior position to arable husbandry. G. Clark has recently estimated that at this date the livestock sector accounted for approximately 25 per cent of agricultural production in the lowland counties of England, whereas by 1850 this proportion had grown to 50 per cent (CLARK, 1991 : 214-219). It follows that for much of the intervening period progress in pastoral husbandry was greater than that in arable. Moreover, it was within pastoral husbandry that the greatest productivity gains were made. Clark calculates that by 1850 stocking densities per cultivated acre were 25 per cent higher than c. 1300, fleece weights had increased by two-and-a-half fold, carcass weights of cattle and sheep had trebled, and milk yields had risen by four-fold. By contrast, grain yields merely doubled (CAMPBELL, 1991 : 179-181 ; CAMPBELL and OVERTON, 1993). If pastoral husbandry was the most dynamic agricultural sector after 1300 why, at this date, did it remain so comparatively undeveloped ?

In part the explanation lies in the imperative which high rural population densities, low income levels, and imperfect development of the market gave to cereal production. But the social and property relations embodied in feudalism also served as a deterrent to the fuller development of pastoral husbandry. Flocks and herds were valuable capital assets and as such attracted the asset stripping activities of feudal magnates. Estates which came into the custody of the crown were usually stripped of all but their working animals before being returned to their owners (BIDDICK, 1991 : 100-104). Lords, in their turn, via their exaction of feudal rent, deprived the peasantry of crucial investment capital which might otherwise have served to enhance the size of flocks and herds (BRENNER, 1976 : 33). Indeed, feudal dues such as heriot - the payment to the lord of a deceased tenant's best beast - struck directly at the pastoral sector. Outbreaks of murrain, rinderpest, and other livestock diseases were a further scourge which periodically decimated the flocks and herds painstakingly built up by lords and peasants (KERSHAW, 1973 : 106-11 ; MATE, 1991 : 85-86, 92-93). The spread of such diseases was encouraged by the prevalence in much of the country of communal methods of flock and herd management, methods which obstructed the kind of selective breeding which in later centuries was so to enhance carcass weights, fleece weights, and milk yields. Medieval farmers, in fact, operated under a number of technological constraints, not the least of which were the limited range and relatively low productivity of available fodder crops (principally oats, inferior grains, peas, and vetches) and a reliance upon natural rather than artificial grass. Deficiencies in the supply of animal foodstuffs naturally circumscribed both the number of animals that could be supported and their size, weight, and quality (POSTAN, 1972 : 59 ; GRANT, 1988 : 177).

Nevertheless, pastoral husbandry was not entirely backward and inert c. 1300 and research is beginning to reveal the developments which the pastoral sector underwent during the course of the twelfth and thirteenth centuries, in response to the expansion of population, foundation of markets, growth of cities, and general commercialization of the economy. J. LANGDON has documented the wider adoption of the horse for draught work, and especially haulage (LANGDON, 1984 ; 1986). This formed one component within the greater regional differentiation of pastoral husbandry systems and allowed the evolution of more intensive systems of husbandry (CAMPBELL and POWER, 1989 ; CAMPBELL, forthcoming a). The greater speed and strength of the horse, for instance, promoted higher standards of soil preparation in conjunction with a reduction in the size and number of plough-teams. This released scarce pastoral resources to the support of other types of livestock, the more so as horses were in part fed on oats and other fodder crops (CAMPBELL, 1988 : 95-7). Where these developments occurred arable and pastoral husbandry became more closely integrated and livestock were released from an exclusive dependence upon temporary and permanent grassland, allowing the mutual expansion of arable and pastoral husbandry. As BIDDICK has observed of the estates of Peterborough Abbey over this period :

"The changing composition of livestock in the herding economy of the estate characterizes a pastoral sector of some dynamism and complexity and dispels any notion of linear relations between animal and cereal husbandry" (BIDDICK, 1989 : 65).

In densely populated and intensively cultivated east Norfolk B. M. S. CAMPBELL has shown how the conflicting land-use demands of arable and pastoral husbandry were reconciled via the cultivation of fodder crops - oats, peas, and vetches - stall feeding of certain livestock, and employment of generally labour-intensive methods of management (CAMPBELL, 1983). Similar methods have been documented in parts of Kent and coastal Sussex (SMITH, 1943 ; BRANDON, 1971), where E. Searle has also identified the appearance by the early fourteenth century of convertible husbandry (SEARLE, 1974 : 272-99). By the late thirteenth century pastoral-farming systems therefore varied widely in their character, intensity, and productivity. Of these systems, by far the most productive per unit area of food, and intensive per unit of capital and labour, was cattle-based dairying (SIMMONS, 1974 : 20-2 and 170-2).

II[nd] part

Dairying is an inevitable adjunct of all forms of cattle rearing (SHAW, 1956 : 354) but, as an object in itself, tended in this period to be restricted to the most populous and commercialized districts since it required a high economic rent to justify its high overhead costs arising from its relatively intensive use of labour and land and the capital requirements of byres, dairy houses, and cheese and butter making equipment, plus, of course, the herds themselves. Before 1350 the counties whose cattle husbandry was most strongly geared towards dairying were Middlesex, Kent, Essex, and Norfolk, closely followed by the neighbouring counties of Hertfordshire and Suffolk. After 1350 - with a relative swing from arable to pasture - these same six counties continued to stand out with a pastoral economy distinctive from that encountered in much of the rest of the country, and their emphasis upon herds dominated by female adults became even more pronounced. The composition of cattle herds in the Thames-valley counties of Surrey, Berkshire, Buckinghamshire, and Oxfordshire also appears to have trended in the same direction. The concentration of these dairying counties in East Anglia and the immediate environs of London - among the least grassy counties in medieval England - is highly significant and anticipated patterns of specialization which emerged even more strongly during the Early Modern period. In the Middle Ages this was the most populous and commercialized part of the country and the most exposed to the influence of major urban food markets. London, served by a dense network of subordinate trade centres and with a population in 1300 approaching 100,000 (KEENE, 1984), can be assumed to have had an impact over a wide area and must have been the ultimate destination for a significant proportion of the butter and cheese produced in the surrounding counties, as well as for many of the surplus calves - suitably reared and fattened - which were an inevitable by-product of dairying (GALLOWAY and MURPHY, this volume). Norwich, with a population in the 1330s of approximately 25,000 (RUTLEDGE, 1988), had a similar effect but on a smaller scale and is undoubtedly one reason for the highly developed state of dairying in Norfolk, a county more associated with intensive arable than pastoral farming systems.

Norfolk's excellent coverage by extant manorial accounts allows the characteristics of its pastoral husbandry to be reconstructed in considerable detail. Over the period 1250-1450 roughly 2,000 accounts are extant representing over 200 different demesnes and a

variety of different estates - large and small, lay and ecclesiastical[1]. Each account records in detail the stock present on the demesne at the start and end of the farming year (Michaelmas-Michaelmas), gains and losses from birth, death, purchase and sale etc. during the year, and the income from sales of livestock and their products. On demesnes where dairying was a prominent enterprise the accounts sometimes contain a separate dairy account which records the cheeses and butters made, their method of disposal, and any income that was realized from cash sales.

Since the object of dairying was to maximize milking potential, herds geared towards that objective tended to be dominated by adult females with an accompanying bull. Often some younger animals will also have been present, but only as many as were necessary to maintain the population of dairy cows at full strength, so that overall a strong demographic imbalance in favour of adult females would have existed (herds geared towards rearing and fattening, by contrast, would have been imbalanced in the opposite direction). According to Walter of Henley an annual rate of reproduction of one calf per cow was the ideal, in order to keep the cows in milk. However, as Biddick points out, with a forty-week gestation period for calves and an interval of at least three to four weeks from calving to first heat, cows had only three mating opportunities per year to maintain yearly production of a calf (BIDDICK, 1989 : 90). Subsequently, of course, a substantial proportion of the calves would have been sold off, along with such sterile and decrepid milkers as needed replacing. Unlike herds producing animals for meat and draught there would have been few intermediate sales or transfers. Given its intensive nature, dairying often became the paramount pastoral activity within a generally intensive pastoral economy. In Norfolk the oat-fed horse often partially or wholly replaced the grass-fed ox for draught, thereby releasing scarce grassland resources to the support of the dairy herd. Cattle herds geared towards dairying thus usually contained only a small proportion of oxen, and sometimes none at all.

In Norfolk demesne dairy herds generally contained between 5 and 25 cows, the number tending to be higher after 1350 than before. There appears to have been a natural upper limit of 35-40 cows per herd, with, on average, one bull to every 13.5 cows. As table 1 shows, the demographic bias in favour of adult animals was often highly marked, a sure sign that dairying rather than rearing or fattening was the principal object of cattle husbandry. The typical demesne herd thus contained 10-40 animals - sometimes less, sometimes more - plus such oxen as were required for draught work. The herd maintained by the prior of Norwich on his demesne at Hemsby is a well-documented and good example.

	NO.	%
less than 25	11	8.6
25 - 49.9	29	22.7
50 - 74.9	40	31.3
75 - 99.9	24	18.8
100 - 124.9	13	10.2
125 - 149.9	7	5.5
150 +	4	3.1
TOTAL	128	100.0

Table 1 : Norfolk, 1250-1449 : number of immature cattle per 100 adults (cows + bulls) (oxen, and herds below 10 in size omitted). Source : manorial accounts.

Hemsby was one of the prior's largest and most valuable demesnes, being situated on the rich loam soils of Flegg with access to the alluvial grazings of Broadland. Between 1266 and 1335 the prior maintained a herd of 27-77 cattle on this demesne, the maximum being recorded in 1318 following two decades of steady expansion, and the minimum just three years later in 1321, following the devastating cattle plague (probably an outbreak of rinderpest) of 1319-20[2]. On average the herd comprized 46 cows and their followers plus up to 21 oxen maintained for draught work. The need to rear replacement work animals meant that the demographic bias in favour of mature females was less marked than on some other demesnes. Even so, adults outnumbered immatures by a ratio of 1.00 : 0.62. There were, in fact, rarely fewer than 20 cows on the demesne and when the herd was at full strength - in the mid 1290s and 1310s - there were almost twice this number, with, on average, only one bull to every 28.5 cows. The herd was managed

(1) The accounts are scattered among 22 public and private archives. A handlist is available from the author.
(2) Norfolk Record Office (hereafter NRO) DCN 60/15/1-16 ; NRO L'Estrange IB 4/4 ; Bodleian Library Oxford, MS Rolls, Norfolk, 47.

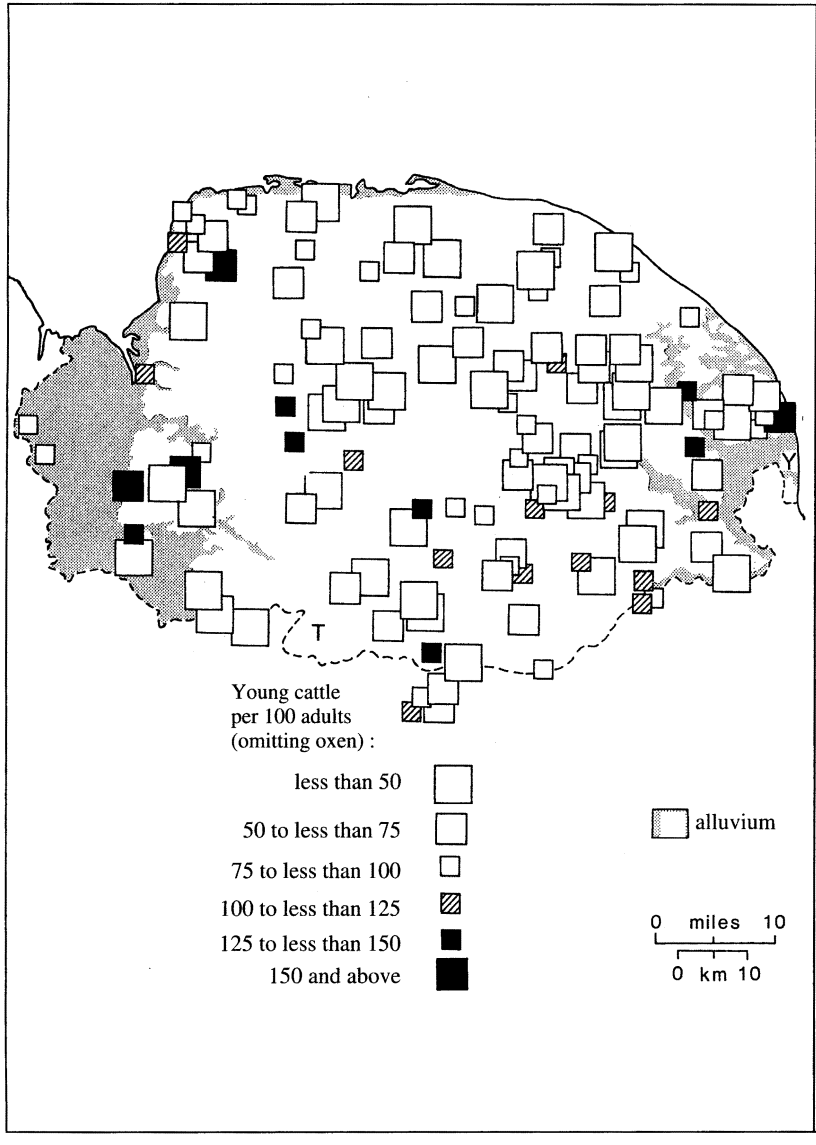

Fig. 1 : Norfolk : ratio of young cattle to adults (omitting oxen ; minimum herd size of 10).

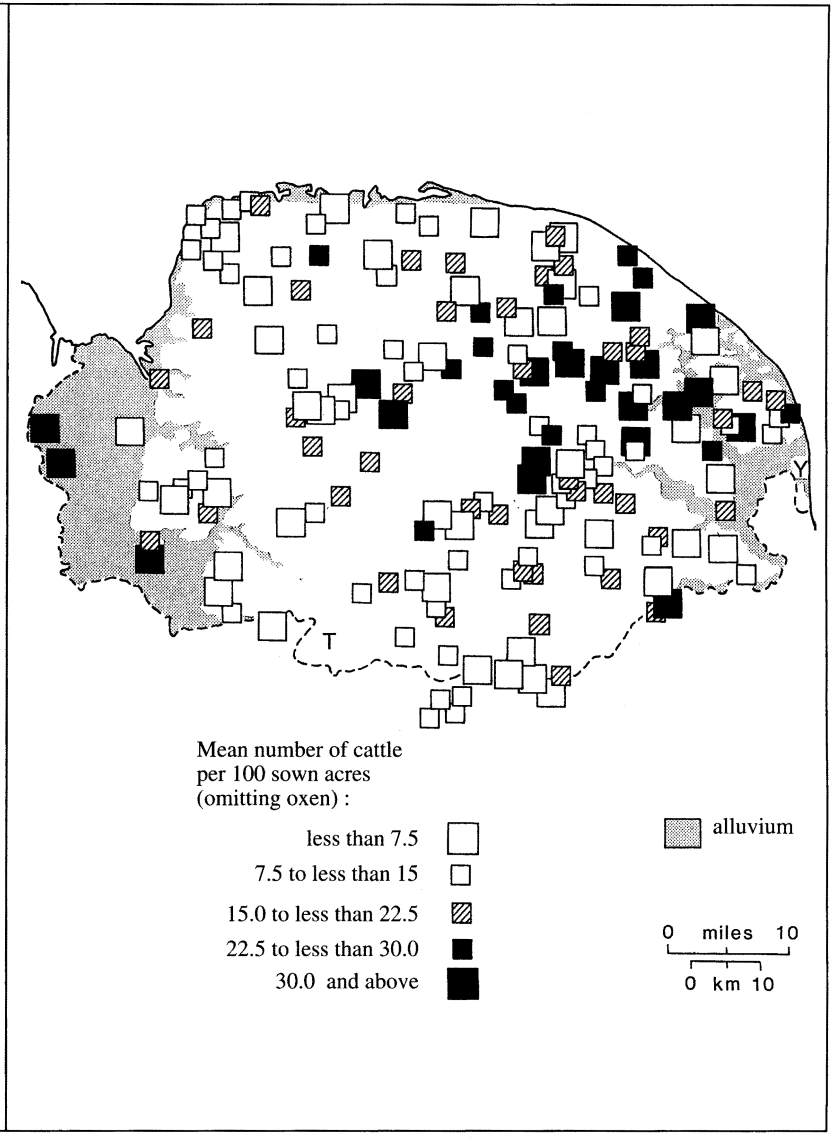

Fig. 2 : Norfolk : ratio of cattle to sown acres (omitting oxen).

by a full-time cowman while dairy production was the responsibility of a head dairymaid and assistant. An inventory of 1352 records the existence of a dairy equipped with one bench, five eastland tables, one table with two trestles, one table for drying cheese, five cheese vats, two pressing-boards, one stoup (wooden bucket), one churn, nine dishes, nine plates, twelve saucers, two hanging tables, one press, one jug, and one broken tong (YAXLEY, 1988 : 14-15). There was also a stable which accommodated both the demesne's working horses and its cattle. The same inventory records similarly equipped dairies on the prior's manors of Great Plumstead and Newton (where there is also specific reference to a cowhouse), both, significantly, located within a few miles of Norwich (YAXLEY, 1988 : 5-7, 16-18). The accounts of these and other dairying demesnes record a regular annual outlay on salt, cheese cloths, and replacement items of equipment involved in the cheese and butter-making processes. At Costessey in 1278-79, for example, salt, stoups, a board, buckets, a press, plates, a bench, a churn, and sundry other items were all bought for the dairy at a total cost of 3s 8¾ d[3].

With the exception of Broadland and the fen-edge, Norfolk was one of medieval England's least grassy counties, and in the drier and more free-draining parts of west Norfolk grassland was both scarce and of poor quality. On the evidence of Inquisitions *Post Mortem* arable exceeded several grassland in value by a ratio of four to one, as compared with a ratio of two-and-a-half to one in the the country as a whole (CAMPBELL, 1990 : 82). Nevertheless, on the evidence of the ratio of immature cattle to adults calculated for demesnes with a minimum herd size of ten (oxen omitted), there were few parts of the county in which dairying was not practised (fig. 1). It was as much a feature of the demesnes at Brandon, East Wretham, and West Harling in sandy Breckland, or of Sedgeford, Gnatingdon, and West Newton on the light sands of north-west Norfolk, as it was of districts where environmental conditions were better suited to grass growth. In fact, at Acle, Ludham, and Reedham in Broadland, and Wimbotsham and Hilgay on the fen-edge, the abundance of good grazing promoted an emphasis upon rearing as much as dairying, as reflected in immature : adult ratios well in excess of 100. Some bias towards rearing rather than dairying (anticipating a sub-regional specialism which was to become even more pronounced in the seventeenth century) is also apparent on certain of the demesnes situated on the heavy soils of southern and central Norfolk - Ditchingham, Earsham, Hempnall, Forncett, East Carleton, Attleborough, Hingham, Bradenham, and Sporle - where the prevalence of ox-ploughing with relatively large teams ensured a steady demand for replacement animals. Widespread as dairying was, however, it does seem to have been a particular specialism of east-central and north-eastern Norfolk. On demesne after demesne in this area, as a comparison of figures 1 and 2 shows, above average stocking densities of cattle other than oxen were combined with ratios of immature cattle to adults which strongly favoured the latter. Notable examples include Gateley, Mileham, Gressenhall, Foxley, Hainford, Wroxham, Tunstead, Horning, Burgh in Flegg, and *Heythe*, but there was scarcely a demesne in this area on which dairying was not practised. In this respect, the intensive character of pastoral husbandry echoed the intensive character of arable husbandry as undertaken on the same farms. The latter was characterized by intensive rotations, heavy seeding rates, systematic manuring, high labour inputs, and the cultivation of fodder crops (notably oats and legumes) (CAMPBELL, 1983). Dairying thus formed one component of an intensive mixed-farming system which employed high levels of input to obtain remarkably high levels of agricultural output per unit area. It represented, in effect, medieval agriculture at its technological and productive best.

One objective of demesne dairying was, of course, to satisfy the consumption requirements of the lord's household and his farm-workers, in whose diet cheese formed an important component, especially at harvest time. At Sedgeford in north-west Norfolk, for example, C. Dyer has shown that between 1256 and 1341 dairy produce accounted for a fifth of the value of all foodstuffs consumed by harvest workers (DYER, 1988, 25). The bulk of the milk, cheese, and butter concerned would have been produced from the cows and ewes maintained on the manor. On the prior of Norwich's seven demesnes of Gnatingdon, Thornham, North Elmham, Taverham, Monks Granges, Plumstead, and Martham in 1326-27 manorial consumption accounted for 47.5 per cent of all cheeses produced, a proportion which rose to 76 per cent at Plumstead and 77 per cent at Monks Granges[4]. Yet there were other manors on which the market formed the main destination for the

[3] Public Record Office (hereafter PRO) SC 6/933/13.
[4] NRO DCN 62/1.

cheeses produced. Martham sold 66 per cent of its cheeses in 1326-27 and Thornham 96 per cent. In the heartland of cheese production, in east-central and north-eastern Norfolk, consumption in fact almost invariably took second place to sale and there is a clear implication that specialization in dairying was a response to market opportunities. Between 1307 and 1315 the Norwich Cathedral Priory manor at Attlebridge sold 58.5 per cent of its cheeses and 79 per cent of its butters ; between 1305 and 1338 the sacristan of Norwich's manor at Bauburgh sold 62.5-89.9 per cent of its cheeses and 80 per cent of its butters ; 1296-97 the queen's manor at Cawston sold 93 per cent of its cheeses and 94 per cent of its butters (the remainder being paid as tithe) ; during the 1270s the royal manor at Costessey sold 94 per cent of its cheeses and butters ; and during the same decade the earl of Norfolk's Broadland manor of Acle sold its entire output of cheese and butter[5].

Norfolk's dense network of over 120 markets must have provided a ready outlet for this dairy produce, much of which may eventually have found its way onto the Norwich food market. Costessey, for example, for which a series of detailed though damaged dairy accounts survive from the 1270s, was actively engaged in the large-scale commercial production of butter and cheese and possibly traded with Norwich directly[6]. It was situated in the valley of the River Wensum, four miles north-west of the city, and maintained a herd of 25-30 milking cows. This was a well managed herd for on the three occasions when there are legible figures of the number of cows kept and calves born the calving rate was 100 per cent (although two out of three calves born were subsequently sold). Such a high fertility rate reflected both a favourable ratio of labour to animals - the herd was under the charge of a permanent cowman while the dairy was staffed by a permanent dairymaid - and the careful culling of aged and sterile females. This high fertility rate was matched by similarly favourable milk yields to judge from the quantities of cheese and butter produced and sold. One year the sale of cheese, butter, milk, and calves produced by the 25 cows kept on the demesne yielded an income of £6 8s 4d, another - this time from a herd of 26 cows - an income of £6 12s 0d. On both occasions this was equivalent to a gross income of just over 5 shillings per cow.

Auditors sometimes calculated the annual income per cow and appended a note to this effect on the account. At Plumstead, Martham, and North Elmham, for instance, it was calculated in 1326-27 that the lactage of each cow yielded an income of 2s 7d, 4s 7d, and an impressive 6s 0d respectively[7]. On other demesnes, and increasingly during the fourteenth century, the cows were farmed out to a lessee in return for an annual rent. The income that could be generated in this way was often considerable and it is clear that a single cow could be more profitable than several acres of good arable land. Sometimes cows were farmed for their milk only, with the lord retaining their issue. This was the arrangement at Burgh-in-Flegg in 1296-97 where the rental was 4s 0d per cow, and an identical rental prevailed at Hautbois in 1363 and Horning in 1372[8]. Similar rates sometimes applied when the lessee was entitled to both the lactage and the calves, as at Wroxham in 1342-43 (3s 4d per cow), Hainford in 1363-64 (4s 0d per cow), and Haveringland in 1356-57 and 1376-77 (4s 0d per cow, although 3s 4d per cow in 1364-65)[9]. Usually, however, lords were able to demand a higher rent when lessees retained both lactage and calves, since the latter were worth anything between 8d and 15d each. The farm of milk and calves was 4s 9d at Ludham in 1355, 5s 0d at Foxley in 1305-06, Gimingham in 1358-59 and 1391-92, and Tunstead in 1359-60, 5s 6d at Melton in 1332-33 but 6s 0d in 1366-67 and 1369-70, as also at Thurning in 1319-20 and Horning in 1372, and 6s 8d at Gateley in 1326-27 and Arminghall in 1347-48[10]. These are remarkably high rental levels, given that the lessees also had to make a livelihood as well as cover their expenses, and they testify to the potentially greater intensity and productivity of peasant as opposed to demesne husbandry. The arrangement seems to have been that the herd continued to be managed using the grassland resources of the demesne but that the lessee was responsible for calving, milking, and the manufacture of butter and cheese using the dairying equipment of the

(5) NRO DCN 61/11-13 and 16-19 ; PRO SC 6/1090/4 ; PRO SC 6/933/13 ; PRO SC 6/929/1-7.
(6) PRO SC 6/933/13.
(7) NRO DCN 62/1.
(8) PRO SC 6/1090/4 ; NRO Diocesan Est/2, 2/15 and 17.
(9) NRO NRS 2848 12 F1 ; British Library Add. Roll 26060 ; British Library Add. Charter 15199-202.
(10) NRO Diocesan Est/10 ; PRO SC 6/935/19 ; PRO DL 29/288/4719 and 4734 ; PRO DL 29 288/4720 ; NRO DCN 60/25/1-3 ; NRO NRS 2796 12 E2 ; NRO Diocesan Est/2, 2/17 ; NRO DCN 62/1 and 7.

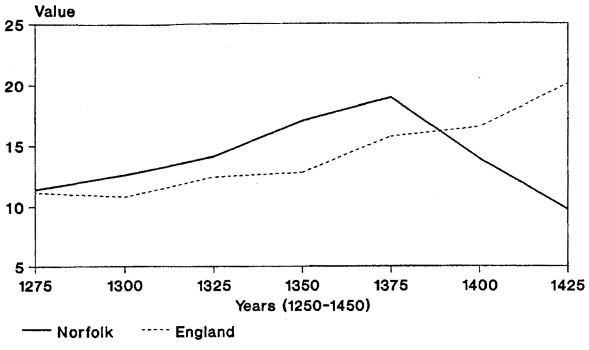

Fig. 3A : Cattle/100 sown acres (omitting oxen), 50 year means

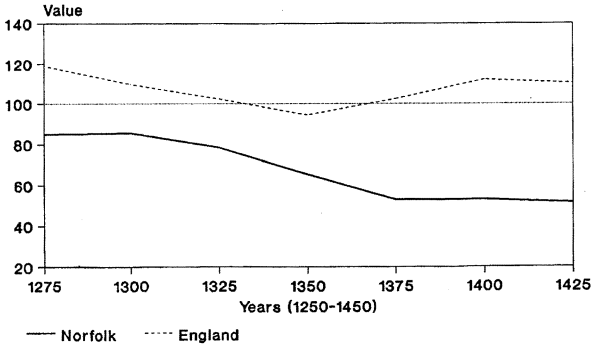

Fig. 3B : Young cattle/100 adults (omitting oxen ; minimum herd size of 10), 50 year means.

demesne, as well as for marketing these products. As an arrangement it must have operated to the benefit of both parties for it endured for many years on significant numbers of demesnes.

The intensive and profitable management of grassland which these rental rates imply is reflected in the high value placed upon grassland in the main area of commercial dairying. Inquisitions *Post Mortem* reveal a concentration of high meadow values in central and north-eastern Norfolk. Beeston, Billingford, Ingham, and Stratton all had meadowland assessed at 36d an acre, and at Knapton and Belaugh, respectively, assessments of 40d and 48d were returned[11]. Valuations of 24d an acre are also quite common in the area, as on the group of demesnes represented by Foxley, Foulsham, Kerdiston, Stinton, Cawston, Witchingham, Hockering, and Tuddenham in central Norfolk[12]. To some extent these high valuations - which compare with a mean of 18d within the country as a whole - must reflect the relative scarcity of meadow as a resource, for on all of them there was less than one acre of meadow to every 12 acres of arable and on several a ratio of one to 40 or worse, but this cannot be the entire explanation for meadowland was in equally scarce supply in other parts of the county where valuations were lower. Such meadowland needed to have been highly productive to have sustained these high valuations, and this, in turn, was probably related to favourable environmental circumstances (strong loam soils and adequate ground-water levels), intensive and effective methods of grassland management, and the specialized and commercially successful dairying which prevailed in the area. In parts of Suffolk and Essex at this time meadow values were even higher, which may point to the presence of even more intensive and productive dairy-farming systems.

III[rd] part

Over time, as will be seen from table 2 and figure 3A, cattle husbandry, as measured by the number of cattle other than oxen per 100 sown acres, gained steadily in relative importance throughout the period 1250-1399. In this Norfolk's experience paralleled that of the country at large with the exception that nationally stocking densities of cattle continued to rise right down to the middle of the fifteenth century and, possibly, beyond, whereas in Norfolk they eventually reverted to their late thirteenth-century level. Until 1375 at both levels the rise in stocking densities of cattle was accompanied by a progressively greater emphasis upon adult animals, as dairying gained relative to rearing (fig. 3B). This trend was especially pronounced in Norfolk, where dairying had always been the more important activity, and it persisted right down to the middle of the fifteenth century, by which time adult cattle exceeded the number of recorded immatures by almost two to one. As such it was reinforced by the gradual substitution of horses for oxen throughout Norfolk and

[11] PRO C133 File 47 (13) ; C134 File 48(9) ; C133 File 29(3) ; C132 File 42(6) ; C132 File 37 (4) ; C133 File 1(7).
[12] PRO C134 File 83 ; C133 File 34(8) ; C134 File 72(18) ; C134 File 21(4) ; C133 File 7(5) ; C133 File 51(7) ; C133 File 34(8) ; C133 File 102(1).

the reduced premium which this consequently placed on the rearing of replacement animals. On the other hand, the proliferation of leasing arrangements after 1375 which excluded immature cattle from the stock enumerated on the demesne means that this trend, along with the contemporary decline in stocking densities of cattle, is partially a figment of the method of recording. It certainly deviates from developments at a national level, where there was an abrupt return to the *status quo* of the late thirteenth century, with immatures outnumbering adults and a re-emphasis in many parts of the country upon oxen as draught animals.

Table 2 : England and Norfolk : trends in cattle (omitting oxen) per 100 sown acres, and immature cattle per 100 adults, 1250-1449[a].

Years	Cattle per 100 Sown acres		Immature Cattle per 100 Adults[b]	
	England	Norfolk	England	Norfolk
1250-1299	11.15	11.39	1.19	0.85
1275-1324	10.80	12.63	1.10	0.86
1300-1349	12.46	14.11	1.02	0.79
1325-1374	12.79	17.01	0.95	0.66
1350-1399	15.71	18.91	1.02	0.53
1375-1424	16.47	13.88	1.22	0.53
1400-1449	20.04	9.70	1.10	0.52

[a] Norfolk trends calculated from all extant accounts for all recorded demesnes. The figures are the means of the individual manorial means, weighted geographically to control for changes in the spatial coverage of the data.
National trends calculated from a sample of 1,904 accounts representing 792 different demesnes. Means for five sub-regions have been calculated from the individual manorial means. These have then been combined with the corresponding figures for Norfolk to produce a single national figure using weightings based on the respective regional shares of lay wealth in 1334 and population in 1377.
(For further details see CAMPBELL, 1991 : 151-153).
[b] based on demesnes with a minimum herd size of 10.

On this evidence it would appear that commercial dairying in Norfolk attained its peak of development as a demesne activity during the third quarter of the fourteenth century, at a time when population decline, relative prices, and associated changes in demand were encouraging a swing from grain to livestock (CAMPBELL, 1990 : 105-11). That this trend was not sustained thereafter reflects several factors. First, the progressive withdrawal of demesne lords from direct management meant that dairying increasingly became a peasant rather than seignorial activity, albeit employing working capital provided by lords. Second, continued population decline, rising living standards, and changes in relative prices reduced the market for dairy produce. By the early fifteenth century, for instance, dairy produce accounted for barely 10 per cent by value of the foodstuffs consumed by harvest workers at Sedgeford, as workers consumed less bread and cheese than in the thirteenth century and more ale and meat (DYER, 1989 : 157-60). Third, rising costs, especially of labour, and falling prices encouraged a shift to more extensive forms of livestock enterprise for which other parts of the country enjoyed a greater comparative advantage. By the close of the fourteenth century the intensive pastoral and arable husbandry in which Norfolk specialized, and of which dairying was one manifestation, had become too expensive to remain profitable. In the quest for a lower-cost alternative lords increasingly turned to sheep farming. The incentive to do so lay less in high wool prices - for these stagnated throughout much of the fifteenth century (LLOYD, 1973) - than in the fact that sheep had lower labour and feeding costs than cattle and produced a variety of products - meat, milk, and wool - which provided a hedge against uncertain markets. This switch from cattle to sheep, which echoed trends in the country at large (MATE, 1987), is reflected in a ratio of sheep to cattle which was twice in 1400-49 what it had been 1350-99. Not until the sixteenth century, when population growth and associated price and wage trends encouraged a return to more intensive forms of husbandry, would Norfolk again become a county in which cattle predominated over sheep (THIRSK, 1967 : 40-9 ; OVERTON and CAMPBELL, 1992).

IVth Part

A. Grant, in a valuable recent survey of the animal resources of medieval England, doubted whether milk could have been very intensively exploited in the twelfth and thirteenth centuries (GRANT, 1988 : 156-7). Nevertheless, the example of Norfolk suggests otherwise. It also points to the importance of market demand, and the high levels of economic rent consequent upon it, as a stimulus to the development of more intensive and productive pastoral-farming systems. If, therefore, pastoral husbandry remained comparatively extensive and undeveloped in much of the rest of the country the explanation may lie in part with the inadequacy of market

demand and depressing effect of low levels of economic rent (CAMPBELL, forthcoming b). Although the leading urban centres were larger *c.*1300 than has hitherto been appreciated, the proportion of the population resident in towns remained low, both by comparison with other European countries and with the situation prevailing in England from the late sixteenth century on (SMITH, 1991 : 50-1). A socially polarized distribution of wealth further restricted commercial demand for livestock products. Moreover, the commercial links between town and country remained imperfectly developed. Had purchasing power been greater *c.*1300, a higher proportion of the population resident in towns, and the institutions and arteries of commerce more fully developed, the prospects for progress in pastoral husbandry along the lines outlined in this paper would have been considerably enhanced. It was arguably the resolution of these obstacles, as much as technological progress *per se*, that was to promote the fuller development of pastoral husbandry in later centuries.

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