

Northern Wolds and Wessex Downlands: Contrasts in Sheep Husbandry and Farming Practice, 1770–1850

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Abstract

Two separate and distinct farming systems developed on the chalk wolds of Lincolnshire and east Yorkshire, and the downlands of South Wiltshire, East Dorset, Berkshire and Hampshire during the French Revolutionary Wars period and in the years immediately afterwards. This is rather surprising in view of the broad similarity of the 'sheep and corn' systems practised in the two areas before about 1770, the relatively minor differences in geology and climate, and the general availability of information about innovatory farming practices at the time. The characteristics of a high-input system of farming which developed on the northern wolds, and a low-input one which evolved on the Wessex downlands, are defined. The link between the high-input system and High Farming is described, as is the efficiency of the low-input system in giving farmers an acceptable income with rather less capital outlay and running costs.

BETWEEN 1843 and 1852 agriculturalists Phillip Pusey, John Clarke and James Caird noted that, whilst most of the wolds of Lincolnshire and east Yorkshire had been converted into arable fields upon which crop rotations had been established, major parts of the downland of south central England remained as sheep walk.¹ This is indicative of two separate and distinct farming systems which developed on the northern wolds and Wessex downlands during the period of the French Revolutionary Wars, and in the years immediately afterwards. In view of the broad similarity of the 'sheep and corn' systems practised in the two areas before about 1770, and the general availability of information about innovatory farming

practices at the time, this is rather surprising.²

This article will explain the major differences between the two systems, and suggest that the major factors in determining the changes were the radically different demands put on them and the consequent different needs to which they responded. More specifically, though the market demands for cereals were roughly similar, those for sheep meat and wool were not. Improved sheep breeds were introduced on the northern wolds breeds to meet the requirements of the 'great body' of consumers in the expanding east midlands and west Yorkshire industrial areas: a fat carcass for 'the mechanic or labourer who had a large family to support', and a heavy fleece to provide the woollen mills of west

¹ The 'northern wolds' refers to the chalk wolds of Lincolnshire and east Yorkshire, and includes the 'heath and cliff' land to the west of these wolds, which shared a similar pattern of change and growth; the 'Wessex downlands' are the downs of South Wiltshire, East Dorset, Berkshire and Hampshire; P Pusey, 'On the Agricultural Improvements of Lincolnshire', *Journal of the Royal Agricultural Society of England* (JRASE), IV, 1843, p 298; J A Clarke, 'The Farming of Lincolnshire', JRASE, XII, 1851, p 330; J Caird, *English Agriculture in 1850–51*, 1852, p 310. The author is grateful for advice from B Afton, D Agerskow, and Alan Harris in the preparation of this paper.

² Caird, *op cit*, p 59; E L Jones, 'Eighteenth Century Changes in Hampshire Chalkland Farming', *Ag Hist Rev*, VIII, 1960, p 5; G G S Bowie, 'New Sheep for Old – Changes in Sheep Farming in Hampshire, 1792–1879', *Ag Hist Rev*, 35, pt 1, 1987, p 18; Wm Marshall, *The Rural Economy of the Southern Counties*, ii, 1798, pp 330–31. Sheep were the most important livestock during this period, as cattle were not significant in Wessex downland farming until after 1850, and only beginning to be important on the northern wolds in the eighteen forties – G Legard, 'The Farming of the East Riding of Yorkshire', JRASE, IX, pp 112, 115; Clarke, *loc cit*, pp 389–90; Caird, *op cit*, p 59; Alan Harris, *The Rural Landscape of the East Riding of Yorkshire, 1700–1850*, 1961, p 104.

Yorkshire with the type of longwool they wanted.³

However, these new wold flocks required an improved highly capitalized, high-input arable farming system which was created and sustained by the proximity of such rapidly developing markets.⁴ On the other hand, the markets of the south were for the most part established, and the farmers of the Wessex downlands did not have the advantage of such a growing industrial urban market. Instead a breed of sheep was wanted which optimized existing aspects of an efficient but low-input system. Because no such sheep existed, breeders in the area developed one which suited the needs of the mixed downland farm. It was this rather than intensive arable cultivation which attracted the capital expenditure on Wessex downland farming.⁵

I

By 1850 there were completely different breeds of sheep in each area. The major changes on the Lincolnshire and Yorkshire wolds took place between about 1770 and 1830. The native slow-growing shortwool breed on the upper wolds by 1812 was 'chiefly confined to the few remaining open field townships'. These, and the Old Lincoln and Holderness longwools found on the lower wolds which were more suited to the adjacent lowland pasture, became extinct, and were replaced with flocks of Improved Lincolns on the Lincolnshire uplands, and Improved Leicesters on the Yorkshire wolds. Both breeds had a major common New Leicester longwool ancestry, which matured more rapidly and fattened more

readily than other longwool breeds.⁶ However, it was short-legged, carried a heavy fleece, and was unsuited to travelling much further each day than from one enclosed arable field to the next.⁷

The translation of such a breed onto the wolds of northern England, some parts of which were very bleak and inhospitable, should be regarded as a remarkable achievement, for to thrive there it had to be as well fed and managed as the sheep which Bakewell and others had bred to suit the rich pastures of the east Midlands.⁸ Efforts on the Wessex downlands at the turn of the century to introduce the New Leicester, and the numerous Leicester crosses that were attempted, failed as such sheep were unsuited to the daily walking required, and were considered unable to thrive on the forage available.⁹ This illustrates the different expectations of farmers in the two regions. In Wessex a sheep was required to meet the needs of farmers who had little incentive to alter their agricultural practices, the majority of them regarding their flocks principally as manure carriers, travelling daily between pasture and arable land – 'of the different manures used, the sheepfold

³ Caird, *op cit*, p 49; E L Jones, 'The Changing Basis of English Agricultural Prosperity, 1853–73', *Ag Hist Rev*, X, 1962, 226–7; Bowie, *loc cit*, 20.

⁴ J Donaldson, *General View of the Agriculture of Northamptonshire*, 1794, p 57; G Culley, *Observations on Livestock*, 4th ed, 1807, pp 106–8; A Roland, *Stock Keeping and Cattle Rearing*, 1893, p 171.

⁵ 'On the Preparation of Live-Stock and Meat', *Quarterly Journal of Agriculture (QJA)*, VIII, 1838, p 90; G E Mingay, ed, *The Agrarian History of England and Wales*, VI, Cambridge, 1989, pp 12, 191–4, 287.

⁶ Wm Marshall, *The Rural Economy of Yorkshire*, II, 1788, pp 257, 259; A Young, *General View of the Agriculture of Lincolnshire*, 1799, pp 310–11; H E Strickland, *General View of the Agriculture of the East Riding of Yorkshire*, pp 31, 89–90, 231–34; J Thirsk, *English Peasant Farming*, 1957, p 257; R Trow-Smith, *A History of British Livestock Husbandry, 1700–1900*, 1959, pp 62–3; Alan Harris, *The Open Fields of East Yorkshire*, East Yorks Loc Hist Soc (EYLHS), 1959 (reprinted 1981), pp 14, 19; J A Perkins, *Sheep Farming in Eighteenth and Nineteenth Century Lincolnshire*, Occasional Papers in Lincolnshire History and Archaeology, 4, 1977, pp 40, 47–9; G E Mingay, 'The East Midlands', Joan Thirsk, ed, *The Agrarian History of England and Wales*, V, i, 1984, p 101.

⁷ Wm Marshall, *The Rural Economy of the Midland Counties*, i, 1790, p 410; *The Complete Grazier*, 1805, pp 152–53; *An Encyclopedia of Agriculture*, J C Loudon, ed, 1825, p 1007.

⁸ W Pitt, *General View of the Agriculture of Northamptonshire*, 1809, p 206; Trow-Smith, *op cit*, p 66; D Grigg, *The Agricultural Revolution in South Lincolnshire*, 1966, pp 57, 150.

⁹ C Vancouver, *General View of the Agriculture of Hampshire*, 1910, pp 365–66; T Davis, *General View of the Agriculture of Wiltshire*, 1811, pp 159–60; T Rowlandson, 'On the Breeds of Sheep best adapted to different Localities', *JRASE*, X, 1849, p 432. Note also the close correlation between the diffusion of New Leicester flocks, enclosure and turnip cultivation in northern Oxfordshire at this time – J R Walton, 'The diffusion of improved sheep breeds in eighteenth and nineteenth century Oxfordshire', *Jour of Hist Geog*, 9, no 2, 1983, p 181.

stands first'.¹⁰ Although all but one of the native Wessex downland breeds had died out by the 1830s, they were not replaced by a longwool sheep. Instead the replacement was another shortwool which was still hardy and well able to 'travel'. It could also be stocked more intensively, was a more economical feeder, and more docile than the native breeds.¹¹ Cross-breds between the Southdown and the existing breeds evolved, which were larger than the Southdown and specifically adapted to the Wessex downlands. These were variously known as Hampshire West Country and West Down sheep.¹²

For most of the eighteenth century, flock management on the Wessex downlands and on the northern wolds had an emphasis on wether flocks kept on open fields by 'common' shepherds, and culling surplus lambs at Michaelmas, but there were important changes in both areas after about 1770.¹³ There was a significant improvement in turnover on the Wessex downlands during the Revolutionary War, where wether flocks were being replaced by breeding flocks. The old wether sheep, which had normally been killed out at 4-6 years, had little place in breeding flock systems, and instead wethers were now being slaughtered at 2-3 years old.¹⁴ Also, a new system of flock management, the Hampshire Custom, evolved which aimed to avoid overwintering even the wether

lambs on the farm in order to devote the winter feed to the breeding ewes of the flock. Its most important feature was a rapid turnover of lambs, involving lambing in January-February; pushing the lambs forward from the end of March with an intensive feeding regime based on the early grass 'bite' from watermeadows; and selling them in the late summer or early autumn, retaining only a few rams and the ewe lambs needed to maintain the breeding flock. This development, unlike the traditional practice of autumn culling with its emphasis on the disposal of surplus wether and ewe lambs with little expectation of much financial return, was principally concerned with sending wether lambs to market in a forward condition, where they would normally realize a reasonable profit.¹⁵

Norfolk husbandry in the strict sense was not generally adopted on the Wessex downlands during this period. Instead, there was a fairly ubiquitous five-course rotation, with wheat followed by barley or oats, a two-year ley, and a winter and summer fallow. The two-year ley was innovative. Such a 'five-field' rotation was proposed for the farms in hand on a progressive Hampshire downland estate in 1755 where, because of the need to restore soil fertility, there was an emphasis on growing sheep food rather than cereals. Arthur Young described the country between Salisbury and Romsey, and Alresford and Alton, as generally enclosed and being farmed with this five-course in the late 1760s. Charles Vancouver described it as normal on many parts of the Hampshire downs in the early years of the nineteenth century, and John Wilkinson looked upon it as prevalent on

¹⁰ E Little, 'The Farming of Wiltshire', *JRASE*, V, 1845, p 168; J Bravendar, 'On the Advantages or Disadvantages of Breaking up Grass Lands', *JRASE*, VII, 1846, pp 161-162; E P Squarey, 'The Hill Farming of Wiltshire and Hampshire', *JB&W*, IX, pt 1, 1861, pp 67-8; J Darby, 'Farming on the Chalk Soils of Dorset', *JB&W*, IX, 1861, p 57.

¹¹ Wm Marshall, *The Review and Abstracts of the County Reports to the Board of Agriculture*, 1818, p 347; Bowie, loc cit, p 17.

¹² *British Husbandry*, III, 1840, p 15; J Wrightson, *Sheep Breeds and Management*, *Livestock Handbook No 1*, 1895, pp 54-55.

¹³ Jones, 1960, loc cit, p 5; Davis, op cit, pp 68, 110, 155-58; Harris, 1959, op cit, p 25.

¹⁴ Davis, op cit, p 207. Note the wether flocks described on a progressive Hampshire down estate in 1755-56 - Russell MSS, Hampshire Record Office (HRO) TD 159 R4/6039, 6063. Wm Humphrey, 'A West Country Down Ram . . .', *Farmer's Magazine*, ser 3, XXI, Feb 1862, p 99; E P Squarey, 'A short account of the Hampshire or West Country Down Sheep', *JB&W*, ser 3, I, pt 1, 1869, p 50.

¹⁵ Bowie, pp 20, 22 and PRO, IR 18 8949, 8984, 9142. Breeding flocks practising the Hampshire custom had come to characterize the Hampshire downs by the late eighteenth century; L H Ruegg, 'The Farming of Dorset', *JRASE*, XV, 1854, p 404; J Darby, 'The Breeds of Sheep . . . in the South and West of England', *JB&W*, ser 3, III, 1871, pp 70, 75-76, 77-78. Note also the evidence for a major increase in root crop production on the Hampshire chalklands between about 1850 and 1870 in Raine Morgan, 'The Root Crop in English Agriculture, 1650-1870', unpub PhD thesis, Univ of Reading, 1978, pp 136, 270.

the Hampshire and Wiltshire downs until the 1850s. Although there were an infinite number of 'variations and permutations' of this rotation, only one had a distinct root break, where it was placed between the two grain crops.¹⁶

There was an emphasis on grass, clover, and hay crops on the Wessex downlands. The crop returns of 1801 for three parishes on the Hampshire downs are unusual in providing information on grasses, and give some idea of the importance of short-term leys in the downland farming system. At Bentworth there were over 1600 acres of cereals, 100 acres of turnips, and about 600 acres of 'clovers, sainfoin and artificial grasses'; whilst at North Waltham there were 1500 arable acres of which 30 were occupied by peas, 100 by turnips/rape, 400 were in a 2-year clover ley, and two hundred acres in fallow. Similarly, at Martyr Worthy there were about 1600 acres with 526 acres of cereals and 80 acres of turnips, and the rest of the arable acreage was in grass, clover and sainfoin leys and fallows.¹⁷

The cultivation of sainfoin was important in most parts of the Wessex downlands. A sainfoin ley might be left down for the period of a rotation, and the land then returned to the normal rotation of the farm. This was generally five or six years, or even as much as ten years. Sometimes it was simply left until worn out. It was usually cut for hay early in the ley, and the aftermath was looked upon as invaluable for 'finishing' lambs for the autumn markets. If carefully managed, lightly pastured, and top dressed each February-March after the third year with ashes manure (potash), such a ley

might be maintained for a number of years, but under normal circumstances, without using fertilizers, the sainfoin plant began to die out after about four years. Grasses and weeds took over in the sainfoin ley that consequently was treated as pasture until it was necessary or convenient for the farmer to break it up. An old sainfoin ley was normally ended with paring and burning, which provided potash, and also a clean and pest-free seed bed for the subsequent crop. The sainfoin provided nitrogen, which continued to build up in the soil even when the ley had degenerated into pasture. It is not surprising that contemporaries considered it 'impossible for the farmer to proceed on a more economical plan for importing and retaining fertility' on his arable land.¹⁸ This may be contrasted with the situation on the northern wolds where, at the turn of the century, the crop was widely cultivated, but by the 1840s was not much grown. In 1848 George Legard made the point that, when winter provender was a matter of anxious consideration for the wold farmer, sainfoin hay had been important, but that once turnip husbandry became reliable it had lost its original value.¹⁹

The thousands of acres of watermeadows in the river valleys of the chalk uplands were also important for Wessex downland farming. They came into general use in Wiltshire during the first third of the seventeenth century, and were constructed after about 1650 in Hampshire, Dorset and

¹⁶ Russell MSS, HRO TD 159 R4/6039 f 19; HRO 18M64, box 22, Broome Farm Account Book, 1814-17, where rotations given for every field; A Young, *Six Weeks Tour Through the Southern Counties of England*, 1768, pp 168, 176; Vancouver, *op cit*, p 139; J Wilkinson, 'The Farming of Hampshire', *JRASE*, XXII, 1861, pp 291-2; R A Pelham, 'The Agricultural Revolution in Hampshire with Special Reference to the Acreage Returns of 1801', *Proc Hampshire Field Club*, XVIII, pt 2, 1953, p 146.

¹⁷ Michael Turner, *Home Office Acreage Returns (HO67) List & Analysis*, pt 1, Bedfordshire-Isle of Wight, 1801, vol 189, 1982, pp 73-92, 197-218.

¹⁸ E.g. PRO, IR 18 8912, Bramdean, Hants, 1839, where 'About one seventh of the arable lands [was] in sainfoin, and the rest cultivated in five field'; W Stevenson, *General View of the Agriculture of Dorset*, 1812, p 190; Reading Univ Lib (RUL), WIL, P 713, Farm account book of Aldbourne Farm, Wiltshire, 1836-40; Little, *loc cit*, pp 163-64, 169, 173; Caird, *op cit*, pp 33-34; J Wilson, *Our Farm Crops*, ii, 1860, pp 157-9; Wilkinson, *op cit*, pp 293-95; *A Cyclopaedia of Agriculture*, II, J G Morton, ed, pp 781-82; J Clarke, 'On the Advantages and Disadvantages of Breaking up Grass Land', *JRASE*, VII, 1846, p 510; PRO, IR 18 8933, Catherington, Hants, 1841 - 'where sainfoin is sown it is not ploughed up as long as it will produce a crop'.

¹⁹ Young, 1799, *op cit*, pp 58, 166-9, 422; Hull Univ Lib (HUL), DDSY 101/66, letters from George Britton to Sir Christopher Sykes, 3 March, 21 July, 18 and 25 August 1799, show the importance of the sainfoin hay crop on the home farm, Sledmere; Strickland, *op cit*, pp 145-47; Legard, *loc cit*, pp 118-19.

Berkshire. By the mid-eighteenth century they were ubiquitous, with little suitable land remaining on which they could be made.²⁰ Watermeadows remained important until well after 1850 for three reasons. First, the hay crop made in July provided downland flocks with much-needed winter feed – ‘if it be winter, they are served with watermeadow hay night and morning’. Moreover, this hay crop was more reliable than that made from ordinary dry meadows, where yields fell dramatically in a spring drought. Secondly, the ‘aftergrass’ or aftermath was also valuable, and could be fed off with wether lambs that were being finished for the autumn markets.²¹ Thirdly, and perhaps most importantly, watermeadows provided a grass crop about six weeks ahead of that obtainable from ordinary dry meadows. On the wolds, farmers grew, with varying success, increasing acreages of late turnips and swedes in an attempt to fill the ‘hungry gap’ in keep between the latter end of March and the beginning of May. However, in Wessex late root crops were to be found ‘only where water meadows were lacking’, and the latter provided a reliable early spring ‘bite’ just when it was needed for the new crop of lambs. The ‘couples’, pastured on the watermeadows during the day, and then walked to, and folded on, arable fallow land at night, were in turn used as dung carriers. Stocking was intensive, at about five hundred couples per acre per night, which consolidated the seedbed and provided nitrogen for the following crop, generally barley. Hence the pasture of the day was converted into fertilizer at night.²²

The idea that, ‘according to the quality of the soil, the situation and lay-out of the farm, and the personal opinion of the farmer’, there was a choice on the Wessex downlands between down pasture, watermeadows, and sainfoin, and that with a combination of any two of these sources of grazing and hay, it was ‘possible to dispense with the third’, is essentially correct.²³ However, there still tended to be shortages of winter feed on the downs, particularly in years when the hay crop from dry meadows was poor or failed, and then it was necessary to revert to the traditional practice of ‘agisting’ the chilver (ewe) lambs of flocks between November and April on nearby lowland pasture and vale.²⁴

II

There was a similar shift in emphasis from wether to breeding flocks on the northern wolds at this time. On the Yorkshire Wolds, George Britton, Sir Christopher Sykes’s steward at Sledmere, noted this in terms of a change in the proportion of the different kinds of sheep kept in local flocks. The proportion had been ‘about one-third each’ of ewes, hogs and wethers, the hogs being ewes and wether lambs up to the first shearing, and the wethers shearling and older wethers, but during 1798–9 farmers changed to selling shearling wethers, which ‘paid better’, sold off their older wethers, and bought a greater proportion of ewes to maintain stock numbers.²⁵

However, other developments on the northern wolds were substantially different. Essential to these was the Improved Lincoln/Leicester’s ability to mature rapidly. The wethers of the new breeds were ready

²⁰ Eric Kerridge, ‘The floating of the Wiltshire watermeadows’, *Wilt Arch & Nat Hist Mag*, LV, no 1966, 1953, 109–15; Marshall, 1818, *op cit*, pp 201, 375; Wilkinson, *loc cit*, p 254; G G S Bowie, ‘Watermeadows in Wessex: a re-evaluation for the period 1640–1850’, *Ag Hist Rev* 35, pt 2, 1987, pp 152–53.

²¹ Eric Kerridge, *The Agricultural Revolution*, 1967, p 259; *The Annual Hampshire Repository*, I, Winchester, 1799, p 72; J Wimpey, *Rural Improvements* . . . , 1775, p 107; Wilkinson, *loc cit*, pp 289–90.

²² Vancouver, *op cit*, pp 133, 176–7; Wm Smith, *Observations on the Utility, Form and Management of Watermeadows*, Norwich, 1806, pp 30–31; A Young, *Annals of Agriculture*, XXIII, 1795, pp 265–66.

²³ M C Naish, ‘The Agricultural Landscape of the Hampshire Chalklands, 1700–1840’, unpub MA thesis, Univ of London, 1960, pp 361–2. Sainfoin was grown generally on the Wessex downlands except for Dorset – this can probably be explained by the high proportion of permanent downland pasture on the latter downs – Kain, *op cit*, maps 267 and 8, p 576.

²⁴ *Brit Hus*, III, *op cit*, pp 12, 18.

²⁵ HUL, DDSY 101/66, *op cit*.

for the butcher at 'two shear', or about 27-months old, whereas those of the Old Wold breed and the old native longwools required between 39-months and 5 years.²⁶ Also, although turnip cultivation during this period was fairly rudimentary, and mainly dependent upon paring and burning 'maiden wold', old pasture and leys, it nonetheless offered a new source of winter feed that was sufficient to allow farmers to increase their stock of sheep on the wolds.²⁷ This helps to explain why, in about 1780, Lincolnshire wold farmers started to buy or rent lowland pasture, marsh or meadow, to the east of the wolds: by the end of the eighteenth century a system evolved in which the young wethers spent their first winter folded on turnips on the wolds, were grazed on the lowland pasture during spring and summer and then at Michaelmas, when about eighteen months old, sold to 'butchers, and other graziers, to carry on'.²⁸ The next refinement in flock management on the northern wolds was the provision of spring and summer feed on the arable fields, and a system incorporating this had been established on the Yorkshire wolds by 1812. Here the wether lambs of the Improved Leicesters were weaned in late July, put on pasture or aftermath, then fed on turnips during the autumn and winter, and finally put on arable seeds for the spring and summer. The shearling wethers were normally sold at Market Weighton Fair at the end of September, most of the buyers being 'jobbers' from the West Riding of Yorkshire who

drove them home, and fattened and killed them the next spring.²⁹

Whereas turnips came into general use as a field crop on the northern wolds in the late eighteenth century, they were less important on the Wessex downlands. Turnips are distinguished from rape in the 1801 returns from ten Wiltshire down parishes, the average percentage of turnips to the enumerated crops being 7.3 per cent, and on the Hampshire downs there are sixteen parishes, the average being 11 per cent. In comparison nine such parishes on the east Yorkshire wolds average 17.5 per cent, and the figures for the Lincolnshire wolds, though less easy to analyse, indicate an average of at least 20 per cent. In east Yorkshire the returns for the parish of North Newbold were claimed to be 'strictly accurate' at 21 per cent, and though Hutton Cranswick was much lower than the rest at 3 per cent, the actual crop was said to be 'very good'. A factor which helped this shift to turnip husbandry was that, in general, the loess or glacial drift overlays covering many parts of the northern wolds were superior in depth, workability and natural fertility to the thin 'hungry' soils of the Wessex chalk uplands. In practical farming terms this meant that there were many more acres suitable for growing roots on the northern wolds.³⁰

The main problem was that the northern wold version of the sheep and corn system did not, of itself, provide sufficient manure or plant nutrients to sustain the desired farm outputs, and chalk soils were often deficient in the phosphates needed for the cultivation of reliable, high-yielding root crops. This was reflected in the way some wold soils were cropped to exhaustion at the latter end of the French Wars, and prompted northern wold farmers to tackle the problem. They

²⁶ A Young, *Northern Tour*, II, 1770, p 79; Young, 1799, *op cit*, pp 310, 317; Grigg, *op cit*, p 57; Perkins, *op cit*, p 44.

²⁷ Perkins, *op cit*, p 33; Young, 1799, *op cit*, pp 115, 136-8, 184, 249, 259, 315, 329; T Stone, *A Review of the Agricultural Survey of Lincolnshire by Arthur Young, Esq.*, 1800, p 372.

²⁸ Lincolnshire Record Office (LRO), Dixon 4/2, Small account book of Thomas Dixon, 1769-98, p 45 - in November 1773 232 'hogs [were] put into winter quarters upon turnips'; 4/1 ff 103-04 - carr and marsh land rented for extra pasture in 1782 and 83; Grigg, *op cit*, pp 55, 79-80 - the coastal counties dead and livestock returns of 1798 show these changes on the 'heath' of South Lincolnshire. Thirsk, *op cit*, pp 150-151, 177 and Mingay, 1984, *loc cit*, p 105, provide an alternative hypothesis, suggesting rather an early eighteenth-century date for the general introduction of turnips as a field crop on the Lincolnshire Wolds.

²⁹ Strickland, *op cit*, pp 235-8.

³⁰ Turner, *op cit*, pt 2, vol 190, Jersey-Somerset, 1982, Lincolnshire-Lindsey Division, pp 84-119; *ibid*, pt 3, vol 195, Staffordshire - Yorkshire, 1983, pp 115-133; PRO, HO 67 24 ff 21, 239, 275; L Dudley Stamp, ed, *The Land of Britain, South-Western England*, IX, pt 89, 'Hampshire', 1940, p 357.

did this by using the 'artificial' fertilizer, bone manure.³¹ Indeed, bone manure may be said to have been the foundation of the startling growth of agricultural output on the northern wolds, a growth which was proceeding vigorously in the years 1815 to 1835.³² There was a staggering increase in the tonnage of bones imported into England, mainly through the port of Hull. Between 1823 and 1824 alone, there was an increase amounting to just under 300 per cent, which again doubled in 1825.³³ It is also clear that this development actually began during the Wars when several very intelligent farmers from Lincolnshire were successfully using bone manure on their farms. By 1815 their value had already been ascertained by a 'pretty extensive experience of their effects . . . on the wolds in Lincolnshire, and in the East and West Riding of Yorkshire'.³⁴

III

However, not only were ever-increasing tonnages of bone manure being purchased by northern wold farmers to promote the reliable growth of their turnip crops, but the bones themselves came to be used more efficiently as a fertilizer. During the later years of the French Wars, the recommended application rate was 60–70 bushels of crushed bones sown broadcast, but during the 1820s an application rate of 12–16 bushels per acre, ground into dust and drilled in at the same time as the turnip seed, became general on the northern wolds. Here a

combined drill was used where the seed and fertilizer were put into separate hoppers.³⁵ The realization that the finer the bones were crushed, and the closer the dust was placed to the seed, the more rapidly bones acted as a fertilizer, was critical. It meant that even the most remote fields from the farmyard could now be profitably manured, as one four-horse wagon load carried sufficient phosphate fertilizer to manure 7–8 acres of ground.³⁶ The northern wold system was successful because bone dust, turnips and sheep were 'all best suited for the same kind of soil'. Moreover, the value of bone manure was reckoned to depend on the turnip crop itself, the feeding on the ground by sheep, fully supporting the fertility of lightland soils during the course of crop rotations.³⁷

A leading progressive farmer on the north Lincolnshire wolds was Thomas John Dixon of Holton Hall. He bought the machinery necessary for this new system of farming in 1820–23, including a 'fixed' (stationary) bone mill, a rather better portable bone mill, and three drill machines by Hornsby of Grantham for sowing turnips. For the season of 1824 he bought over 2500 bushels of bones, had them ground into dust in his portable mill, and, during late June and early July, organized turnip drilling on about 190 acres at '12 bushels bones per acre'. His major wold neighbours were also evidently buying large quantities of bones annually as the portable bone mill, and its crew of 6–7 men, was hired to them for a

³¹ Clarke, 1851, *loc cit*, p 396; Pusey, *loc cit*, p 300.

³² Mingay, 1989, *op cit*, pp 278–81; F M L Thompson, 'The Second Agricultural Revolution, 1850–80', *Econ Hist Rev*, 2nd ser, XXI, 1968, 68; Grigg, *op cit*, pp 49, 148; *British Sessional Papers*, House of Commons (BSP), Agricultural Distress, 1837, V, Q 3545; RUL, LIN P 323/1, farm account book, Nocton Rise, Lincoln, 1826–46, where there were regular annual purchases of bone manure even on a fairly small stock farm.

³³ *British State Papers* (BSP), 1836, *op cit*, VIII, pt 1, appendix 3.

³⁴ *Supplement to Encyclopedia Britannica*, 1815, pp 147–8, Watson, 'On Bone Manure . . .', *Quarterly Journal of Agriculture* (QJA), 1, May 1828–Aug 1829, pp 40–2; for the origins of bone manure see Alan Harris, 'Bones for the Land', *Bulletin of the East Yorkshire Local History Society*, no 31, Spring 1985, pp 8–11.

³⁵ Strickland, *op cit*, p 211; Watson, *loc cit*, p 41; Anon., 'On Bone Manure', *QJA*, 2, Nov 1829–Feb 1831, p 108; *Brit Hus*, I, 1834, p 397.

³⁶ Legard, *loc cit*, pp 105, 110; Pusey, *loc cit*, p 300; BSP, 1836, *op cit*, QQ 5887–88; PRO, IR 18 5209, Riby, Lincs, 1838 – 'a great quantity of bone and other artificial manures are used, for tho' the produce is very abundant, the natural powers of the land are not great'.

³⁷ *Brit Hus*, III, *op cit*, pp 27–28; *Brit Hus*, I, *op cit*, pp 399–400; Watson, *loc cit*, p 40; H Stephens, 'On Feeding Sheep on Turnips', *QJA*, 3, Feb 1831–Sept 1832, p 390.

few days each between early June and mid-July.³⁸ There were similar changes on the Yorkshire wolds. In the late 1830s farming at Wharram le Street was said to be a 'fair average' for the area, having been much improved since the introduction of swedish turnips and bones in about 1820, and with 'one of those soils on which the efficacy of bones . . . [was] most visible'.³⁹

However, the majority of Wessex downland farmers did not purchase fertilizers in significant quantities during this period. In the mid-1830s Robert Hatch Stares, who farmed near Droxford in Hampshire, made the point that bone dust and artificial manures were only applied by neighbours 'who have a large capital employed', and Pusey remarked in the early 1840s that on no part of the Wessex downlands was there so heavy an outlay on fertilizers as on the northern wolds. This is confirmed in the tithe files where there are 18 references to bone manure in Lincolnshire; 3 in Hampshire; 1 in Berkshire; and none in Wiltshire or Dorset.⁴⁰ As may be expected with such different levels of inputs, yields per acre were higher on the northern wolds than on the Wessex downlands. In the 1840s, a very good crop of turnips on the Wessex downlands did not exceed 16 tons, and averaged about 12, whilst 18–23 tons were being achieved on the northern wolds.⁴¹ Similarly the wheat crop on the

better soils of the Wessex downlands averaged only about 20 bushels per acre throughout the period, whilst yields on the northern wolds had risen to between 24 and 28 bushels per acre by the 1840s.⁴² Hence it is clear that, during this period, the majority of Wessex downland farmers were prepared to forgo the opportunity of maximizing yields in order to minimize inputs. The determining financial aspect of this was that a northern wold farm 'farmed highly', with little permanent down pasture and crop rotations having at least twenty per cent of roots, required a capital outlay of fifty per cent more than one managed on the low-input Wessex downland system. Moreover, the high-input system required an additional revenue expenditure of about 11 per cent per annum of this capital outlay. This extra annual outlay was needed to buy the fertilizer and animal feed, and pay for the additional labour, required to sustain higher outputs.⁴³

IV

The wool clip had been more important than meat production in both areas until the introduction of new breeds of sheep in the late eighteenth century. On the Wessex downlands after about 1830 there was a shift in emphasis to meat production. A factor here was the better feed provided by field-folding systems; this increased shortwool fleece weight, but meant that the wool itself was coarser and poorer in quality than that grown on down pasture.⁴⁴ However wool production based on the Improved Lincoln/Improved Leicester remained an important part of the new system on the northern wolds. The good return on longwool for

³⁸ LRO, Dixon 6/6/2/3/3, Account with Seaman and Hornsby, 1820–23 – information confirmed in 6/6/2/3/1 and 6/6/2/11; 5/1/1, Day book for Holton, Nettleton and Thornton farms, 1824; PRO, IR 18 5023, Holton le Moor, 1838 – Mr Dixon 'has by great spirit, the expenditure of much capital and the unlimited use of bone manure increased the produce on lands which a few years ago were totally unproductive'. Hornsby of Grantham began making combine drills in 1815 – G E Fussell, *The Farmer's Tools . . . 1500–1900*, 1952, p 111.

³⁹ PRO, IR 18 11787.

⁴⁰ W Hutt, *The State and Prospects of British Agriculture*, 1837, pp 21–25; Pusey, *loc cit*, p 308; T Walkden, 'On the advantages of ploughing up downland', *JRASE*, IV, 1843, p 8 – on the Wessex downlands the manure applied to the swede crop consisted 'only of a few ashes, or at most one-quarter of bone dust per acre'; R J P Kain, *An atlas and index of the tithe files of mid-nineteenth century England and Wales*, 1986, pp 563, 583, 594 – insufficient data available for east Yorkshire.

⁴¹ P Pusey, 'On the Progress of Agricultural Knowledge during the Last Four Years', *JRASE*, III, 1842, pp 197–98; Clarke, 1851, *loc cit*, pp 331–33; Mingay, *op cit*, p 299.

⁴² Hutt, *op cit*, pp 21–25; BSP, 1836, *op cit*, QQ 5833, 5887–88; *ibid*, 1837, *op cit*, Q 3541; Legard, *loc cit*, p 117; Caird, *op cit*, pp 61–62, 189, 311–12; Grigg, *op cit*, pp 117, 162–3; Mingay, *op cit*, pp 139–40.

⁴³ J Darby, 'The Farming of Dorset', *JB&W*, ser 3, IV, 1872, pp 7–8; E P Squarey, 'The Farming of the Southern Counties', *JB&W*, XV, 1867, p 21; cf Mingay, *op cit*, pp 178–82, 609.

⁴⁴ Grigg, *op cit*, p 80; Bowie, 1987, i, *loc cit*, p 20; Mingay, *op cit*, p 111 – meat prices tended to be more stable than grain prices after about 1820.

the 'Yorkshire looms' was said to have been a 'considerable alleviation' for farmers during the post-Napoleonic War depression, the continued expansion of the woollen industry in west Yorkshire during the 1820s and 1830s created a demand for raw wool 'in excess of the home clip', and although all agricultural prices were low in these years, wool 'generally held up better' than the price of other crops.⁴⁵ Moreover, good quality longwool was versatile, being 'more or less applicable for each of the great variety of goods . . . made in the great woollen manufacturing districts'.⁴⁶ Yet even more important than the above was the weight of wool per sheep, as a ewe in good condition of either of the new breeds sheared at about 8–12 lb, which compared most favourably with the shortwool fleece of the Old Wolds breed, which weighed about 3 lb, or the fleeces of shortwool downland breeds in general at 3½–5 lb.⁴⁷ Though the price per pound of shortwool may have been higher than longwool, this was more than compensated for by the return on the extra weight of the longwool fleece. A northern wold farmer might achieve as much as double the return on his wool clip than a farmer with a shortwool flock of similar size.⁴⁸

V

The emphasis on manures and fertilizers produced on the farm in the Wessex downland system began to change from the mid-1840s, and during the 1850s and 1860s most of the remaining sheep walks were ploughed up, and crop rotations similar to

those on the northern wolds established on them.⁴⁹ This expressed not only the effect of tithe commutation on the cultivation of marginal land after about 1840, and a recovery from the agricultural depression of 1848–51, but also a shift to the general application of fertilizers on the downs. Phosphates used included both bone manure and superphosphate, the latter being a relatively cheaper, quicker-acting but less long-lasting fertilizer introduced in 1843, and oilcake was purchased in increasing quantities for animal feed. Together these inputs permitted the cultivation of reliable fodder crops in the quantities needed for High Farming with arable flocks on light-land soils.⁵⁰

This paper has defined the characteristics of a high-input system of farming which developed on the northern wolds, and a low-input one on the Wessex downlands. In so doing, Professor F M L Thompson's theory of a Second Agricultural Revolution during the period 1815–80 has been found to have been essentially correct in the two areas. It is important, however, to be aware of the extent to which a general shift to the regular purchase of, and dependence upon, artificial fertilizers varied in time from one area to another. In addition, certain doubts about aspects of E L Jones's analysis of chalkland farming in Hampshire have been raised, particularly his ideas that, during the early years of the nineteenth century, working flocks were largely superseded by field-folded arable ones, and roots became an essential and crucial part of crop rotations.

⁴⁵ 'The Agricultural State of the Kingdom in February, March and April 1816', *Board of Agriculture*, 1816, p 164; J M Bellamy, *The Trade and Shipping of Nineteenth-Century Hull*, EYLHS, no 27, 1971, p 19; Grigg, *op cit*, p 178; Perkins, *op cit*, p 46.

⁴⁶ J Wilson, 'On the Various Breeds of Sheep in Great Britain', *JRASE*, XVI, 1856, p 242.

⁴⁷ Young, 1770, *op cit*, p 3; Young, 1799, *op cit*, pp 310, 333, 356; Caird, *op cit*, p 190; Vancouver, *op cit*, p 367; Ruegg, *loc cit*, p 432.

⁴⁸ B R Mitchell and P Deane, *Abstract of British Historical Statistics*, Cambridge, 1962, pp 495–96. The Author's analysis is consistent with Mingay, 1989, *op cit*, pp 117–19 – particularly note comparative wool prices after c 1825 in fig 2.2.

⁴⁹ Little, *loc cit*, pp 163, 168, 180; Rowlandson, *loc cit*, p 432; Darby, *loc cit*, pp 2, 5, 7, 33–45.

⁵⁰ PRO, IR 18 9112, Rockbourne, Hants, 1839 – 'a considerable part [of the parish] is Down, which will probably be broken up in consequence of this commutation of tithes'; RUL, HAN, 9/1/1, Farm account book kept by John Twynam, 1845–7; Hants Rec Office (HRO) 5M5O/2262. Daly MSS, Normancourt Estate accounts, 1851, ff 32, 37; Caird, *op cit*, pp 81–3; Wilkinson, *loc cit*, p 286; J B Spearing, 'On the Agriculture of Berkshire', *JRASE*, ser 1, XXI, 1860, pp 16–17; J B Lawes, 'On Agricultural Chemistry', *JRASE*, VIII, pt 1, 1847, p 252; W C Spooner, 'On the most Economical and Profitable Method of Growing and Consuming Root Crops', *JB&W*, II, 1854, pp 9, 11–12; Darby, 1861, *loc cit*, pp 50–53, 64–65.

These ideas have recently been adopted and expanded to cover all of the Wessex downlands. Clearly this approach is more applicable to the northern wolds during this period, as working flocks remained very important on the Wessex downlands until well into the nineteenth century. Furthermore, in general, root crops were not grown in sufficient quantity to sustain field-folding systems until many years later when fertilizers came into general use on the Wessex downlands. Essentially, farming on the northern wolds and Wessex downlands developed at different rates in response to different pressures. On the Wolds, growing consumer demands for meat and wool encouraged substantial capital expenditure,

and led to an early expansion into High Farming. On the Wessex downlands, the ability of the majority of farmers to supply year-round feed from arable leys, water-meadows, downs and pasture, combined with the development of a new type of sheep which, whilst providing a faster turnover of lambs than hitherto, was still capable of working efficiently as a dung carrier, meant that there was less incentive for an early shift towards the use of artificial fertilizers.⁵¹

⁵¹ Thompson, *loc cit*, pp 62–5, 68; Jones, 1960, *loc cit*, pp 15–17; A K Copus, 'Changing Markets and the Development of Sheep Breeds in Southern England, 1750–1900', *Ag Hist Rev*, 37, 1989, 42, 46 and 'Changing Markets and the Response of Agriculture in South-West England, 1750–1900', unpub PhD thesis, UCW, Aberystwyth, 1986, pp 252, 307, 310, 318–19, 323.

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