

The latter-day history of the draught ox in England, 1770–1964*

by E. J. T. Collins

Abstract

Following a short-lived sporadic recovery in the Napoleonic Wars, draught oxen are assumed to have undergone a demographic collapse and, by the mid-nineteenth century to have been virtually extinct. This assumption is re-examined to suggest that, while nationally oxen were in retreat, parts of southern and eastern England, notably the chalk and limestone uplands, where horses had long been the rule, were experiencing a resurgence. The ‘old’ and ‘new’ traditions are contrasted to show fundamental differences in function, breeds, management, and environment. The paper also provides a summary account of the ultimate demise of the ox from the mid-nineteenth century to the disbandment of the last working team at Cirencester Park in 1964.

In 1930 four fifths of the world’s population were estimated to have been very largely dependant on animals for inputs of ‘foreign energy’. Although tractor numbers had more than doubled in the interim, forty years on, livestock still provided 90 per cent of all draught power used on farms worldwide.¹ England stands out as one of the first countries to have replaced horses by tractors, and at an earlier stage, oxen by horses, a long drawn-out process that began in medieval times and was still incomplete in the nineteenth century.

I

Professor John Langdon’s seminal study of animal traction on farms in the Middle Ages has no counterpart for the modern period, for which there exists only the broadest outline,

* This is an expanded version of the author’s paper, ‘The draught ox in England, 1750–1964’, presented at the annual conference of the British Agricultural History Society at Nottingham in 2008, and is part of a broader study of the more recent history of working animals in European Agriculture. I am grateful to the following for their help and advice: Fred Banks, Michael Bayley, Gavin Bowie, Liam Brunt, Gareth Beech, Michael Havinden, John L. Liebowitz, Susanna Wade Martins, Joe Morris, Francois Sigaut, Paul Starkey, John Walton and Martin Watts. Oxen and bullocks are herein defined as castrated male cattle aged four years and over. Up to one year old, they were termed ‘ox calves’, and from one to three years old, ‘steers’. W. L. Rham, *The dictionary of the farm*, rev. W. and H. Raynbird (1855), p. 250. M. Watts, *Working oxen* (1999) is the best and most easily accessible popular introduction to the topic. See also J. L. Liebowitz’s excellent survey covering Europe and North America: ‘The persistence of draft oxen in the West’, *Material Hist. Rev.* 36 (1992), pp. 29–37.

¹ A. J. Smith, ‘The role of draught animals in agricultural systems’, paper presented to the ‘Vegetables to Man Seminar’, Institute of Biology, 1979.

herewith summarized.² Already by the late sixteenth century, horses comprised more than half of the national draught herd, and were predominant down almost the entire eastern side of the country, and over a large part of the southern chalk-lands. When Young visited the North and Midlands in the late 1760s, the transition was in full swing or already complete with, as he put it, the use of oxen 'rather wearing out' even in the bovine strongholds of the south and west.³ The period 1770 to 1815 saw a slowing down, or in some districts a reversal of the long-term trend, due to a shortage of horses. Vigorous efforts were made to promote the reintroduction of oxen, with the aims of reducing the cost of field work and freeing large quantities of oats, hitherto fed to horses, for human consumption.⁴ Though widely publicized, notably in the Board of Agriculture reports, the revival is thought to have been sporadic and elitist, and to have had only a limited impact on the composition of the working herd and on regional distributions of oxen and horses. The end of the wars saw a speedy renewal of the downward trend, and by 1850 the virtual eclipse of draught cattle. A mere sprinkling of teams, owned mainly by gentlemen farmers and traditionalists, survived into the twentieth century. Long before then the working ox was an archaism, a quaint survival of a bygone age, scarcely referred to in farming textbooks, or indeed the standard agricultural histories. Moreover, the most authoritative contemporary account of the power forces of the farm, by J. C. Morton, published in 1868, makes no mention of them.⁵

This paper examines the latter-day history of draught oxen from the 1760s up to the disbandment of the last working team at Park Farm, Cirencester, in 1964. It suggests, contrary to the received wisdom, that while, nationally, the ox herd declined over the first half of the nineteenth century by at least three quarters, parts of southern and eastern England experienced an ox revival, mainly on the lighter soils where the use of oxen had long since ceased, and the old ox traditions were entirely forgotten. This should not to be confused with the earlier revival, which had lost impetus by 1815, but which overlapped it. This little-known episode in livestock history, and the co-existence of two ox traditions, the 'new' and the 'unbroken', will now be examined, beginning with a summary review of the regional distribution of oxen and horses at the close of the eighteenth century.

In the first edition of his *Political Arithmetik* (1774), Arthur Young estimated the number of working oxen in England at just over 200,000, or 17 per cent of a combined animal workforce of 1.2 millions. In 1790, William Marshall proposed a similar ratio, almost certainly plagiarized from Young's earlier figure. A sixth of 'the work of husbandry', he opined, was performed by

² J. Langdon, 'The economics of horses and oxen in medieval England', *AgHR* 30 (1982), pp. 31–40; id., *Horses, oxen and technological innovation: the use of draught animals in English farming from 1066 to 1500* (1986).

³ A. Young, *Six weeks tour of the Southern Counties* (1769), p. 291; id., *The farmer's tour through the east of England* (4 vols, 1771), *passim*; id., *A six week's tour through the north of England* (4 vols, 1771).

⁴ For further discussion, see J. Brown, 'Arable farming', in G. E. Mingay (ed.), *The agrarian history of England and Wales*, VI, 1750–1850 (1989), pp. 289–90; J. S. Creasey, *The draught ox* (1974); A. Fenton, 'Draught

oxen in Britain', *Narodopisny Vestnik Ceskoslovensky*, 3–4 (1968–9), pp. 17–49, repr. in Fenton, *The shape of the past* (2 vols, 1985–6), II, p. 2. R. Moore-Colyer, 'Cattle', in Mingay (ed.), *Agrarian history*, VI, pp. 335–48; R. Trow-Smith, *A history of British livestock husbandry to 1700* (1957), chs 3, 5, 6; id., *A history of British livestock husbandry, 1700–1900* (1959), chs 1, 2, 3, 5, 8; J. A. Perkins, *The ox, the horse and English farming* (Working paper in Economic History, Department of Economics, University of New South Wales, 1975).

⁵ J. C. Morton, *Handbook of farm labour* (new edn, 1868).

TABLE 1. Regional distribution of working oxen as a percentage of the total animal workforce in English agriculture, c.1780–1800.

	<i>Oxen as percentage of total animal workforce</i>	<i>Agricultural area (thousand acres)</i>	<i>Number of oxen</i>
North	5	5202	17,100
E. Midlands	1	3205	2100
East Anglia	0	3096	–
S. Midlands	1	1102	720
South and south-east	20–25	2480	33,200
South-west	50	822	92,300
West-central	30	53	20,800
Welsh Borders	30–35	1334	28,700
West Midlands	3	1440	2800
North Midlands	3	1005	2200
England	12–15	22,507	c.200,000

Note: The following formula was used to determine the numbers of oxen in each region: (region as per cent of national agricultural land area) x (oxen as per cent of total workforce in each region), weighted by size of agricultural area (x 7.4). This assumes a national ox herd of c.200,000 (see n. 7). The size of agricultural regions is taken from *Annual agricultural statistics*, 1871.

Sources: principally the Board of Agriculture county reports, *Annals of agriculture*, and the following surveys by William Marshall, *The rural economy of Gloucestershire* (1789), *the Midland counties* (1790, 1796), *West of England* (1796, 1805), *Yorkshire* (1788, 1796) and those by Arthur Young, *The farmer's tour of the east of England* (1771), *A six week's tour of the southern counties of England* (1769) and *A six week's tour through the north of England* (1771).

oxen.⁶ In a seminal study of national energy consumption, Paul Warde put the population at ten per cent, and this author at 12–15 per cent (see Table 1).⁷ In contrast to other European countries, in England, draught oxen were never separately distinguished in the government statistics, nor in the 1854 Poor Law Agricultural Returns. The Tithe Files, even for parishes which are known from other sources to have had numerous working oxen, normally make no reference to them.⁸ The Civil Defence Returns for Sussex, compiled by churchwardens and overseers of the poor for each parish in the years 1798–1803, is the only source in which draught

⁶ A. Young, *Political arithmetik* (1774); W. Marshall, *The rural economy of the Midland counties* (1790), p. 469. And other estimates, M. Turner, 'Counting sheep: waking up to new livestock numbers in England in 1800', *AgHR* 46 (1998), p. 151; P. Warde, *Energy consumption in England and Wales, 1560–2000* (2007), pp. 40–5. Wrigley assumes that the agricultural draught herd c.1800, consisted almost entirely of horses, whereas 10–15 per cent was comprised of oxen, each one equivalent to 0.6 of a horse. This has implications for Wrigley's estimates of draught power per unit area and per worker, and for differences between French and English agricultural

productivity. E. A. Wrigley, 'Energy availability and agricultural productivity', in B. M. S. Campbell and M. Overton (eds), *Land, labour and livestock: historical studies in European agricultural productivity* (1991), pp. 332–9; id., *Continuity and change: the character of the Industrial Revolution in England* (1988), pp. 41–2.

⁷ Warde, *Energy consumption*, pp. 42–3.

⁸ R. J. P. Kain, *Atlas of the Tithe Files of England and Wales* (1986). Kain's subject index contains only 44 references to 'oxen', of which only 24 were working oxen – 13 in Somerset and just two in Sussex, where many thousands were then at work.

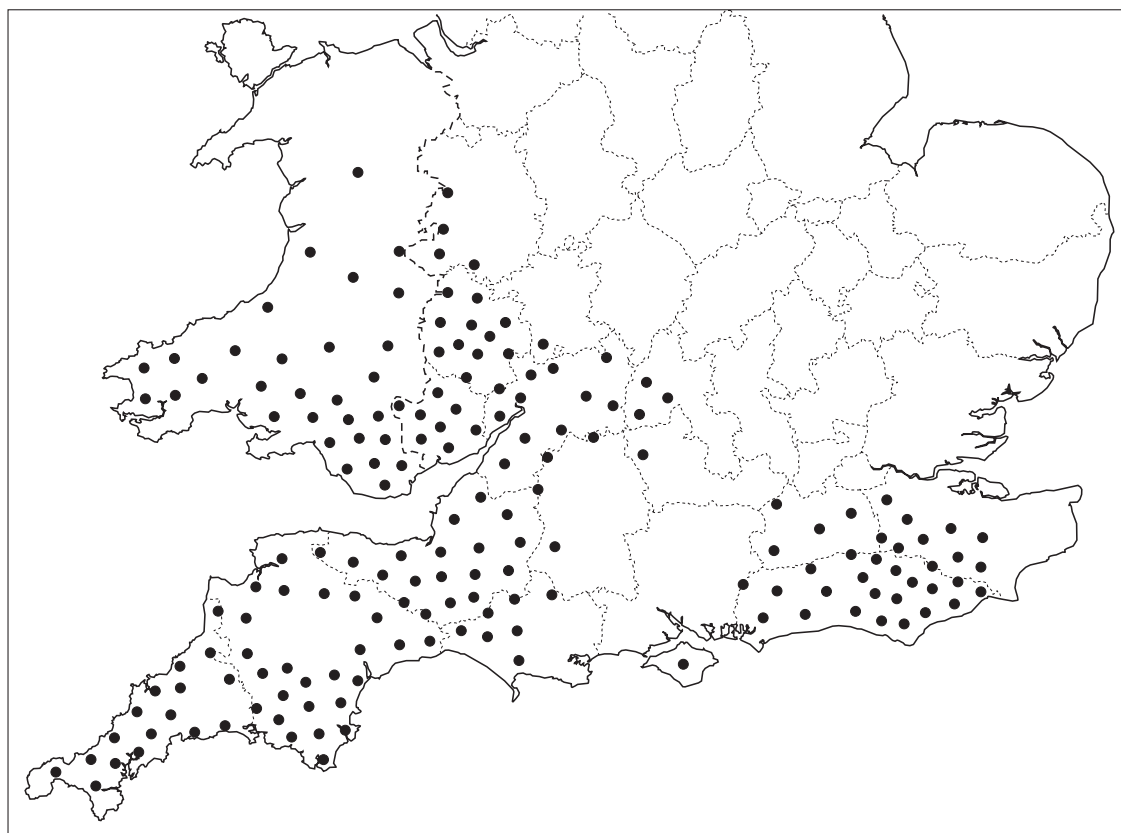


FIGURE 1. Distribution of draught oxen in England and Wales, 1780–1800.

and fattening oxen are differentiated.⁹ This might be taken to imply, but wrongly, that in the early nineteenth century working cattle were of negligible importance in England, in contrast to France where they were returned in every agricultural census up to the 1960s.

At the turn of the nineteenth century, oxen were used mainly in the south and west, with the highest densities at the extremities – Kent and Sussex, Devon and Cornwall, and Herefordshire and Monmouth – as shown in Table 1 and Figure 1. Even here, horses had made substantial inroads. In Kent, Sussex, and Devon, oxen were still in the majority and, in purely agricultural parishes, often comprised 70 per cent or more of the draught workforce. Overall, as much as 90 per cent of the working herd was concentrated in one third of England, south of a line from Kent to Shropshire. However, the overwhelming majority of all farm work was performed by horses, while relatively few farms were now worked by oxen alone. Mixed teams, led by horses, were common in the south-west. Cows and heifers were employed only very occasionally for draught, in contrast to many parts of mainland Europe where the majority of cattle irrespective of gender spent time in the yoke. The precise division of labour varied with

⁹ East Sussex RO, 4CG/3/EW2. The returns form the basis of G. H. Kenyon's important but undervalued article, 'The civil defense and livestock returns for Sussex in 1801', *Sussex Archaeological Coll.* 89 (1959), pp. 57–84.

the size of farm, type of farming, soil and terrain, and custom. Oxen were employed mainly for ploughing, and tasks requiring a long, dead-weight pull. Most of the other work together with the carting, particularly road-work, and jobs depending on speed and agility, such as harrowing, were performed by horses. In some counties – Devon, Hereford, and Sussex for example – oxen were used for haulage, and in parts of the East Riding and on the Lincolnshire Wolds almost exclusively so, the field work being the preserve of the horses.

II

It is generally held that the period after the Napoleonic Wars saw the renewed decline and virtual disappearance of the draught ox in England, even in districts where as recently as 1800 oxen had outnumbered horses. A close reading of the evidence suggests though that oxen were still in general use over quite large areas of southern and western England up to the 1840s, and exceptionally the 1860s. The average conceals a complex situation, with marked variations in the composition of working herds between regions and farming systems. Three broad regional demographic trends can be distinguished: regions where oxen underwent a rapid or terminal decline; those where the downturn was more gradual with substantial numbers still surviving in 1840; and thirdly, horse-using districts where oxen were re-introduced after a long period, sometimes centuries, of disuse. The regional distribution of working oxen c.1835 is shown in Figure 2.

The decline was most precipitous in the West Country and Welsh borderlands where as recently as 1800 oxen and horses had been roughly equal, or oxen even in the majority. Described as ‘the farmer’s favourite hobby horse’, in Herefordshire in 1805, oxen did nearly half the ploughing, half the harvesting, and a large part of the carting.¹⁰ Yet, in the mid-1830s, they were reliably reported to be ‘no longer much used for husbandry’, and in 1865 as rare, ‘the tread of the ox having given way to the more rapid step of the horse’.¹¹ In South Wales, oxen had mostly vanished from the mountain districts by 1830, and at mid-century also from Pembrokeshire, a renowned ox-breeding county, and the historic source of draught cattle used in south Wales. By this late stage, oxen were worked regularly only in the Vale of Glamorgan; in the mining districts, mixed teams of horses and oxen were extensively used for hauling coal. A measure of their diminishing importance was the decision by the Glamorgan Agricultural Association in 1832 to stop the award of prizes for ploughing with oxen.¹² In Cornwall likewise, oxen were casualties of the post-war equine surge. Where, in 1815, they were ‘everywhere to be met with’ and, it was insisted, ‘no other county where they were so much esteemed’, twenty years on they were no longer generally seen even in ploughing, and rarely on the roads.¹³ One

¹⁰ J. Duncomb, *General view of the agriculture of Hereford* (1805), p. 116; J. Clark, *General view of the agriculture of Hereford* (1794), p. 79.

¹¹ W. Youatt, *Cattle* (c.1834), p. 31; J. Duckham, ‘On the farming of Herefordshire’, *J. Bath and West of England Agricultural Soc.*, 13 (1865), pp. 52–3.

¹² Youatt, *Cattle*, pp. 52, 56–64; G. Nash, ‘The historical farm buildings of Pembrokeshire’, *J. Historical Farm*

Buildings Group 3 (1989), p. 139; R. J. Colyer, *Country Life*, 4 Oct. 1973, pp. 991–2; C. S. Read, ‘Farming of South Wales’, *JRASE*, 10 (1849), p. 139.

¹³ G. B. Worgan, *General view of the agriculture of Cornwall* (1811), pp. 146–7; Youatt, *Cattle*, p. 26; W. K. Karkeek, ‘On the farming of Cornwall’, *JRASE* 6 (1845–6), p. 147.

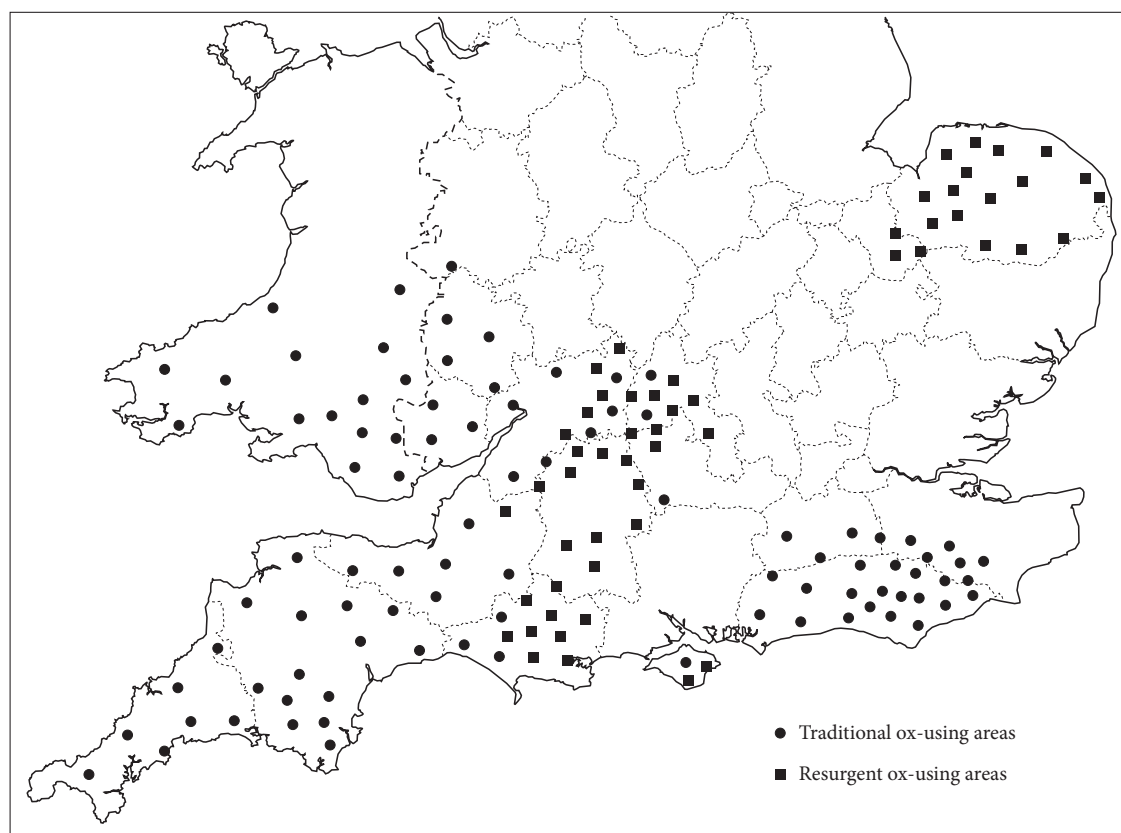


FIGURE 2. Distribution of draught oxen in England and Wales, c.1840.

dissident voice, a distinguished Cornish historian, contends that oxen were general in the county in the 1850s, and slowed down the adoption there of the reaping machine.¹⁴ The first quarter of the nineteenth century saw oxen largely given up on the English clay lands. By 1840, they had disappeared from the Vales of Berkeley and Gloucester, the north Wiltshire dairying districts, the north Hampshire Woodlands, the Surrey Weald, and north-west Kent. Only on the Weald proper were they still a regular feature of heavy land husbandry.

The equine advance was slowed by spirited rearguard actions and phased withdrawals. In Devon, apart from on the hard flinty soils on the eastern and southern borders, and the rearing district around Barnstaple, oxen were still the rule in the 1830s, and though by then in a minority, still quite large numbers were in place in 1850, both there and in parts of Somerset, such as the Vale of Taunton.¹⁵ In Monmouth and Glamorgan, oxen still performed

¹⁴ J. Rowe, *Cornwall in the age of the Industrial Revolution* (1953), pp. 253–4; Karkeek, *Farming of Cornwall*, p. 457.

¹⁵ Youatt, *Cattle*, p. 18 and *passim*; S. Kidner, 'Devon

cattle', *JRASE* 73 (1912), p. 49; J. Bettey, *Rural life in Wessex* (1987), p. 36; T. Dyke-Acland and W. Sturge, 'The farming of Somersetshire', *JRASE* 11 (1851), p. 155.

a 'great proportion' of Vale husbandry in the 1830s.¹⁶ In 1840, on the Weald, a famous bastion of ox husbandry, they still performed a large part, possibly the majority of the work in 1840, the typical 150–200 acre farm then possessing between 10 and 12 oxen for ploughing and road haulage.¹⁷ On the South Downs, horses were now dominant in the western section towards Hampshire, but in the east and centre oxen were the rule on large farms with extensive hill pastures, such as around Brighton, where, in 1850, advancing up the hill towards him, James Caird was confronted by three teams each of six heavy bullocks, drawing traditional wooden ploughs, a practice he said, which 'for waste of opportunity, of power, and of time, could probably not be matched in any county in the United Kingdom'.¹⁸ In the North and Midlands, oxen were now of little or no importance, with the minor exception of here and there in the Yorkshire Dales, where they continued in use, mainly for carting, up to the 1860s, and on one estate, at Helmsley, after 1900.¹⁹

The foregoing discussion calls into question some of the assumptions about the rate and timing of the decline. This was slower and more attenuated than is generally assumed, while there is clear evidence of a revival centring on three regions – the Cotswolds, the southern chalklands, and north and west Norfolk – each of which will be examined in turn.

Horses predominated in parts of Oxfordshire as early as the sixteenth century, and by the end of the eighteenth century were in effective control throughout the county, with oxen largely restricted to gentlemen's farms.²⁰ Journeying westwards across the county in 1769, Arthur Young encountered his first ox near Stow-on-the Wold, thence in increasing numbers towards Gloucester.²¹ Though heavily outnumbered in the vales, oxen were met with more frequently on the Cotswolds, where a revival may have been under way as early as 1789, when Marshall reported them to be gaining ground in numbers and esteem.²² In 1809, in contrast to his earlier visit, Young noted approvingly, 'the increasing attention paid to oxen as beasts of labour' on the Oxfordshire Cotswolds: around Burford, he claimed, every farmer now had them, where ten years before only one was kept.²³ Here as throughout the entire west-central region, the draught economy was in a state of flux, with oxen becoming more popular in some areas, while being discarded in others.

Thus engendered, the Cotswold Revival rapidly gathered pace. In 1826, Cobbett saw oxen doing much of the ploughing and other work on the 'Hills', encountering on the road between Witney and Fairford, some of 'the finest teams I ever saw'.²⁴ The strength of the Oxfordshire

¹⁶ Youatt, *Cattle*, pp. 52, 64, 86; Nash, 'Historical farm buildings', Colyer, *Country Life*, 4 Oct. 1973, pp. 991–2.

¹⁷ Youatt, *Cattle*, pp. 39–42, 46; M. Robinson, *A South Down farm in the sixties* (1947 impr.), pp. 5–7; G. Buckland, 'On the farming of Kent', *JRASE*, 6 (1845), p. 293. And still in use in Sussex in the 1880s: R. Jefferies, *Nature near London* (1893), pp. 226–30.

¹⁸ James Caird, *English agriculture in 1850–51* (1852, repr. 1967), p. 128.

¹⁹ Watts, *Working oxen*, pp. 14, 31.

²⁰ E. Kerridge, *The agricultural revolution* (1967), pp. 59, 64, 68; M. A. Havinden, *Household and farm inventories in Oxfordshire, 1550–1590* (1965), p. 38; id.,

'The rural economy of Oxfordshire, 1580–1730' (B.Litt thesis, University of Oxford, 1961), p. 68 and *passim*. Information kindly supplied by author. R. Davis, *General view of the agriculture of Oxfordshire* (1794), p. 293.

²¹ Young, *Six weeks tour of the Southern Counties*, pp. 114–35.

²² W. Marshall, *The rural economy of Gloucestershire* (1789, repr. 2005), pp. 173–4.

²³ A. Young, *General view of the agriculture of Oxfordshire* (1809), pp. 291–3, 295–6.

²⁴ W. Cobbett, *Rural Rides* (Everyman edn, 2 vols, 1912), II, p. 131.

Revival is confirmed by Dr Walton's helpful analysis of working cattle mentioned in farm sale notices in the period c.1820–1870. Between 1826 and 1837, fat or working oxen featured in 71 sales, working cows in two, and a draught bull in one. Clearly, in the 1820s, oxen were widespread, and no rarity even on the claylands. From the 1830s, Herefords replaced Devons as the standard breed, while from the 1850s Shorthorns too were sometimes put into harness. As their numbers gradually declined, oxen became increasingly concentrated in western districts, on the stonebrash. In some parts of the county, the draught ox remained 'in rude health' up to at least the 1870s.²⁵ In the later 1830s in Gloucestershire, the Assistant Tithe Commissioners reported 30 oxen in Newington Bagpath and Minchinhampton, and 20 at Rodburgh.²⁶ Although the revival had by then probably peaked, many oxen of both traditions were still working on the Gloucestershire Cotswolds at mid-century.²⁷ Inexplicably, Caird made no mention of them when he visited the region in early 1850, possibly because oxen were not normally worked at that time of year, and because January was a hiatus between the end-of-year sales of fat or retired oxen, and the arrival of the new intake in February. In their relative youth, draught oxen looked little different from other cattle. Yet four years later, we are informed by C. S. Read, a highly dependable source, with a good knowledge of the county, that most medium-sized farms on the stone-brash kept two teams.²⁸ Further north, in Worcestershire, a few oxen were still working on Breedon and on the Malvern Hills into the 1870s.²⁹

Farm sale notices provide a measure of the popularity of draught cattle in Oxfordshire between 1800 and 1880. Much the highest concentrations were in the Cotswold district, although no part of the county was entirely without them. While featuring in just 4.5 per cent of sales, disposals of oxen and ox harness fluctuated sharply from year to year, from more than 10 per cent in 1835 and 1856–9, to none at all in some years. Table 2 shows the highest turnovers in the 1850s, and the lowest, less than 3 per cent, in the 1840s and 1860s, reflecting perhaps a slowing of cattle movements due to cattle plague. This evidence suggests that though now in decline oxen were still widely used in parts of Oxfordshire during the 1870s.³⁰

The revival appears to have begun later on the chalk than on the limestone uplands. In Dorset, in 1812, oxen were estimated to number 2250, about an eighth of the combined workforce. They were mainly found on the heavier land to the north and west, with very few remaining on the Downs, having been rejected as too slow, and no more than three or four teams were to be found on the Isle of Purbeck.³¹ By the early 1830s oxen had made a spectacular come-back much to Youatt's surprise. While the draught ox had been declining for many years, he said, of late and 'to a quite extraordinary degree', it had revived in some districts, while continuing to contract in others.³² In 1854, there were reported in the chalk district to be 'fully as many

²⁵ I am much indebted to Dr J. R. Walton of Aberystwyth University, for this and other original information based on his research into Oxfordshire farm sale notices.

²⁶ TNA, IR 18/2810, 2803.

²⁷ J. Bravender, 'Farming of Gloucestershire', *JRASE* 11 (1850), pp. 142, 163–4.

²⁸ C. S. Read, 'On the farming of Oxfordshire', *JRASE* 15 (1854), pp. 222, 239.

²⁹ W. MacDonald, 'On the relative profits to the farmer from horses, cattle and sheep ...', *JRASE*, 2nd ser., 12 (1876), p. 30.

³⁰ From original data kindly supplied by Dr J. R. Walton, Aberystwyth University.

³¹ J. Claridge, *General view of the agriculture of Dorset* (1793), p. 12; W. Stevenson, *General view of the agriculture of Dorset* (1812), pp. 378–80.

³² Youatt, *Cattle*, p. 127.

TABLE 2. Farm sales with working cattle or ox harnesses as a percentage of all sales detailing draught animals in Oxfordshire, 1820–80.

	<i>Farm sales detailing draught animals</i>	<i>Farm sales with working cattle</i>	<i>Working cattle as % of all draught animals</i>
1820–9	380	17	4.5
1830–9	428	26	6.1
1840–9	393	11	2.8
1850–9	424	27	6.4
1860–9	390	11	2.8
1870–9	429	18	4.2
Totals	2444	110	4.5

Source: Farm sale notices, *Jackson's Oxford Journal* and *Reading Mercury*, as per original data supplied by Dr J. R. Walton, Aberystwyth University.

again as there were twenty years earlier', implying a continuing increase over the 1840s, where in other revivalist districts their numbers had by then levelled off or were in decline.³³ In the 1930s, in the down parish of Corfe Cullen, old men still talked of the days when oxen were used extensively for ploughing and carting.³⁴

Elsewhere on the southern chalklands, the revival was on a more modest scale. On his southern tour, Arthur Young encountered barely any oxen on Salisbury Plain.³⁵ By the end of the eighteenth century, most of those remaining had been driven off the Downs by sheep, but were persevered with by a few progressive farmers.³⁶ Yet, in the 1840s, oxen were widely used for ploughing, with most farms possessing one or two teams.³⁷ In the Vale of Pewsey, in 1842, the celebrated agriculturist and politician Albert Pell had, as a pupil, learnt the management of oxen, which he subsequently introduced onto his own Leicestershire farm.³⁸ Wiltshire affords well-authenticated examples of late usage, in the form of contemporary photographs of working teams at, for example, Codford, Idstone, Bishopstone, Bratton and Albourne, all taken between 1900 and 1919.³⁹ In the 1850s, a few teams could be seen on the Berkshire Downs above Lambourne. As late as 1910–15 they were still used on the chalk overlooking the Vale of the White Horse. 'It is pleasing', wrote Alfred Williams, 'to meet with oxen (yoked and in pairs) at the plough and harrow about the farm, or attached to the cart and wagon'.⁴⁰

³³ L. H. Rugg, 'On the farming of Dorset', *JRASE* 15 (1854), pp. 406, 412.

³⁴ M. R. Dacombe (ed.), *Dorset: up along down along* (1951), p. 33.

³⁵ Young, *Six weeks tour of the southern counties*, pp. 189–91; Bettey, *Wessex*, pp. 33, 36.

³⁶ T. Davis, *General view of the agriculture of Wiltshire* (1794), pp. 73–4.

³⁷ Edward Little, 'Farming of Wiltshire', *JRASE* 5 (1844), p. 170; Caird, *English agriculture*, pp. 83–4. H. H. Dixon noted in south Wiltshire the practice of ploughing with

Herefords for a year or two before passing them on to the Buckinghamshire graziers. 'History of the rise and progress of Hereford cattle', *JRASE* 29 (1868), p. 285.

³⁸ J. Mackay, *Albert Pell* (1908), p. 174.

³⁹ Photographs: e.g. Museum of English Rural Life, University of Reading, Negative nos 35/2324, 6773. See also Bettey, *Wessex*, p. 130; I. Gandy, *The heart of a village ... Aldbourne* (sec. edn, 1991), pp. 59–60.

⁴⁰ Caird, *English agriculture*, p. 108; J. B. Spearing, 'Farming of Berkshire', *JRASE* 21 (1860), p. 36; A. Williams, *Villages of the White Horse* (1918), pp. 69–73.

Hampshire, a predominantly chalk county, appears untouched by the Revival. Young claimed to have seen scarcely a single ox in the county, not even at Crux Easton where, in the early years of the eighteenth century, oxen had been employed on a regular basis by Edward Lisle of literary fame; nor on the Russell estates at West Stratton and Micheldever, which in 1756 had purchased 32 working oxen direct from Devon.⁴¹ In contrast to the mainland, Devon oxen drawing traditional high-gallows ploughs were a common sight on the chalk downs in the south of the Isle of Wight.⁴² One farmer, near Ashley, the possessor of a steam plough, kept eight oxen, mainly for rough work, whereas Prince Albert on a heavy clay farm at Barton on the other side of the island, used only horses.⁴³

Intrinsically the most interesting of the revivals and the most puzzling, was that of Norfolk. This is partly on account of its remoteness, a hundred miles or more from traditional ox country, and partly its hallowed position in the historiography of farm traction, being reputedly the first county where oxen were replaced by horses.⁴⁴ As early as the fifteenth century, horses comprised about 70 per cent of the animal work force on demesne farms, and an even larger proportion on peasant farms. By the 1630s oxen had been all but eradicated, while, at the end of the eighteenth century, William Marshall, who knew the county well having worked for several years as agent on an estate near Norwich, confidently proclaimed: 'Horses are the only beasts of labour made use of in Norfolk husbandry: there is perhaps not one OX in the county'.⁴⁵ The historian of the agricultural revolution in Norfolk states that the idea of oxen supplanting horses as urged by the agricultural reformers was never popular in the county.⁴⁶

Coke, no less, is credited as having been probably the first to re-introduce draught oxen (or 'bullocks', as they were generally termed in East Anglia) into the county, initially for carting, following a gift of thirty Devon cattle from the Duke of Bedford, but was forced to give them up owing to problems with shoeing and the prejudice of his workmen who were used only to horses.⁴⁷ The use of oxen was extended to field work soon after 1800, whence they quickly gained favour with progressive landowners and large farmers, to become by 1830 a familiar feature on large sheep-corn farms managed on the Norfolk system. When, in the early 1840s, Almack, the Royal Agricultural Society's prize essayist, visited the county for the first time, he was surprised to find few instances of where the use of oxen for ploughing had been given up: rather, most large farms possessed two, three, or even four teams, in addition to horses.⁴⁸ Whilst scathing of the traditional system of ox management in Sussex, Caird was highly approving of the Norfolk

⁴¹ A. Young, *The farmer's tour through the east of England* (4 vols, 1771), III, p. 197; id., *Six weeks tour of the southern counties*, pp. 209–10; Hampshire RO, 49 M89/R4/6063. I am grateful to Dr Gavin Bowie for this reference.

⁴² J. Wilkinson, 'The farming of Hampshire', *JRASE* 22 (1861), pp. 355, 367.

⁴³ Ibid., pp. 363–4.

⁴⁴ Langdon, *Horses, oxen*, p. 88.

⁴⁵ M. Overton, *Agricultural revolution in England* (1996), p. 126; W. Marshall, *The rural economy of Norfolk* (2 vols, sec. edn, 1795), p. 42 (Marshall's own emphasis).

⁴⁶ N. Riches, *The Agricultural Revolution in Norfolk* (sec. edn, 1967), pp. 107–8.

⁴⁷ The origins and early stages of the Norfolk revival are unclear. But see Young, *Norfolk*, pp. 446, 479–82; A. W. M. Shirley, *Coke of Norfolk and his friends* (new edn., 1912), pp. 162–4; Trow-Smith, *British livestock husbandry, 1700–1900*, p. 98; S. Wade Martins, *A great estate at work* (1980), *passim*; R. A. C. Parker, *Coke of Norfolk* (1975), pp. 122–3, inexplicably makes no mention of working oxen on the estate home farms in the 1820s.

⁴⁸ B. Almack, 'On the farming of Norfolk', *JRASE* 5 (1844), p. 330.

practice.⁴⁹ Though their popularity was then beginning to wane, 'bullock teams' remained a common sight in many parts of the county up to at least the late 1850s.

The ox economy of Norfolk is comparatively well documented in the farming literature,⁵⁰ and more specifically in a farming survey of the county conducted in 1843 by Richard Bacon, a Norwich newspaper proprietor.⁵¹ More than 100 leading agriculturists – admittedly mostly large farmers and Whig landowners – were sent a questionnaire of some 145 questions relating to current farming practice, some of which asked about the use of working cattle – their numbers, breeds, utilization, management, feeding, and opinions as to their usefulness. The results of this enquiry are incorporated into the following analysis.

III

By the early nineteenth century the mechanical superiority of the horse over the ox was universally acknowledged, and begrudgingly even by ox enthusiasts. The horse was a specialist worker, faster, more powerful, and more versatile. Though more economical than horses, oxen did less work, and were valued increasingly or even principally for their meat. Technically oxen were an anachronism, and their re-introduction might therefore seem counter-intuitive. The key to the paradox lay in the differences between the 'old' and 'new' ox economies, and the co-existence of two traditions, the 'unbroken', dating from medieval times, and still ongoing in ancient strongholds such as Devon and Sussex; and the 'revivalist', in those districts where oxen were reintroduced after a long period of horse domination. The new role of the draught ox in the nineteenth century, and the distinguishing characteristics of the new ox economy, will now be examined.

The new homelands of the ox were the undulating terrain and light shallow soils of the chalk and limestone uplands of southern and west-central England, and the calcareous sands, gravely loams, and lighter boulder clays of north and west Norfolk. A first point of difference was that in the medieval and early modern periods oxen were deployed mainly on the heavier soils, on account, it was claimed, of their steadier and deeper draught, and horses mainly on the lighter soils, where their greater speed and agility was best utilized.⁵²

According to Bacon's survey, choice of draught animal was closely correlated with soil type. Some 16 of the 29 current and former ox-using farms are described as light or predominantly

⁴⁹ Caird, *English agriculture*, pp. 166–8.

⁵⁰ See the following for descriptions of the Norfolk practice: Almack, *Norfolk*; R. N. Bacon, *Report on the agriculture of Norfolk* (1844); C. S. Read, 'Recent improvements in Norfolk farming', *JRASE* 29 (1858), esp. pp. 185–8; H. W. Keary, 'On the management of cattle', *JRASE* 9 (1848) esp. pp. 435–8. Keary was chief steward on the Holkham estate, and C. S. Read probably the most dependable source for mid-nineteenth century Norfolk farming.

⁵¹ The returns and correspondence are deposited at Norfolk and Norwich Record Office, Ms 4363. C. S. Read, 'Recent improvements', describes the respondents as

'the best agriculturists Norfolk can produce'. To this extent, they are unrepresentative. The responses are of very variable quality ranging from virtual treatises to rough notes with many questions left unanswered. Barely half of the respondents employing oxen give their exact numbers, although these could vary from year to year, from two to three teams, to none at all.

⁵² Pre-1750, oxen were mostly used on the heavier soils. Langdon, *Horses, oxen*, pp. 255–6; Bettey, *Wessex*, p. 33; Trow-Smith, *British livestock husbandry to 1700*, pp. 76, 93; P. R. Edwards, 'The horse trade in Tudor and Stuart England', in F. M. L. Thompson (ed.), *Horses in European economic history* (1983), p. 120.

TABLE 3. Characteristics of ox- and horse-using farms in Norfolk: soil type, farm size, cropping system, and access to substantial areas of rough grazing, c.1843 (74 farms).

<i>Farm Category:</i>	<i>Farms using oxen and horses</i>	<i>Farms where oxen were used formerly or occasionally</i>	<i>Farms using only horses</i>
Number of farms:	22	7	35
Soil type:			
Light soils	13	3	4
Mixed soils	8	3	23
Heavy soils	1	1	8
Size of farm (acres):			
<150	–	–	1
150–299	–	1	7
300–499	2	3	11
500–749	8	1	8
750–999	4	1	4
1000–1499	4	–	3
>1500	4	1	1
Aggregate acreage:	21,440	4514	18,500
Average farm size (acres):	974.5	644.9	528.6
Cropping system:			
4-course	14	7	32
4- or 5-course	3	–	1
5-course	2	–	–
6-course	–	–	1
Not known	3	–	1
Type of grazing:			
Marsh	5	2	7
Meadow	–	–	2
Warren and heath	1	–	–
Common	1	–	–
Sheep-walk	3	2	3
Poor grass	2	1	1
Park	–	–	1
<25% in pasture	7	2	9
Not known	2	–	12

Source: Bacon Survey, Norfolk and Norwich Record Office MS 4363.

so, eleven as mixed, and two as heavy; in contrast to horse-using farms where 23 of the 35 were described as mixed, eight as heavy and just four as light (Table 3). Although best adapted to the easy-working soils of the Norfolk Goodsands, in the west and north of the county, oxen were also employed on the lighter soils of the east coast around Yarmouth and in the Waveney valley on the Suffolk borders. In Oxfordshire, they enjoyed a wide distribution, on heavier land as well as the limestone soils.⁵³ On hill farms oxen were allocated mainly to the gentler slopes and firmer ground, and horses to the steeper slopes and flinty soils – where the narrower ox's hooves were liable to damage – and loose or slippery ground on which oxen had difficulty in keeping their footing.

Oxen became a feature in districts where farming landscapes had been re-configured, and farms enlarged, by enclosure and reclamation. Tillage extension, more frequent cropping, intensive cultivations, and the adoption of the four-course rotation, resulted in a sharply growing demand for animal traction, particularly in the spring and summer quarters, putting a heavy strain on the horses, and at the same creating a niche for the re-introduction of working oxen as seasonal workers. The typical ox-using farm was predominantly arable, three quarters under tillage, worked on a four- or five-course rotation of cereals, roots, clover and grasses, with occasional courses of pulses and vegetables, and usually possessing very little meadow or permanent grass. All Bacon's respondents claimed to follow the four-course system, even on land not ideally suited to it (Table 3).

A pre-requisite for employing oxen was a substantial area – upwards of four acres per head – of rough pasture for their summer keep. In the sixteenth century Fitzherbert advised that oxen be kept where grass was plentiful, and horses where it was scarce.⁵⁴ About 60 per cent of ox-users in the Bacon survey had access to large areas of sheep-walk, common, or marsh, compared with only 40 per cent of horse-users (Table 3). In the 1853 Agricultural Census about eight per cent of all land in the county was designated as sheep pasture and down, with sizeable remnants of rough grazing still to be found in most ox-using districts.⁵⁵ Although most of the former marginal land had been brought into cultivation, large areas of down were still un-reclaimed in some chalk districts, particularly in Dorset and Wilshire.⁵⁶ In the new ox economy, oxen were fed primarily on low-grade pasture, often on unenclosed land. In the Middle Ages they had been better provided for: Walter of Henley had prescribed that when working and in order to maintain condition, oxen needed to be given at least three sheaves of oats per week, and in the summer 'twelve pennyworth' of grass.⁵⁷ Likewise in the sixteenth century, as Dr Thirsk points out, it was no good putting oxen to graze on a bare common pasture after a day's work, and expecting them to be fresh in the morning: a working ox had to be kept on 'lush grass', such as was normally found only in enclosures.⁵⁸

⁵³ Ex inf. Dr John Walton, Aberystwyth University.

⁵⁴ *The book of husbandry by Master Fitzherbert*, ed. W. W. Skeat, (English Dialect Society, 15, 1882), p. 15.

⁵⁵ *Reports of the Poor Law Inspectors on agricultural statistics (England)*, 1855, Schedule D, Norfolk (repr. in BPP 1928, LII, p. 491). See also, Kain, *Atlas of the Tithe Files*, p. 75 and *passim*.

⁵⁶ e.g. Caird, *English agriculture*, pp. 56–69, 79–81.

⁵⁷ *Walter of Henley's Husbandry*, trans. E. Lamond (1890), pp. 11–13, 23–5, 111.

⁵⁸ J. Thirsk, 'Farming techniques', in J. Thirsk (ed.), *The agrarian history of England and Wales*, IV, 1500–1640 (1967), p. 165.

Only large or very large farms could provide the economies of scale needed to justify employing several ox teams in addition to five or more teams of horses (see Tables 3 and 5). Ox-using farms in the Norfolk enquiry averaged 974.5 acres, farms using oxen occasionally or which had done so until recently 644.9 acres, and exclusively horse-using farms, 528.6 acres. Ninety per cent of farms in the first group were of 500 acres and above, compared with only 40 per cent in the third group. This implies a farm size threshold for the 'use' or 'adoption' of working oxen of about 500–600 acres. Two respondents reckoned it even higher, at about 800 acres, while one former user, who had recently moved to a smaller farm of 430 acres, would use oxen again if he had 800 or 1000 acres. According to the 1851 census, Norfolk contained about 400 farms of more than 500 acres, 5 per cent of all farms, but occupying 30 per cent of the total farmed area.⁵⁹ On this reckoning, the ox population of Norfolk in the early 1840s numbered perhaps 4000–6000, that is, about 12 per cent of the total animal workforce. The ox herd is modest compared with the 44,572 horses enumerated in the 1854 Agricultural Return, and the 42,100 in the 1870 Agricultural Statistics. Locally however, the ox proportion could be far larger, as much as 25–30 per cent, on for example the Holkham estate, which in 1851 possessed 51 farms in excess of 300 acres and 34 of more than 500 acres, most of which would have been using oxen, or had used them formerly.⁶⁰

Ox-using farms in revivalist districts were typically large. On the Dorset Downs, where in the 1850s large areas of sheep-walk still survived, farms of 1200–1500 acres were not uncommon, and 500 acres the standard for a sheep-corn farm.⁶¹ On the Berkshire Downs, 400–1000 acres was the norm, while on Salisbury Plain farms ranged from 800–1000 acres, with outlying fields in some cases between two to three miles from the farmstead.⁶² One advantage of oxen was that on a 'long farm' with outlying commons they could be kept out overnight and forage unsupervised, whereas horses had to be brought home each evening. In Oxfordshire, a 400-acre stonebrash farm kept normally two teams of oxen to four or five of horses, inferring an adoption threshold of 300–500 acres, smaller than in Norfolk, but much larger than in the old ox counties, such as Devon, with its preponderance of small and medium-sized farms, only 5 per cent of which were above 300 acres.⁶³ An analysis of farm sale notices for Oxfordshire 1820–80 (Table 4) suggests a minimum adoption threshold of about 250 acres, and the majority of users in the 400- to 600-acre size group.

Large rectangular fields were the ideal working environment. Plough oxen worked best walking at a steady pace of one to two miles per hour in straight lines on level or gently undulating ground. In the 1860s, the average size of fields on chalk soils was estimated at 13

⁵⁹ *Great Britain Census 1851, BPP, Accounts and papers*, LXXXVIII (1852–3), pt 2, p. 313.

⁶⁰ Parker, *Coke of Norfolk*, p. 164. The 1851 Census records fewer than 17,000 farms of 300 acres and above and just over 5000 farms of 500 acres and above in England and Wales. If farm size was the sole determinant of ox usage, and assuming *all* farms in excess of 300 acres kept them, the maximum number of working oxen in England and Wales would have been about 180,000, and in Norfolk and the chalk and

limestone districts of southern and central England perhaps 25–30,000. This compares with Young's estimate of 200,000 in c.1770. Ox-using farms in heavy and medium soil districts were in the main much smaller than on the light soils in the revivalist districts.

⁶¹ Ruegg, 'Farming of Dorset', p. 142.

⁶² Spearing, 'Farming of Berkshire', p. 12; Caird, *English agriculture*, pp. 80–1.

⁶³ Read, 'Farming of Oxfordshire', p. 239; *Great Britain Census 1851*, 1, Devon.

TABLE 4. Distribution, by farm size group, of working cattle mentioned in farm sale notices, Oxfordshire 1820–80.

Acreage	<200	200–99	300–499	500–699	>700
Mentions	1	13	16	13	8
%	2.0	25.4	31.3	25.4	15.7

Source: Farm sale notices, *Jackson's Oxford Journal* and *Reading Mercury*, as per original data supplied by Dr J. R. Walton, Aberystwyth University.

acres, compared with 11 acres on limestone, and just four on clay. Large fields meant less time turning at the headlands: ploughing a three-acre field with horses, it was calculated, involved 102 turns, and a 27-acre field just 28.⁶⁴ The bigger the team, the bigger the turning space required at the end of each plough strip.

IV

The genetic lynch-pin of the revival was the emergence, from the middle of the eighteenth century, of new or improved breeds of working cattle, in which superior draught qualities were combined with thriftiness and quick fattening.⁶⁵ Breeders sought to create a more dynamic and active animal, designed for speed rather than brute strength, with a deep chest; powerful, slanting shoulders; and light, elevated hind-quarters: in short, a bovine with equine characteristics, smaller and more stream-lined than the large-framed, all-purpose Longhorn, or the stumpy barrel-shaped Shorthorn just coming into fashion. Marshall reckoned northern oxen much inferior to the southern and western types, with little attention paid to breeding for draught.⁶⁶ Ancient black cattle of the Longhorn genus were widely distributed throughout England in the eighteenth century. Though physically very powerful, they were claimed to be too heavy for the plough and both too slow and lacking in versatility to meet the needs of the 'new husbandry'. In 1623, Gervase Markham described the Longhorn as black with large white horns tipped with black, square stocky bodies, and short legs, similar in conformation and colour to the draught cattle depicted in the fourteenth-century Luttrell Psalter.⁶⁷ The improved Longhorn was unsuited for work on account of its very long upward-curving horns, which

⁶⁴ W. H. Kirkpatrick, *The seasonal distribution of farm labour requirements* (1930), pp. 14–16. See also W. H. Long, 'Size of fields in Devon', *The Farm Economist* 11 (1935), pp. 244–5. Field sizes in the light-land revivalist districts were much larger than in the Midlands and West Country. A Devon survey within a radius of 15 miles around Exeter revealed an average field size of just over 4.5 acres. Out of 7997 enclosures surveyed, only 327 were larger than 10 acres. A. Tanner, 'The farming of Devonshire', *JRASE*, 9 (1848), pp. 483–4.

⁶⁵ For breed modifications and improvements, see

Trow-Smith, *British livestock husbandry to 1700*, ch. 5; *British livestock husbandry, 1700–1900*, chs 3, 8; Moore-Colyer, 'Cattle', pp. 335–50; Youatt, *Cattle, passim*; and for mid-century, Keary, 'Management of cattle'; J. C. Morton (ed.), *A cyclopaedia of agriculture* (4 vols, 1855), under name of breed.

⁶⁶ W. Marshall, *The review and abstract of the country reports to the Board of Agriculture* (5 vols, 1818, repr. 1968), I, *Northern Department* (orig. pub. 1808), pp. 55–6.

⁶⁷ Thirsk, 'Farming techniques', p. 186; Watts, *Working oxen*, pp. 7–8.

required a greater distance between pairs to avoid injuries, and large headlands of up to 40 feet or more wide to turn the teams.⁶⁸

The principal source of improved working cattle were the ‘middle horns’, said to be descended from the ancient ‘red cattle’ native to certain parts of southern and western England, although the precise origins are obscure and the lines of descent blurred. As a result of selective in-breeding and judicious crossing, by 1815 as many as 90 per cent of working cattle in southern Britain was comprised of just four breeds: the North Devon (or Bideford), the Hereford, the Sussex and the Pembroke (or Castlemartin), descended from the old Welsh Longhorn. Together, they replaced the Longhorn and local breeds, such as the Gloucester, Dorset, South Devon, and Glamorgan.⁶⁹ Of the four, the most popular were the Devon and the Hereford, the ones most often singled out for specific mention in farmers’ account books and sale particulars, and favoured by landowners as park animals because of their pleasing appearance. Farm sales notices suggest continuing rivalry between Devons and Herefords in Oxfordshire up to the mid-1850s – when the latter became the standard – and, as in Norfolk, the sporadic use of Shorthorns and – in one case – Welsh cattle, probably Pembrokes.⁷⁰

The North Devon, depicted in Figure 3, had an unrivalled reputation as a worker on light land. Quick and agile, it could keep pace with a horse, trot at speeds of up to six miles per hour pulling an empty cart, thrive on poor land, and fatten quickly upon ceasing work. Recent research casts doubt as to its true origins: the predominant cattle in north Devon in the mid-eighteenth century were, it seems, black rather red in colour, and the ruby-red Devon was a new breed created from about this time by the Quarterly family of Molland.⁷¹ In the early 1790s, it was remarked how the ‘red breeds’ of Devon and Somerset had been progressively increasing, and were now dispersed over a great part of the Kingdom, and adjudged the ‘best labouring animal’. The larger and heavier-boned Pembroke was better adapted for the stiffer soils, but reckoned by some as lively as many horses.⁷² There were two types of Sussex, a bigger more powerful type for the Wealden clays, and a smaller type for the chalk downland. One such is reputed to have run four miles against the clock over Lewes racecourse in 16 minutes.⁷³ Smaller than the Sussex but larger than the Devon, the Hereford was a good steady worker on medium soils, with excellent beefing properties and reputation for early maturity. In the early years of the revival, the respective merits of the various breeds provoked widespread discussion among breeders and adopters. One Essex enthusiast, who had tried them all, thought the

⁶⁸ I am indebted to the late Fred (F. J.) Banks for this and other valuable information based on usage of plough oxen in the North Riding. See his unpublished typescript, *Old ridge and furrow* (nd) held by the Museum of English Rural Life, University of Reading.

⁶⁹ Davis, *Wiltshire* (1794 edn), p. 234.

⁷⁰ From information kindly supplied by Dr J. R. Walton, Aberystwyth University.

⁷¹ The North Devon was the clear favourite of the experts. Youatt, *Cattle*, pp. 18, 49 (‘a quickness of action which no other breed can equal and which few horses exceed’). Read, ‘Recent improvements’, p. 290 reckoned it stood the heat better than any other breed.

On poor land it was preferable to have either Herefords or Shorthorns in Coke’s view. Parker, *Coke of Norfolk*, p. 122. R. Stanes, ‘Devon agriculture in the mid-eighteenth century. The evidence of the Milles Enquiry’, in R. Stanes *et al.*, *The husbandry of Devon and Cornwall* (2008).

⁷² Youatt, *Cattle*, p. 20; Keary, *Management of cattle*, p. 440; [Ministry of Agriculture], *British breeds of live-stock* (third edn, 1920), pp. 54–5.

⁷³ Youatt, *Cattle*, pp. 39–42. Also for Sussex, see J. P. Boxall, ‘Sussex cattle in the nineteenth century’, *AgHR* 20 (1972), pp. 18–20, 27; J. Francombe, ‘On the farming of Sussex’, *JRASE* 11 (1850), p. 82.

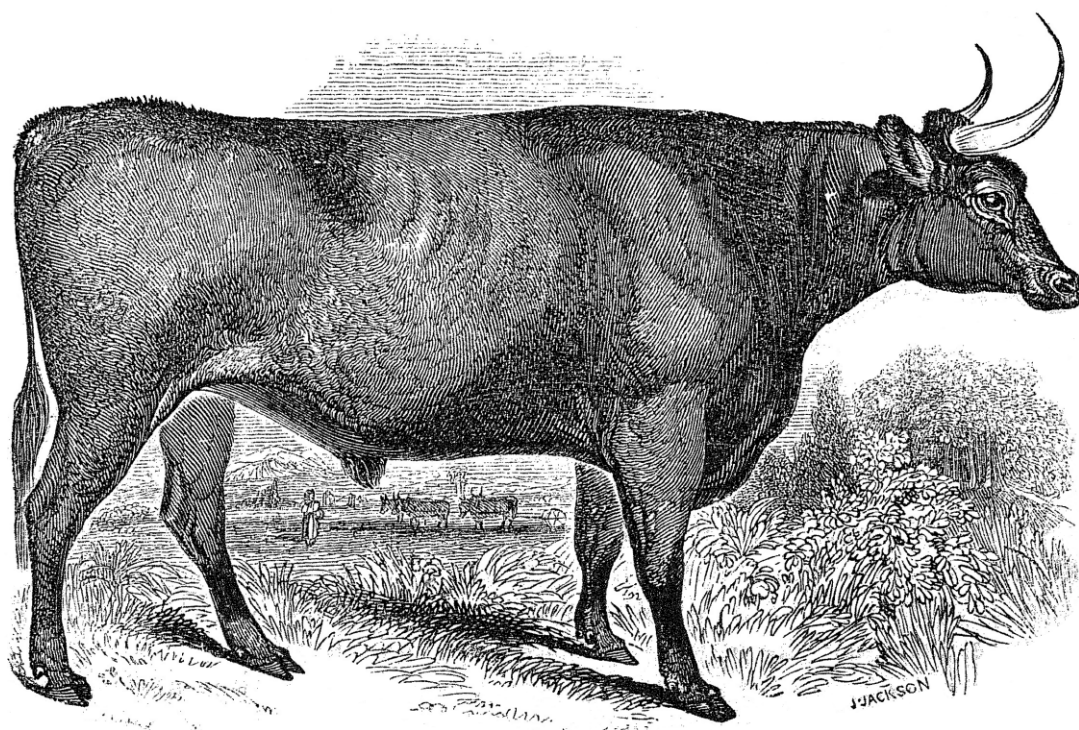


FIGURE 3. The Devon working ox.

Source: William Youatt, *Cattle* (n.d. but c.1835), p. 13.

Sussex suited him best: the Devon he thought too weary, the Hereford 'gummy' and too slow, and the Shorthorn the worst of all.⁷⁴

The North Devon was the breed of choice in all the revivalist districts, with the exception of the Cotswolds, where the Hereford held sway. The Pembroke diffused eastwards into the Vale of Glamorgan and the Marches where it ousted the Glamorgan and challenged the Hereford. In the later nineteenth century the Pembroke was successfully introduced onto the South Downs where it largely superseded the native Sussex, whose draught qualities had been sacrificed to those of beef production.⁷⁵ In contrast, the Sussex remained almost entirely confined to Kent and Sussex. Heavier and less active but stronger than the Devon, and a slow feeder, it found little favour outside its native homelands. Devons constituted 11 per cent and Herefords 13 per cent of total beef sales at the Smithfield meat markets in 1838.⁷⁶

After a false start, Norfolk took quickly to the North Devon. In the Bacon survey, 14 out

⁷⁴ A. Young, *General view of the agriculture of Essex* (2 vols, 1813), II, p. 358.

⁷⁵ Robinson, *South Down farm*, pp. 5–7; A. D. Hall and J. Russell, *A report on the agriculture and soils of*

Kent, Surrey and Sussex (1911), pp. 39–40.

⁷⁶ R. Herbert, 'Statistics of livestock for consumption in the metropolis', *JRASE* 19 (1858), pp. 497–8.

of 29 current and former ox users employed them exclusively, and seven principally, together with a smattering of Herefords and Shorthorns. On light land, it could do as much work as a horse, being described by one land agent as 'by far the highest spirited Beast that I know of ... and the quickest walker'. The immigrant Devon was a class apart from the old Norfolk breed, described by Marshall as 'small-boned, short-legged, round-barrelled, well-loined, thin-thighed – the very antithesis of the preferred form of working ox'.⁷⁷

In the old tradition, oxen were worked throughout the year, often until an advanced age. By 1700, most ox users kept at least one team of horses, or mixed teams of horses and oxen. As their numbers increased, so horses did an increasing share of the work, until the ox's role was reversed, from that of primarily workers to horse auxiliaries. In his Yorkshire tour, William Marshall made a crucial distinction, central to this discussion, between cattle that were 'beasts of draught', that is specialist workers, and cattle that were worked occasionally while growing, that is dual-purpose animals.⁷⁸ The latter, appropriately conformed, were later to find a ready niche in the sheep and corn systems of southern and eastern England.

IV

Here we turn to the more narrowly practical aspects of the new ox-husbandry beginning with selection and training.⁷⁹

The typical Norfolk ox-using farm possessed between two and five teams, some eight to twenty oxen, representing 25–40 per cent, theoretically a third, of the combined workforce. (Table 5) The usual practice was to purchase 2- or 2½-year olds, part- or already-broken Devon-bred 'bullocks', at local fairs or from specialist dealers each February. As many as were needed for the campaign, including reserves, were selected out for training in teams led by experienced oxen. Here, as in most other revivalist districts, oxen were worked in collars and reins in the same way as horses, as an alternative to the traditional yoke. Though more expensive, the new form of harness was thought to be more efficient, as it allowed the team to be controlled by one man without the services of a boy, and easier for local workmen brought up with horses to fit. Properly fitted, a collar, it was claimed, enabled the ox to pull with its whole weight and move away smoothly, whereas the horse tended to 'snatch', causing the implement or vehicle to jump. One disadvantage was that the point of draught sat lower on the shoulders, which depressed the angle of leverage, thereby reducing the draught output. The new style of hitching, first employed in England probably in the later eighteenth century, became one of the distinguishing marks of the new-style ox, and the revival.⁸⁰

Norfolk oxen were normally worked for only half the year, from late winter to the end of the

⁷⁷ Marshall, *Rural economy of Norfolk* (2 vols, 1787 edn), I, p. 323.

⁷⁸ W. Marshall, *The rural economy of Yorkshire* (2 vols, sec. edn, 1796), I, p. 266.

⁷⁹ The following sections are based on the Bacon survey and Norfolk sources identified in the text.

⁸⁰ Harnessing has attracted more scholarly interest probably than any other aspect of ox management.

See Fenton, *Draught oxen*, pp. 2–9, 29–32; C. Martell, 'Draught oxen in Britain', *Heavy Horse World* 8 (3) (1994), pp. 50–2; E. M. Clifford, 'Working oxen at Cirencester', *Trans. Bristol and Gloucestershire Arch. Soc.*, 63 (1942), pp. 1168–71. For the theory, see, R. K. Bansal and G. E. Thierstein, 'Engineering considerations', in J. L. Falvey (ed.), *An introduction to working animals* (nd), pp. 80–98.

TABLE 5. Numbers of horses and oxen and herd composition on Norfolk farms, c.1843.

Number of ox teams (four oxen each)	1	2	3	4	5
Numbers of farms using oxen					
Precisely specified	2	3	4	2	1
Estimated	1	6	2	–	1
Total farms	3	9	6	2	2
Total oxen	231				
Total horses	471				
Oxen as % of draught-workforce	33.4				
Numbers of animal units per 1000 acres (horse=1.0, ox =0.6 units)	35.0				
Horses per farm					
On ox-using farms	22.2				
On former ox-using farms	35.7				
On all-horse using farms	30.3				

Source: Bacon Survey, Norfolk and Norwich Records Office, MS 4363.

corn harvest, after which they were put out to grass and thence into straw yards or stalls for over-wintering, or in the case of older cattle in their second or third year of work, for fattening and sale. Oxen were employed principally for ploughing – preparing seed-beds, breaking-up leys, making summer fallows – plus other jobs, which the horses being otherwise fully employed, were unable to do. Horses did the heavy work, along with most of the harrowing and carting. Turn-of-the-century photographs, however, show in Norfolk and Oxfordshire oxen doing a range of jobs, such as working with harrows, and drawing laden carts and empty wagons. Oxen were preferred for dead-weight tasks requiring a long steady pull such as stone or timber hauling.

The career of a Norfolk ox was short but physically not very demanding. The standard ‘team’ of four was sub-divided into two teams of two, each working a half-day, morning or afternoon. On heavy land, teams of three but normally four were employed, working 6–8 hour days, with a long rest in late morning. Bacon noted one routine in which the ploughing was let out to ‘bullock men’, four oxen to a plough, split into two teams, each changed four times a day, and working two sessions.⁸¹ In Wiltshire and Dorset, teams of two were the rule on lighter and teams of four on the heavier land and steeper slopes.⁸² Team configuration on the Cotswolds comprised elements of both old and new traditions. In Oxfordshire, teams of three or four were worked like horses, from 7 am to 3 pm, with an extended break in the middle of the day.⁸³ In Gloucestershire, teams of four or five in line or six or eight in pairs, were worked as in Norfolk, in spring and summer, although it was customary for some teams to be kept ploughing all year round.⁸⁴

⁸¹ Bacon, *Norfolk agriculture*, pp. 376–7.

⁸² Little, ‘Farming of Wiltshire’, p. 170.

⁸³ Read, ‘Farming of Oxfordshire’, p. 239.

⁸⁴ J. Bravender, ‘On the farming of Gloucester’, *JRASE* 11 (1850), p. 142.

During the revival, teams were generally smaller, the working day shorter, and the number of days worked per year fewer than in former times, when teams of six or more were worked all year round. An important question, which we will return to, is why on light soils with a low draught resistance, oxen appear to have been systematically under-worked.

Two 'good' horses were reckoned equal to three or four oxen, although such relatives are meaningless without a precise knowledge of the variables in the equation – age, weight, condition, size of team, soil conditions, loading. Most comparisons do little more than confirm the superiority of the horse. Yet on Norfolk turnip soils two pairs of Devons were said to work almost as quickly as a pair of horses, and under favourable conditions to plough one or one and a half acres of unbroken ground or to ridge-hoe five acres of turnips a day, about the same or even slightly more than a pair of horses, thereby implying a horse-ox substitution ratio of about 3:5.⁸⁵ Little is known about changes in relative performance over time. That of horses may have improved during the first half of the nineteenth century due to better breeding, though this is questionable. It probably owed more to the availability of better-designed implements with lower draughts and higher working speeds, whereas oxen continued to be worked with ploughs of traditional design and construction, often made of wood.

Physiology and diet explain much of the difference in the work outputs of horses and oxen.⁸⁶ The ruminant ox could consume and convert into energy a fibrous diet of poor grass and crop residues such as straw. For its digestive system to function efficiently, it needed large volumes of bulky food eaten in one meal, and as this took a long time to digest, a large part of the day (or nominal working day) was spent foraging or resting. Oxen, unlike horses, were unable to increase their consumption of bulky low-energy foods to compensate for the energy expended while working, and so tended to tire quickly and lose weight and condition. The horse's stomach was small but so constructed as to enable it to consume and metabolize relatively small volumes of high-energy foods such as oats and beans at frequent intervals, and work harder and more continuously.⁸⁷

The virtues of the ox were, firstly, that it could be fed cheaply on foods of low nutritive value; and secondly that it consumed little more energy when working than when walking

⁸⁵ Keary, *Management of cattle*, p. 436. Lord Albermarle's steward at Ouidenham (Norf.) reckoned two pairs of oxen changing over at the middle of the day could plough 2–2½ acres of fallows and two acres of seeds per diem, and eight pairs, working alternately, nine acres. Almack, *Norfolk*, p. 331.

⁸⁶ A growing body of scientific literature exists on working oxen at the present day, much of it relating to sub-Saharan Africa. A key issue now, as well as historically, is the relationship between draught output, nutritional requirements, and use management. The following publications are relevant to this discussion. P. Starkey, E. Mwenya and J. Stares (eds), *Improving animal traction technology* (1994); R. A. Pearson and A. J. Smith, 'Improving draught animal management', in P. Starkey *et al.*, *Improving animal traction technology*; A. J. Smith, 'Using science to understand the

biological constraints that limit work', in P. Starkey and A. Faye (eds), *Animal traction for agricultural development* (1990), pp. 156–9. For physiology and nutrition, see Falvey, *Introduction to working animals*; P. R. Lawrence, 'Nutrient requirements of working ruminants', in W. R. Cockrill (ed.), *Working animals international: Proc. of meetings of the World Association for Transport Animal Welfare Studies* (1989), pp. 61–9; D. Hoffmann *et al.*, *Draught animals in rural development* (1989), pp. 143–81. Research into work physiology in France, Germany and Italy in the inter-war period is a promising avenue for investigation.

⁸⁷ For reasons of space, the economics of horse draught can only be touched upon. See E. J. T. Collins, 'The farm horse economy of England and Wales in the early tractor age', in Thompson (ed.), *Horses in European economic history*, pp. 77–100.

TABLE 6. Feeding regimes on 22 ox-using farms in Norfolk, c.1843.

Summer		Winter				
Grass	Other feed	Hay	Straw	Turnips	Beans	Oil cake
22	2	22	22	14	1	6

Source: Bacon Survey, Norfolk and Norwich Records Office, MS 4363.

or at rest.⁸⁸ If doing light work, oxen were nutritionally more efficient than horses. Horses, on the other hand, were physiologically better adapted for converting concentrated foods into muscular energy. J. C. Loudon pointed out the mistake of supposing that oxen could work on straw alone; on a diet of straw and roots, he contended, they would only plough three days a week, or two full and two half days.⁸⁹ Oxen could not produce beef if constantly worked, or be capable of sustained work unless commensurately nourished, which greatly increased the expense of an animal whose principal virtue was supposed to be its thriftiness and low cost of upkeep.

Herein lay a dilemma. A poorly nourished ox could do only light or very moderate work, while richer foods – meadow grass, clover hay, grains, roots – could be utilized more profitably by other livestock. For these reasons, the strategy for draught was often determined by the foods available, and their alternative use value. On all 22 Norfolk ox-using farms, oxen were fed on low-grade pastures during summer, and in winter on hay and straw, supplemented by turnips, turnip tops, plus a little oilcake and barley-meal (Table 6). A superior regimen in late winter was often needed to bring the new arrivals, weak after a long overland journey, into condition for the start of the spring ploughing. Before the fodder revolution in the eighteenth century, the ox's performance was limited by food shortages, especially in late winter and early spring. Hence the not uncommon sight of teams of up to eight or ten oxen, in motion but in reality doing very little work, each member contributing what it could.⁹⁰

Employing oxen to best advantage required an understanding of the relationship between power, speed, and work. Horses were stronger than oxen and could work at least one or two more hours per day. Oxen could produce the same draught as horses weight for weight, but for a shorter period of time. Soil resistance varied from an estimated 16 lbs per square inch on clay, to 8 lbs on medium land, to just 4 lbs on light land. It was for good reason therefore that Norfolk farmers chose not to work their oxen too hard, and restrict them to light land. The expression 'strong as an ox' belies the reality. The short working year, abbreviated working day, and long breaks for foraging and ingestion, were designed to eke out and replenish its

⁸⁸ P. Buttery *et al.*, 'Animal response to nutrient supply', in E. Owen *et al.*, *Livestock and wealth creation* (2005), p. 167.

⁸⁹ Cited in E. Wiliam, *The historical farm buildings of Wales* (1986), p. 122.

⁹⁰ A further factor, glossed over here, is the weight of the animal, as weight and draught were directly correlated. Clark suggests that in the fourteenth and fifteenth

centuries cattle were 80 per cent of the height and half the weight of eighteenth-century cattle. A young ox may have weighed little more than five hundred-weight. See G. Clark, 'Labour productivity in English agriculture', in Campbell and Overton (eds), *Land, labour and livestock*, p. 217; M. E. Turner, J. V. Beckett, and B. Afton, *Farm production in England, 1700–1914* (2001), pp. 176, 195, 199–200.

short-term energy reserves. Though comprising a third or more of the animal workforce, oxen produced at most only 15–20 per cent of the draught. Devons worked best when lightly or very moderately loaded, on level or gently sloping ground, on light dry compact soils, working in shifts, and the weather not too hot. A good Devon, Bacon was told, would plough as much light land as a horse if a steady draught was required, but for hard work, only horses would do. Horses and oxen could exert a force equal to about an eighth of their respective body weights. A mature horse normally weighed between a quarter and a third more than a four- to five-year old working ox, and could exert not only greater pulling power, but a maximum pull of up to 70–80 per cent of its body-weight in short bursts. Oxen were most effective in the mass, pulling dead-weight loads of stone or timber, or drawing heavy trenching ploughs used for reclamation work and, ironically, recovering immobilized steam traction engines.⁹¹ A remarkable feat of haulage took place at Preston Manor near Brighton in 1797. A contemporary print shows 86 oxen in six columns abreast, drawing a windmill two miles uphill from Regency Square near the sea-front, to the Dyke Road high above the town.⁹²

The horse was a specialist draught animal with a long working life, typically twelve to fifteen years, whereas the ox was taken from the plough to be fattened at a young age, normally five or six years. The Norfolk practice was to retire working bullocks at the end of their second or third working summer to be sold later in the year at the Norwich or London Christmas markets.⁹³ Bullock fattening was a two-storied enterprise producing old and young beef, the former principally grass-fed, the latter intensively, on roots, grains and cake. Devons and Herefords matured quickly, and, weighing upwards of 84–90 stones (1200 lbs), were an important source of the huge marbled roasting joints favoured by catering establishments, large wealthy households, and by epicures.⁹⁴ On the Cotswolds, retirees were usually sold onto specialist graziers in the south Midlands for finishing and eventual sale.⁹⁵

VI

While increasingly of academic importance, the respective merits of oxen and horses continued to be debated up to at least the mid-nineteenth century. In the 1880s, Professor Wrightson of the Royal Agricultural College was urging Scottish crofters to use cows instead of horses, a practice never much favoured in Britain.⁹⁶ Whether and to what extent oxen paid is a nice question, difficult to answer because few contemporary farm accounts distinguish working from other cattle, and because of the seemingly insuperable methodological problems involved in allocating costs and revenues between jointly supplied outputs – work, meat and manure. That arable beef paid only in the dung-heap, and seldom ever directly, is a well-worn axiom. Yet, apart from one, who complained that they ate too many turnips, all Bacon's respondents

⁹¹ Robinson, *South Down farm*, p. 6.

⁹² Watts, *Working oxen*, pp. 19–20 (together with a photograph of the original).

⁹³ Keary, *Management of cattle*; Trow-Smith, *British livestock husbandry, 1700–1900*, pp. 166–7.

⁹⁴ Meat as such is a neglected topic. See though, R. Perren, *The meat trade in Britain* (1978), esp. ch. 2;

Trow-Smith, *British livestock husbandry, 1700–1900*, pp. 257–8; Morton, *Cyclopaedia*, II, 'Meat'.

⁹⁵ Read, 'Farming of Oxfordshire', p. 239.

⁹⁶ J. Wrightson, 'Cows for draught purposes', *J. Bath and West of England and Southern Counties Soc.*, fifth ser., 5 (1910–11), pp. 1–17.

reckoned oxen profitable on farms where horses were a major budgetary item, and summer workloads large enough to provide employment for a minimum of two teams. In theory, the ox's technical disadvantages were offset by its lower marginal and opportunity costs, and the increasing value of its meat while working. The consensus was that oxen were cheaper for ploughing, and horses for all-round performance.

This is a convenient point at which to summarize the differences between the 'new' and 'old' traditions. Table 7 suggests little continuity, and the 'Revival' as representing a more or less clean break with the past. Indeed, in the early days, workmen were sometimes hired from the ox-exporting districts to teach local workmen how to manage the new and unfamiliar draught species.

The revival reached its zenith sometime in the 1840s, after which the working herd steadily declined, and by 1914 numbered nationwide probably fewer than 50 to 100 teams. In 1850, it stood at perhaps 40,000 head, or 20 per cent of its 1790 level, and by 1880 fewer than 3000. In Cornwall, the last team is said to have been disbanded in 1887, and in Devon and the Vale of Glamorgan about 1912.⁹⁷ They survived longer in the south-east: on the Morghead estate at Tenterden in Kent up to 1920, the Glassenbury estate near Goudhurst in Sussex up to 1938, and at Birling Gap in the same county until 1929.⁹⁸ They were given up at Aldbourne on the Berkshire–Wiltshire borders about 1910.⁹⁹ In Norfolk the final few surviving teams were broken up between 1900 and 1910. With one famous exception, oxen died out in the Cotswolds in the early 1930s.¹⁰⁰ In the Second World War, in Scotland, a cow and mare were recorded working in tandem in Aberdeenshire and, about the same time, ox-carts were reported on Fair Isle in the Northern Isles.¹⁰¹ The last regularly worked team in Britain, in Cirencester Park, was filmed by Claude Frieze-Green, the pioneer colour cinematographer, in the late 1920s. A decade later, H. J. Massingham said a tearful goodbye to 'Blossom', the lead ox. The Park team was eventually disbanded in 1964 on the retirement of the head ox-man, Ted Smith, with the distinction of having outlived the commercial steam-plough, the last of which was sold by auction at Hall Farm, Little Hadham in Hertfordshire, four years previously.¹⁰²

The reasons for the ox's demise can only be touched on. One was the progressive reduction in the area of rough pasture and the improvement, using purchased fertilizers, in the quality of

⁹⁷ George Copp, letter to *The Western Morning Mail*, 5 June 1964; S. Kidner, 'Devon cattle', *JRASE* 73 (1912), pp. 46–52; ex inf. St Fagans National History Museum, Apr. 2008; J. G. Jenkins, *Life and tradition in rural Wales* (1976), pp. 34–5.

⁹⁸ Sussex: H. J. Massingham, *Shepherd's Country* (1938), p. 67; G. K. Whitehead, 'The passing of the draught ox', *Country Life*, 2 Sept. 1952, pp. 758–9. Kent: ex inf. Richard Filmer, Ashford, May 2008.

⁹⁹ Gandy, *Heart of a village*, pp. 59–60.

¹⁰⁰ Photograph of oxen at Northern Farm, Blofield, Norfolk, c.1908. Museum of English Rural Life, University of Reading, Photograph Collection, DX 1120. And about the same date also in Cambridgeshire: F. Gambie, 'Thriplow in my young days', *Cambridgeshire Local*

History Soc. Bulletin 29 (1974), pp. 34–8. For the Cotswolds, see the interesting correspondence on the late use of oxen in *The Oxford Times*, 6 July 1951.

¹⁰¹ Fenton, *Draught oxen*, pp. 30–36, 41.

¹⁰² 'The lost world of Frieze-Green', 'The Open Road', BBC 2, first screened 25 Apr. 2006. Dr John Walton informs me that the film has been restored by the British Film Institute, and is currently viewable online on the BFI's own website, and individual episodes on YouTube. Creasey, *Draught oxen*; Massingham, *Shepherd's country*, pp. 65–9; Whitehead, 'Passing of the draught ox', pp. 758–9; Ted Smith, *My life with oxen*, undated typescript [c.1957], Museum of English Rural Life, Archives, D76/12.

TABLE 7. Characteristics of old 'unbroken' and 'new' ox economies

<i>Characteristics</i>	<i>Old 'unbroken' tradition</i>	<i>'New' resurgence</i>
Topography	Level ground	Hilly, undulating land
Soils	Mixed-heavy	Light
Standard of farming	Traditional	Progressive
Farming-cropping system	2- to 3-field Crop-fallow Mixed farming	4- to 5-course rotation Sheep-corn
Pasture provision	Meadow	Rough grazing
Farm size	Medium-large	Large >400 acres
Farm layout	Open fields; small enclosures.	Large regular-shaped fields, post-enclosure
Breed	All-purpose traditional	Specialized dual-purpose
Breed conformation	Heavy. Large framed. Irregularly conformed.	Lighter, smaller-framed with defined draught characteristics
Strength, agility	Strong, slow, best for heavier land	Smaller, quicker, better adapted for light land
Working routine	Worked 4–8 years, all-year round, full days, general purpose, medium-heavy work	Worked 2–3 years, spring and summer only, half-days, mainly ploughing, light-moderate work
Size of teams	6–10	2–4
Harnessing	Traditional yoke	Collar and reins
Feeding	Meadow, better quality pasture, hay, straw, plus high-energy foods when working	Low-grade pasture in summer. Straw hay, turnips, plus grains, cake in winter
Fattening, slaughter	Killed 6–10 years in spring-summer	Killed 5–6 years for Christmas market.
Adopters	Broad, mostly medium-large farmers	Landowners, gentlemen farmers, larger tenants.

marginal grazing to a standard where it could fatten sheep. Another was the further widening of the performance gap, by the use of improved implements with lower draughts specifically designed for horses, and machines so geared as to run at much higher speeds than could be attained by oxen. Mechanical harvesters posed special problems. Maude Robinson, whose father farmed on the Downs at Saddlescombe near Brighton in the Golden Age, thought the 'picturesque custom' of using bullock teams was ended by 'the blessed invention' of the self-binder: six or eight large animals proved too clumsy to negotiate the corners, especially on the last turns in the middle of the field, leaving a large area of corn to be cut by the scythe.¹⁰³ The rise of the specialist beef industry, and growing demand in artisan and middle-class households for younger meat and smaller leaner joints, was a further disincentive to keeping older cattle. Cross-breeding and high-feeding had by the 1830s rendered beef stores ready

¹⁰³ Robinson, *South Down farm*, p. 7.

for the butcher at three to four years, and by the 1870s at two and a half to three years, as against six or seven years for a typical worker.¹⁰⁴ Breeders could now obtain a better price for two-year old steers when sold for feeding than for work. In 1878, J. Algernon Clarke in his retrospective survey, saw a situation where rising meat prices and high feeding were 'pressing to banish such animals [draught oxen] altogether'.¹⁰⁵ To meet the demands of the feeders, the working breeds were re-conformed and their beefing properties enhanced. The demise of 'the true Devon'¹⁰⁶ was already being lamented by a Norfolk farmer in 1843.¹⁰⁷ With the exception of the Pembroke, which had retained many of its draught characteristics, by the end of the nineteenth century all the working breeds had been re-classified as beef breeds. Between 1838 and 1858, the proportions of Devons and Herefords sold at the London meat market fell from 12 and 13 per cent to five and nine per cent respectively, reflecting partly the growing preference for Shorthorns and other early-maturing breeds, and partly the smaller numbers of workers coming forwards.¹⁰⁸ The Devon was now much more compact, with lighter shoulders and shorter hind legs. The transfer of weight from the fore to the rear quarters increased the ratio of flesh to bone, and of the more valuable roasting to cheaper boiling joints. Decisive too was the growing numbers of heavy horses used for town work, and large sums fetched by five or six-year old geldings trained for shaft work.¹⁰⁹ The generous prices paid for town horses, combined with the opportunity to buy them back at nine- to ten-years old at a discount, still capable of several years of productive work, may ultimately have tipped the scales. Livestock disease was a particular threat in the 1850s and 1860s, causing severe debilitation among working cattle and premature retirement of infected teams.¹¹⁰

The passing of the draught ox was the culminating stage in a centuries-old process of steadily increasing specialization in farming, resulting in the now rigid division of stock into food producers and workers. During its re-incarnation, the ox played a secondary but useful role on sheep and corn farms in the critical early stages of Thompson's 'Second Agricultural Revolution'. It had shown a rare ability at re-invention, finding new niches, and providing an aesthetically satisfying as well as practical solution to a pressing problem, namely the need for a cheap and elastic source of draught power at busy times when the horses were fully occupied.

Adopters of oxen were mostly large landowners, country gentlemen, and large farmers, a class far removed from the biblical stereotypes in the famous passage in the Book of Ecclesiastes (38:25): 'How can he get wisdom that holdeth the plough, and that glorieth in the goad, that driveth oxen, and is occupied in their labours, and whose talk is of bullocks'.¹¹¹

¹⁰⁴ H. Evershed, 'The early fattening of cattle and sheep', *JRASE*, third ser., 1 (1890), pp. 47–64; but also much earlier than this: *Youatt, Cattle*, p. 18.

¹⁰⁵ J. A. Clarke, 'Practical agriculture', *JRASE*, 2nd ser., 14 (1878), pp. 362–5.

¹⁰⁶ Bacon Survey: Norfolk and Norwich Records Office, Ms 4363 (response of Mr Clowes of Helmsley).

¹⁰⁷ For breed modification see P. Brassley, 'Livestock breeds', in Collins, *Agrarian history*, VII, pp. 555–6; *Youatt, Cattle*; *British breeds of livestock*, p. 48; Moore-Colyer, 'Cattle', pp. 335–48; Trow-Smith, *British livestock husbandry, 1700–1900*, ch. 8; Boxall, 'Sussex cattle',

pp. 23–4; W. G. C. Britten, 'Hereford cattle', *JRASE* 74 (1913), pp. 54–57; G. H. Garrard, *A survey of the agriculture of Kent* (1954), pp. 153–4.

¹⁰⁸ Herbert, *Statistics of livestock*, p. 497.

¹⁰⁹ Chivers, *The Shire horse* (abridged edn, 1978), chs 3–7; F. M. L. Thompson, 'Nineteenth-century horse-sense', *ECHR*, 29 (1976).

¹¹⁰ Robinson, *South Down farm*, pp. 56–67.

¹¹¹ J. F. Burke, for one, was highly disparaging of oxen, and 'the uncouthness of the yoke and goad, when compared with the spirit of the horses, the gayer harness, and the whalebone whip'. *British husbandry*, 1 (1834), p. 179.

From the late eighteenth century the draught ox underwent a sea change, to re-emerge with new duties to perform and its standing greatly enhanced. James Caird described the systematic management of large farms in west Norfolk as 'not surpassed in any district of England'.¹¹² Here, as in all the light-land arable districts where it flourished, the revitalized ox was a symbol of rank and competence, and source of prestige. Paradoxically, its revival coincided with the beginnings of the 'Second Agricultural Revolution', and the first stage in the industrialization of English farming. Later, in its twilight years, it came to occupy a place of honour and special niche in the national imagination.

Formally, the ox resurgence can be analysed as the adaptation of an obsolete technology to fit a new set of production functions, in the same way as the scythe and heavy hook had replaced the sickle for cutting corn, and the turnip was transformed from a fodder supplement grown in small patches to become the mainstay of the 'new husbandry'.¹¹³ The post-medieval ox underwent a succession of alternating revivals and downturns.¹¹⁴ In France, in the later nineteenth century, oxen from the Morvan in Burgundy were driven up-country onto the large sugar-beet farms of Picardy and Nord for deep ploughing, and fed on beet-tops, pulp and straw.¹¹⁵ One account describes such a farm in the Paris Basin in the 1850s, whose routines were reminiscent of those of Norfolk, that is to say, oxen working half-days, in just spring and summer, wearing collars like horses.¹¹⁶ In the two World Wars and inter-war depression, oxen were re-introduced onto farms in eastern and central Europe as an economy measure.¹¹⁷ In wars generally, the conflict zones reverted to oxen, out of fear of their horses being appropriated by the occupying armies.¹¹⁸ Since 1990, the crumbling of the Soviet trade bloc, and cessation of subsidized oil exports to client states, has prompted an ox revival in Cuba, while the high cost of mechanical traction and the hard labour of cultivating oxidized clay soils has led to the replacement of hand-hoes by the intermediate technology of ox-power in parts of central Africa. In the developing world at any rate, the ox story, it seems, still has a long way still to run.¹¹⁹

¹¹² Caird, *English agriculture*, p. 162. For similar comment on farming standards in other revivalist districts, see Caird, *passim*; Read, 'Recent improvements', 'Farming of Oxfordshire' and county prize essays in *JRASE* 1st and 2nd ser.

¹¹³ E. J. T. Collins, 'Harvest technology and labour supply in Britain', *EcHR* 22 (1969), pp. 453–72; Raine Morgan, 'The root crop in English agriculture, 1650–1870' (PhD thesis, University of Reading, 1979).

¹¹⁴ Langdon, *Horses, oxen*, p. 285.

¹¹⁵ A. Demangeon, *La Picardie et les régions voisines* (fourth edn, 1973); Liebowitz, 'Persistence of the draught ox', pp. 10–11.

¹¹⁶ F. R. de la Trehonnais, 'Horse labour in France', *JRASE* 45 (1858), pp. 419–2.

¹¹⁷ In Hungary, for example, between 1935 and 1942,

the horse-power supplied by draught oxen and yoked cows rose from 17.8% of total tractive power to 21.3%, while that supplied by draught horses fell from 76.4% to 71.0%. I. Csoppus, 'Mechanisation of plough-land production in Hungary 1920–1944', paper presented at the Conference Internationale des Musees Agricoles (CIMA), Budapest, Aug. 1982.

¹¹⁸ Ex inf., Prof. Francois Sigaut, Maison des Sciences de l'Homme, Paris, Jan. 2009.

¹¹⁹ Starkey *et al.* (eds), *Improving animal traction technology*, relating mainly to Africa, esp. pp. 66–81. For the ox revival in Cuba see R. S. Medina, 'The Cuban ox revival', *The Land* 5 (2008), pp. 44–46; A. Rios, 'Improving animal traction in Cuba', in P. Starkey and P. Kaumbutho, *Meeting the challenges of animal traction* (1999), pp. 296–8.