THE AGRICULTURAL HISTORY REVIEW



a journal of agricultural and rural history

Volume 64, Part I
2016

Agricultural History Review
Volume 64 Part I 2016

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MALCOLM THICK has written a book and several articles on market gardening in England and has also researched aspects of food history in the early modern period, including editing William Ellis's *Country Housewife's Family Companion*. A few years ago he produced a book on the life and work of the Elizabethan proto-scientist Sir Hugh Plat. He has written about manuscript recipe books dated before 1800: their structure and language, and the social history they reveal. Recently he has been working with the Hugh Sinclair Unit of Human Nutrition at Reading University on the Hugh Sinclair Archive. He is a Fellow of the Royal Historical Society. Email: bellglass@waitrose.com.

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Forthcoming conferences

The role of the landowner and agent in food security and sustainabilty: past present and future

A one day symposium (sponsored by the BAHS) to be held on 12 July 2016 at the University of Leicester will bring together landowners, land agents and historians to discuss the past, present and future of food security and food sustainability. Estimates suggest that the population of Britain will rise by some ten million over the next 15 to 20 years, at a time when agricultural experts are considering whether farm productivity has peaked. The aim of the day will be to combine historical knowledge with modern expertise, to assess whether past solutions during periods of food scarcity may have relevance for modern land management practitioners. More details from Dr Carol Beardmore at cb309@leicester.ac.uk

British Agricultural History Society Winter Conference, 3 December 2016

Trade and markets in agricultural goods: from plough to plate, field to fork
Further details will be available from the Society's website at www.bahs.org.uk

British Agricultural History Society Spring Conference, 3–5 April 2017

Plans are under way for this conference, to be held at Plumpton College in East Sussex.
Further details will be available from the Society's website at www.bahs.org.uk

European Rural History Organisation (EURHO) Rural History 2017, 11–14 September 2017

The third biennial conference to be held under the auspices of EURHO is being organised by the Interfaculty Center for Agrarian History (ICAG), in collaboration with the research network CORN (Comparative Rural History of the North Sea Area), and will take place at the University of Leuven, Belgium. The technical programme planning starts with the Call for Panel Sessions. All details will be available from the Conference website at www.ruralhistory2017.be.

Intensive rabbit production in London and nearby counties in the sixteenth, seventeenth, and eighteenth centuries: an alternative to alternative agriculture?*

by Malcolm Thick

Abstract

The history of rabbits raised in rural warrens has been investigated, but little has been written about domesticated rabbits, raised for meat or fur. Such rabbits were often bred in London or its suburbs and, because little or no farmland was involved, production did not follow the pattern of alternative agriculture suggested by Joan Thirsk. Rabbits were raised in special pits, hutches, sheds, and courtyards. They also inhabited pens, lofts, cellars, backyards and rented rooms in lodging houses. Their owners ranged from full-time commercial breeders to poor people making a small amount of money from selling rabbits. The reports of trials conducted at the Old Bailey in the eighteenth century describe aspects of London rabbit-keeping in some detail and scattered references at earlier times reveal that the practice had been going on for some centuries.

A number of histories of wild rabbits in England, and the rural warrens stocked with them, have been written.[1] By contrast, little notice has been taken of more intensive rabbit production, especially that which took place within, or near, the built-up area of London, although there has been recent interest in the animal population of London as a whole, especially in the nineteenth century. Urban rabbit production involved domestication: feeding rabbits, looking after their health, and controlling their breeding. In these situations they grew used to human contact, and became docile. Breeding from bucks exhibiting desired characteristics, led in turn to the development of distinctive breeds of tame rabbits.[2]

* I wish to thank the two anonymous reviewers for their suggestions and comments on the first draft of this article, the genesis of which was a paper at the 2013 Anglo-American History Conference.

[1] John Sheail, *Rabbits and their history* (1972); id., 'Changes in the supply of wild rabbits, 1790–1910', *AgHR* 19 (1971), pp. 175–7; Elspeth M. Veale, 'The Rabbit in England', *AgHR* 5 (1957), pp. 85–90.

[2] The most recent book on animals in London is Hannah Velten, *Beastly London* (2003). See also Peter Atkins (ed.), *Food and the city in Europe since 1800* (2007).

I

Joan Thirsk's theory of alternative agriculture in England (that when demand for traditional agricultural products slackens, new or unusual crops and livestock are farmed until, under population pressure, mainstream agriculture again takes over from this diverse agricultural production) works for extensive rural warrens. The fortunes of such warrens waxed and waned from the Black Death until the twentieth century in the English countryside, according to the demand for arable crops – the main use of the land. The theory does not, however, fit the peculiar circumstances of intensive agriculture and horticulture (including rabbit rearing) in and very near London, particularly in the eighteenth century.[3]

English population was rising particularly fast in the second half of the eighteenth century with a consequent relative increase in the price of grain compared with other agricultural produce. Greater London saw an increase in population faster than that of England as a whole throughout the century. The capital's growth was sustained by an influx of poor people, many sucked in, as Professor Wrigley so elegantly demonstrated some years ago, from all over southern England. London also saw an annual influx of the rich coming on business and for pleasure, as well as accommodating a sizeable resident middle and gentry class.[4] England's population pressure led, as Joan Thirsk demonstrated, to a shift towards land occupied by arable crops raised for human consumption and away other forms of agriculture, including rabbits in rural warrens. However, the resident and transient rich of London demanded exotic and out-of-season fruit and vegetables, and increasing amounts and variety of animal products, while the large numbers of London poor simply needed sustenance. Some of London's demands could be met in London itself or in the suburbs, by agriculture which used no, or comparatively little, land. So, poultry, pigs, and cows (for milk), as well as rabbits, were raised in yards, sheds, hutches, cellars, spare rooms and lofts, in response to a general increase in demand for food from Londoners both rich and poor. Such production used *no* agricultural land. Similarly, highly productive market gardens, under glass, and using dung and labour in large quantities on small areas of land, supplied fruit and vegetables to the London market at the expense of comparatively few acres of arable. Suburban warrens, where rabbits were kept in hutches, yards or sheds in high concentrations similarly bucked the trend.[5] Thus these two seemingly contradictory statements by John Middleton in his report on the agriculture of Middlesex in 1798 are perfectly compatible: 'The soil of this county is rendered too valuable by its connection with London, to be profitably employed in the rearing of rabbits', and: 'There are many places in and about London, where poor people make the breeding and rearing of tame rabbits a very considerable article of profit'.[6]

[3] Joan Thirsk, *Alternative Agriculture* (1997), pp. 10–11, 38–9, 53–4.

[4] E. A. Wrigley, 'A simple model of London's importance in changing English society and economy', *Past and Present* 37 (1967), repr. in E. A. Wrigley, *People, cities and wealth, the transformation of traditional society* (1987); F. J. Fisher, 'The development of London as a centre of conspicuous consumption', repr. in P. J. Corfield and N. B. Harte (eds), *London and the economy, 1500–1700* (1990), pp. 105–18.

[5] Malcolm Thick, *The Neat House Gardens* (1998); P. J. Atkins, 'Is it urban? The relationship between food production and urban space in Britain, 1800–1950', in Marjatta Hietala and Tanja Vahtikari (eds), *The landscape of food* (2003), p. 133.

[6] John Middleton, *View of the agriculture of Middlesex* (1798), p. 377.

Other commentators noticed rabbit rearing in or near London by the (landless) poor at this time. In the 1830s, when grain prices continued to be comparatively high, Professor Low wrote:

> It is generally found that the rabbit-warren in this country is a very unproductive species of property. At the present price of the animals, there is scarce an inducement to preserve existing warrens, and none to form new ones.

He added: 'If the rabbit, then, is to be cultivated in this country as an object of profit, he must be reared in the house or yard, and then the variety to be selected is the tame or domestic rabbit'.[7]

Welcome to the topsy-turvy world of urban rabbit production! This was a world where rabbits might be found in lofts, cellars, or indeed in any of the rooms in between; they might be kept by the King in Whitehall;[8] a titled Lady in Kensington; or they might share a cellar with a desperately poor family (see below). This pattern of non-adherence to the theory of alternative agriculture is clearest in the eighteenth century but was probably also observable in and near the London in the late sixteenth century.

II

There was a thriving trade in rabbit skins in the fourteenth and fifteenth centuries; many were exported through London to the Continent. Good-quality skins were at a premium and warreners in the countryside probably bred selectively for fur quality. Snippets of information imply intensive rabbit rearing in and near London in late medieval times: in 1420 London Poulters were ordered to charge no more than 2*d*. for rabbits 'of the field' but up to 4*d*. for those 'of the town', implying that tame rabbits were reared in London and were superior to wild ones.[9] In 1543, Katheren Bracye, a rich widow, died in the London parish of St Nicholas Shambles (near St Paul's). Her multi-storeyed, many-chambered house had, at the top, a 'Connye Chamber' which contained '2 clapers for conys with 6 breders in them', that is, does kept to produce young. At about the same time an anonymous writer wrote a brief but detailed treatise on rabbits, which were hand-fed and probably kept in hutches.[10]

From the late sixteenth century onwards evidence of tame rabbit production becomes more frequent. In the 1580s Sir Hugh Plat made detailed notes of a visit to a suburban rabbit breeding enterprise run by a school friend. Based on a 'pit system' (see below) it was probably sited in a large suburban garden. Plat gives much detail on the equipment used, the structures involved and the economics of the business. This was a commercial enterprise, with up to 20 does and two bucks. Plat was told two does could produce 33 offspring a year whose skins could be sold for 2*s*. or 3*s*. each, a gross annual income from skins alone of £30 to £50.[11]

[7] David Low, *Elements of Practical Agriculture* (1834), p. 607.

[8] *Calendar State Papers Domestic, 1663–4*, p. 45.

[9] P. E. Jones, *The Worshipful Company Of Poulters. A short history* (1981), p. 121.

[10] Ida Darlington (ed.), *London Consistory Court Wills 1492–1547* (London Rec. Soc., 3, 1967), pp. 82–125; TNA, SP 46/66, fo. 144. *Clapper* is a word, of French origin, sometimes used for a rabbit hutch, sometimes for a rabbit court, and sometimes for a warren.

[11] BL, Sloane Mss 2216, fos. 50v–52.

Early in the following century the prolific agricultural writer Gervase Markham published two descriptions of tame rabbit production. In 1616 he edited and augmented a translation from the French of Estienne and Libault's *The Countrey Farme*, which contained a chapter on raising rabbits. Two years later his own work, *Cheap and Good Husbandry,* also had a chapter entitled 'Of the Tame rich Cony, his nature, choyce, profit and preservation'. The former work, originally published in France in 1570 and augmented by Markham from another French work by Olivier de Serres published in 1600, describes a rural warren and also a '*clapier*', an enclosed courtyard similar to the 'court' system for intensive rearing (see below). De Serres's *clapier* was envisaged as a nursery for restocking the main warren but also as an alternative method of raising 'Tame Conies'.[12] Markham's chapter in *Cheap and Good Husbandry* is concerned only with tame rabbits and covers their maintenance fully. Specifically, he describes in detail the construction of rabbit hutches. He advocates selection for fur quality, referring to 'these rich conies'. This chapter was paraphrased or reproduced many times well into the eighteenth century by writers who may have had no personal experience of rabbit breeding.

In the middle of the seventeenth century there was a flurry of interest in intensive rabbit production, centred on Samuel Hartlib and his circle. In 1647 the keen agricultural innovator Sir Cheney Culpepper, possibly influenced by Markham's edition of *The Countrey Farme*, commissioned Adolphus Speed, an associate of Hartlib's, to find a parcel of black rabbits to start a warren in Kent. Culpepper wrote to Hartlib:

> I have a quarter of an acre of grounde walled in, yf that cowlde be made fitte to keepe & feede them in for breedinge & soe from hence to turne them in to an open warren I might perhaps make a tryall of it, I am not willing to trowble myselfe with clappers; but onely with makinge a berry.[13]

Hartlib gathered material on intensive rabbit production, including a paper headed 'To keep tame coneyes had of one in London Anno 1588' and 'An instruction for a warren for tame coneyes found amongst Mr. Sleggers writings'. Cressy Dymock, a regular correspondent, was enthusiastic about tame rabbits but it was Adolphus Speed who was keenest. In a book of agricultural innovations which he first circulated in manuscript and then published in 1659, he sets out detailed but confused proposals for large-scale tame rabbit production in the London suburbs involving either a purpose-built warren or banks of hutches in sheds. He talked to commercial producers who may well have been operating the systems he described.[14] John Smith, probably a former captain in Cromwell's army and an expert arboriculturalist, described a similar plan for a large shed containing banks of hutches in 1670. In the previous year John Worlidge produced the first published an account of the pit system. Worlidge mentions several different breeds of rabbit and implies a suburban setting for his pit. John Mortimer, in 1707,

[12] Charles Estienne and Jean Leibault, *Maison Rustique or the Countrey Farme* (1616), pp. 646–8; Gervase Markham, *Cheape and good husbandry* (1657), p. 108; Olivier de Serres, *Le Theatre d'Agriculture* (1617), pp. 367–78.

[13] M. J. Braddick (ed.), 'The letters of Sir Cheney Culpeper, 1641–57', *Camden Miscellany, XXXIII* (Chetham Soc., fifth ser., 7, 1996), pp. 311–12.

[14] University Library Sheffield, Hartlib Papers, HP 62/32/1A; HP 67/5/1A–4B; Adolphus Speed, *Adam out of Eden* (1659), pp. 1–13.

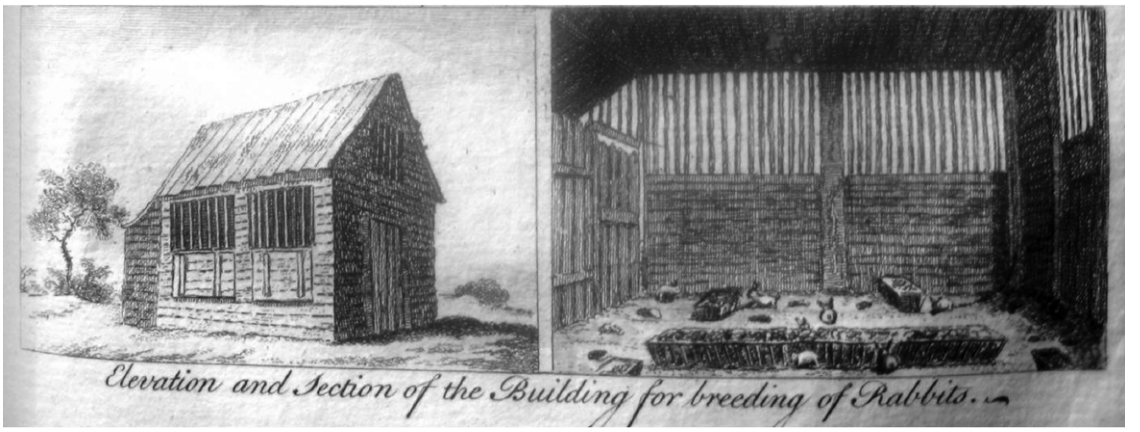


FIGURE 1: 'Elevation and Section of the Building for Breeding of Rabbits'. Thomas Hale, *A Compleat Body of Husbandry* (1758), facing p. 231. Photo: author.

remarked on the profitability of raising tame rabbits near big towns.[15] In the 1720s Richard Bradley based some of his observations on tame rabbit production on a large suburban London enterprise at Hammersmith housed in two storeys of a former wallpaper factory. This was in business more or less until the 1830s. He also viewed a courtyard system for breeding tame rabbits, situated in the suburban garden of Lady Belassis in Kensington.[16]

Of the many descriptions of tame coney-keeping in the eighteenth century, perhaps the most comprehensive is found in *A Compleat Body of Husbandry*, by Thomas Hale published in 1758. He writes: 'There are several methods for breeding and keeping of them. Some allow more and some less liberty to the animal'. He outlines all the methods already mentioned, adding the further variant of a large shed where rabbits are allowed to run freely (Figure 1).[17] Finally, in 1810 we have an eyewitness account of rabbits in hutches kept in long sheds, bred in Aylesbury for the London market.[18]

Supplementing these printed descriptions from agricultural writers are mentions of rabbit production in and near London in the eighteenth-century Old Bailey court records. These scattered remarks are valuable because they allow us to glimpse individual enterprises, both great and small, in this period. There *were* big enterprises but the overwhelming impression is of rabbit keeping as a part-time occupation. Even those clearly in business seem to play it down, like the man who kept rabbits in Kensington gravel pits in 1783. When asked, under examination, in court, 'you deal in them I suppose?', he replied ambiguously:

> Yes, I keep them for the amusement of my child, to keep him out of the street, from bad company, I lost twenty-nine on the 2nd of May, I fed them the night before, they were all in

[15] John Smith, *England's Improvement Reviv'd* (1670), Book Five, pp. 143–4; John Worlidge, *Systema agriculturae* (1675), pp. 162–3; John Mortimer, *The whole art of husbandry* (1707), pp. 252–3.

[16] Richard Bradley, *A general treatise on husbandry and gardening* (1726), pp. 21–3, 338–61; Thomas Faulkener, *The history and antiquities of the parish of Hammersmith* (1839), p. 52.

[17] Thomas Hale, *A compleat body of husbandry* (4 vols, 1758–59), II, ch. XXVI, 'Of the tame rabbit'.

[18] St. John Priest and Richard Parkinson, *General view of the agriculture of Buckinghamshire* (1810), p. 331.

> pens, and locked in the pens joining to the wall close to the house … young ones I sold for 11*d*. a piece, and the old ones were worth 3 or 4*s*.[19]

By the end of the eighteenth century more emphasis was placed by commentators on rabbit keeping as an activity of poor people. They were probably less affected by market forces. A few rabbits could be fed on waste vegetables scavenged from the markets rather than bought-in feedstuffs and the poor might eat their rabbits if the return on selling them was low.

None of the sources used in this paper specifically mention instances of rabbits as pets. Recent studies on the history of the relationship between animals and man offer no examples, although MacGregor does admit the possibility of pet rabbits in this period. Pet rabbits feature in nineteenth-century English paintings but not earlier ones. The Kensington man quoted above *sold* the rabbits he kept to amuse his son. Live rabbits certainly gave pleasure: rural warrens were created near houses so that rabbits at play could be observed, and Plat suggested a banqueting house above his rabbit-pit where 'you may with no small pleasure behold them feeding at theyre racke and skipping upp and downe'. But even those keeping a few rabbits talked in terms of their eventual destination for the skinner or the pot.[20]

III

In our period, tame rabbits were raised for meat or for fur. (The only other product of rabbit rearing was their dung, considered to be a useful by-product because of its richness.)[21] By the 1660s breeds had developed with distinctive fur colouring and varying capacities to put on flesh quickly. John Worlidge in 1669 advised:

> The black or silver-haired are most usually kept tame, their skins being of great value. The great Dutch-Rabbit is the best for food, being much larger than the others. But the Shock-Rabbit of Turkie is the most pleasant, having long and fine hair, and is now become the most in mode.[22]

The question of meat or fur is to some extent academic for it was impossible to have one without the other. Nevertheless price variations of both commodities made one or the other the dominant reason for intensive production. Taking a long view through the various texts extolling rabbit production, most give emphasis to the profits from their fur, and consequently advise selection for fur quality. This is particularly the case from the 1580s to the 1660s. (Or even earlier: an undated paper in the State Papers which, from spelling, looks as if it is from the first half of the sixteenth century, advises: 'The old Conyes Skines, are in season, when ye blowe them whyte all on the backe & under the Belly'.) As Gervase Markham remarked in 1618, they 'give their bodies gratis, for their skins will ever pay their Masters charge with

[19] *Old Bailey Proceedings Online* (www.oldbailey online.org), June 1783, trial of William Jenkins, otherwise Jennings (t17830604–3).

[20] Arthur MacGregor, *Animal Encounters* (2012), pp. 182, 386; Ingrid Tague, 'Companions, servants, or slaves?', *Studies in eighteenth-century culture* 39 (2010), pp. 111–30; BL, Sloane Mss 2216, fos. 50v–52.

[21] William Ellis, *The practical farmer or Hertfordshire husbandman* (1759), p. 140.

[22] Worlidge, *Systema agriculturae*, pp. 173–4.

a most large interest'. In 1659 Adolphus Speed advised that black rabbits should be bred, for their fur was 'worth near 3*s*. 4*d*. the skin, and in goodness near Bever'.[23]

An anonymous writer thought in 1737 that if rabbits were well kept, 'The sweetness, and good relish of their flesh, undoubtedly is a very desirable thing',[24] but over the century, writers usually recommend tame rabbits both for meat and fur. In 1758 Thomas Hale wrote, 'The silver-hair'd rabbit, is a very profitable kind to be kept tame: The Dutch is a larger kind, and is very good for the table, but the skin is of less value'. This pattern over time probably reflects the increased production of rabbits within towns, especially London or in the inner suburbs where it was relatively easy to market both fur and flesh. Rabbit sellers in the seventeenth and eighteenth centuries in London are often depicted with skinned rabbits on a pole, having taken the profit from fur before selling the meat. Alternatively a hawker would offer to buy discarded skins from kitchen maids.[25] The main return was seemingly again in the skins in 1802 when Arthur Young favoured breeding black-furred rabbits: 'The skin of this is dressed as a fur; and as the skins sell for about 4*s*. a dozen, more than those of the common sort, it is a sufficient inducement for propagating it'. The combination of much larger size and much better fur quality gave urban tame rabbits the edge in the market place over wild rabbits brought in from the countryside.[26]

IV

Writers recommended various methods of keeping tame rabbits. The pit system was suited to large-scale production but could not be used in very built-up areas: it needed a large garden in which the pit could be sunk. John Worlidge advises this system only 'if you have much garden-ground' and Arthur Young captures the ideal site when he calls this method 'Orchard Rabbits'. Before Young's account of 1802, we have three detailed considerations of this method, Plat's in the 1580s, another manuscript one by John Evelyn, *c*.1650–1700 and Worlidge's description of 1669. (Later writers copied Worlidge.) All are quite detailed, especially the earliest one which comes from an undated notebook of Sir Hugh Plat's.[27]

Plat was a London-based proto-scientist keenly interested in many things, amongst them agriculture. He describes an intensive rabbit pit operation in the suburbs, run by an old friend of his, 'Mr. Parsons my scholefellow being an Apothecarie'. To keep 10 or 20 breeders with two bucks, a grass plot of at least one rood (1210 square yards) was enclosed with a brick wall. In part of this enclosure a pit 5 feet deep and 15 or 20 yards square was sunk, brick-lined but with some bricks missing at the bottom to afford the rabbits room to make their earths. Gravel round the walls prevented the rabbits tunnelling too vigorously. A long wooden chest was placed in this vault, with a hinged door-flap at one end and a hinged roof-flap. The rabbits were fed from a large rack (made of wire to prevent the rabbits nibbling it) with little partitions so that each animal could feed without disturbance from its neighbour. A stepped slope out of

[23] TNA, SP 46/66, fo. 144; Markham, *Cheap and good husbandry*, p. 108; Speed, *Adam out of Eden*, p. 8.

[24] Anon., *The complete family-piece; and, country gentleman, and farmer's, best guide*, (1737), p. 511.

[25] Marcellus Laroon, *The cryes of the city of London drawne after the life* (1711); Henry Margary (ed.), *Facsimile of cries of London, c.1754* (1978).

[26] Arthur Young, *Gleanings from books on agriculture and gardening* (1802), pp. 324–6; BL, Sloane Mss 2216, fos. 50v–52.

[27] Young, *Gleanings*, pp. 324–6; Worlidge, *Systema agriculturae*, pp. 173–4; BL, Sloane Mss 2216, fos. 50v–52.

the vault allowed the rabbits access to the grass enclosure. A board hung on each wall could be let down suddenly to stop the animals entering their earths. A little bundle of hay hung on a string in the vault gave some food to the rabbits: in the rack they were provided with bran and parched oats. 'I have heard parched otes greatly commended to make the doe to take buck the sooner'. The rabbits could also chew on grass, 'and it will not bee amisse to throw them now and then somme greene meate or carrett toppes, mallows, dandelion etc.'

Every morning the rabbits were to be let out of the vault and the floor swept clean. To count or sort the rabbits, the side boards were let down to stop them entering their earths, the door flap of the chest or bin was opened, and the rabbits were shooed into it. The door was closed, and the roof flap opened 'and you shall see them all like a flock of sheepe together'. Surplus bucks (above the ratio of one buck to 10 does) were castrated when three or four months old. 'This buck will grow in a short tyme to be exceeding fatt, very white of flesh, and of a good leane.' For the best returns Plat advised, 'Now because this enclosure will be costly, I hold yt best to keepe only such bucks and does as bee of silver coullor'.[28]

John Worlidge details a pit largely arranged as described by Plat. He advises, 'In a pit of about ten foot square may be kept two or three *does* (besides the *buck)* which will bring each of them about fifty or more young ones in a year, sometimes seventy or eighty'. Applying Worlidge's stocking ratio to Plat's friend's pit, involves, say, 40 does and 10 bucks, producing, at least 660 offspring.[29] In his unpublished *Elysium Britannicum* (*c.*1650–1700) John Evelyn describes, and sketches, a pit-system for a garden which is detailed and again very similar to that of Plat. Indeed, one wonders if he was drawing on Plat's manuscript for he knew two people who at one time or other possessed Plat's papers, Thomas Henshaw and Sir Hans Sloane.[30]

The courtyard system had affinities with the rabbit pit. Both had bucks chained up at one end, individual burrows for the does, and systems of flaps to isolate and count the rabbits. The big difference was that rabbits were housed in a paved area surrounded by a wall, rather than sunk in a pit. In the 1720s Richard Bradley sets out in detail how to construct and run a rabbit-court in reply to a gentleman who wishes to create a 'garden of profit' in the suburbs. It is clear from the coincidence of this passage with an earlier description of an actual rabbit-court that he is using the former as his template. This court Bradley found in Kensington, in the garden of 'the late Lady Belassis … for the breeding and feeding of rabbets, in such a manner, as that, by constant supply of nourishing food, she might draw at any time of the year a sufficient quantity to oblige her friends, and serve her table'. To contain the rabbits, she 'wall'd in a large square place, and paved it at the bottom'. Two initial attempts were made to create almost natural conditions for the does – heaps of earth were rammed hard and grassed over, so that burrows might be made in them by the does, but the burrows collapsed. A second attempt using a terrace of brick arches filled with earth was not successful either. Earth again fell in, the bucks attacked young rabbits, and it was difficult to catch the rabbits. So:

> at length [she] concluded to build distinct cells for every female, so order'd that they might hide themselves at pleasure, or take the liberty of the enclos'd ground when they thought

[28] BL, Sloane Mss 2216, fos. 50v–52.

[29] Worlidge, *Systema agriculturae,* pp. 173–4.

[30] MacGregor, *Animal Encounters*, pp. 382–3; Malcolm Thick, *Sir Hugh Plat: the search for useful knowledge in early modern London* (2010), pp. 372–5.

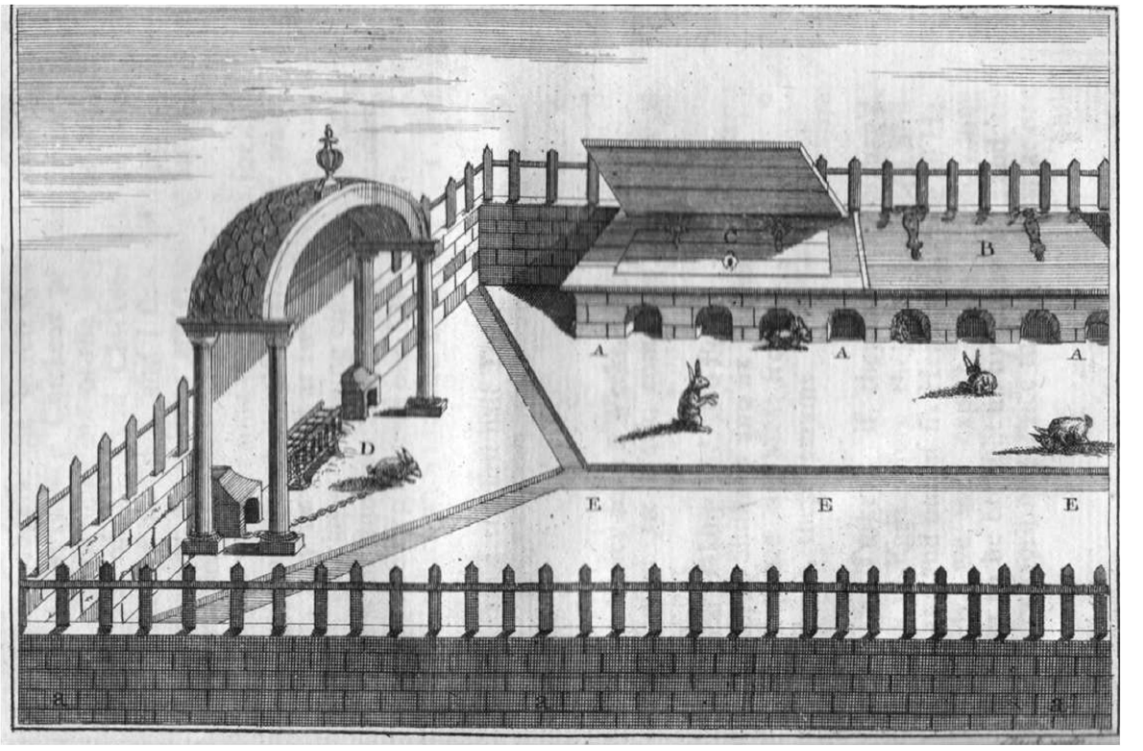


FIGURE 2. Bradley's illustration of a rabbit courtyard, probably that of Lady Belassis in Kensington. Richard Bradley, *A general treatise on husbandry and gardening* (1726), facing p. 358. Photo: author.

> fit; these cells were covered with boards, lying penthouse-wise, made to open at discretion, for the better catching of rabbets.

Trapdoors could be closed to trap the animals in the cells. Bucks were chained under cover at one end, near the food racks. The paved floor sloped to aid cleaning. Normal stocking was two bucks and 50 does. Bradley's later instructions contain an illustration of a court, which, from the elegance of the architecture, was almost certainly a picture of Lady Belassis' (Figure 2).[31]

The unsuccessful initial attempts of Lady Belassis are interesting. Did she have no template to work from? Was hers the first purpose-built court in the London suburbs? The only English description of such a court prior to Bradley is in *The Countrey Farme* of 1616. Markham's edition has a chapter describing the making and use of a 'Clapper'. This word, from the French *clapier* is sometimes translated in English simply as warren, sometimes as rabbit-hutch, and in this case, as what looks very much like a rabbit court, a breeding area and nursery for a rural warren. The reader is instructed to:

> make a clapper in some corner of your court, kitching, or garden, which may be foure square, narrow, and fenced in with bords, or plaistered walls … you must build certain

[31] Bradley, *General treatise*, pp. 21–3, 92.

> small lodgings paved with boords, and these must have holes thereof left so wide, as that the young ones might passe out and in unto their dams … you must build certain small lodgings paved with boords, and these must have holes in them like to those which the conies make themselves in the earth, and every one severall from another, for the conies to betake themselves into: and it will be enough for to allow in such places one male to eight or ten females; and yet therewithall to keep the buck close shut up in his lodgings, for feare he should hurt and wrong the young ones.

It is made clear that 'clapper conies' are tame.[32]

The simplest way to contain rabbits was in the humble hutch. These were the most versatile containers for rabbits, suitable for both small and large-scale production. We have encountered the widow who kept 'six breders' in 'two clapers for conys' in her 'Connye Chamber' in 1543. Gervase Markham, in 1618, whilst not using the word hutch, gives a clear description of one, indeed; his rabbit hutch would be recognizable by rabbit-keepers today:

> The boxes in which you shall keep your tame conies, would be made of thin wainscot boards, some two foot square, and one foot high; and that square must be divided into two roomes, a greater roome with open windowes of wire, through which the coney may feed; and a lesser roome without light, in which the coney may lodge and kindle, and before them both a trough in which you may put meat, and other necessaries for the coney, and thus you may make box upon box in divers stories, keeping your bucks by themselves, and your does by themselves, except it be such does as have not bred, and then you may let a buck lodge with them.

Markham's much-copied instructions on keeping rabbits in hutches appeared in books published in 1725, 1726, 1735, and 1758.[33]

Markham's observation that 'you may make box upon box in divers stories' was also suggested by several later writers for those breeding tame rabbits on some scale. Adolphus Speed, in his chapter on rabbits in 1659, writes that he had known of 'five hundred breeders at a time in an house … in Hutches'. He sees no reason why 1000 may not be kept this way, or, 'the Rabbits in the house we turn out at liberty to go out and come in when they please'.[34] Worlidge in 1669 thought rabbits might be kept 'either in Hutches, or in pits', and a year later, in a chapter on an ideal country estate, the forestry expert John Smith was clearly influenced by intensive production near London when putting forward his ideas:

> it hath been my care both to treat with Warreners and Poulterers in London about the same, and they all condescend to my Propositions, and also say that London markets will take off or vent five times more in one or both seasons, than can be bred of a thousand Does.

Smith proposed a warren of 10 acres, enclosed by an 18-foot-wide moat but the rabbits were housed in a 'shed or low rooft House 4 square'.

[32] Estienne and Liebault, *Maison Rustique*, pp. 645–8.
[33] Markham, *Cheap and Good Husbandry*, p. 108.
[34] Speed, *Adam out of Eden*, pp. 1–13.

> Within this house we shall place 240 conie-hutches or boxes, each of them containing five rooms one above the other, or five stories high; in which rooms must be kept 1000 breeding doe conies, and 100 bucks, every one of them in a several room.[35]

Both Speed and Smith say large profits are to be made from mass rabbit production in hutches: John Mortimer in 1716 observes 'many make great profit of them, by keeping of them in hutches near great towns' and William Ellis in 1759 thought: 'They are more profit, by far, in hutches than in pits'.[36]

Richard Bradley obtained some statistics on rabbit keeping from a large suburban enterprise in Hammersmith in the 1720s. He gave no details of it but a later writer did:

> Rabbit-breeding was formerly carried on extensively at Starch Green; the concern is mentioned by Bradley, as being in a flourishing condition in the year 1720. It had gone to decay for many years, but was revived about twenty years ago, and existed till within these two years [i.e., 1837], when the premises and property were seized and sold by the landlord. The building occupied by the rabbits had been originally built for a paper-hanging manufactory, it was divided into two stories, and was conveniently fitted up to contain one thousand breeding does, which were of the largest breed, weighing from eight pounds to eighteen pounds each, and were of the species called double lops, and single lops, and double smuts, and single smuts, of various beautiful colours. The rabbits were disposed of wholesale, at Leadenhall Market.

This was most likely to have been a business which kept rabbits in hutches.[37]

In 1810 it was said that 'Tame rabbits are generally confined in hutches, or boxes, and many are kept in the vicinity of London', and in 1813 it was reported that intensive production of rabbits in hutches was carried on by several poor producers in Aylesbury for the London market:

> not a small number are sent yearly and weekly to London markets from hence. They are kept by poor men in houses: the houses are oblong: there are three or four such at Aylesbury. One of these is fifteen yards long, three yards wide, and about seven or eight feet high. It is built of clay and covered with tiles, and has a room by a roof leaning to it on one side to lay the food. The lockers for the rabbits are ranged one above another on each side of the house, but raised from the floor to secure them from rats. Each locker is about 3 ft. long, 18 in. wide, and 2 ft. high, and its front formed of wire like a cage for birds. Each locker has a drawer for brewer's grains, and a small neat rack over it made of wire, to hold clover. The breeding lockers have an additional locker to them, length 9 in. One man, who is said to have the greatest number at Aylesbury, keeps 200 breeding does and 20 bucks. Another has 140 breeding does and ten bucks: the house of the latter is nineteen yards long and three yards and a half wide.[38]

[35] Smith, *England's Improvement Reviv'd*, Book Five, p. 143.

[36] Ellis, *Practical Farmer,* p. 139; Mortimer, *Whole art of husbandry,* pp. 252–3.

[37] Faulkener, *Hammersmith*, p. 52.

[38] Priest and Parkinson, *General view ... Buckinghamshire* p. 331.

A final method of keeping rabbits which is occasionally mentioned is simply to build a shed and let the rabbits have the run of it, providing them with food in feeding racks and presumably chaining up the bucks at one end. John Hale in 1758 includes an illustration of one such rabbit-house in his chapter on breeding tame rabbits (Figure 1).

Writers over time suggested similar types of food for tame rabbits, varying only in emphasis. Some, like Plat, another anonymous sixteenth-century writer, and Hale in 1758, placed bran and oats first, supplemented by garden produce and weeds such as dandelions and mallows, as well as grass. Others, such as Worlidge and Ellis, placed the emphasis on garden produce or weeds and this was the principal food of Lady Bellassis' rabbits, according to Bradley. Breeders in Aylesbury were, in 1813, said to feed their rabbits four times a day on brewers' waste grains and clover hay.[39]

V

These 'textbook' methods of intensive rabbit production were, in practice, often modified to suit individual circumstances. We can examine how rabbits were actually kept in London in the eighteenth century by courtesy of the invaluable Old Bailey court records. Rabbits were, on occasion, like much else in London, stolen; also, stolen goods were hidden in or under hutches, or in rabbit houses and so came within the scope of the court transcripts. Given that most urban rabbits were probably not molested or disturbed, the court records must account for just a few of the instances of eighteenth-century London rabbit keeping. In summary, I find rabbits in the eighteenth-century Old Bailey Records kept in the following locations: lofts/rooms in houses, four; cellars, five; rabbit houses/pens, three; outhouses, three; yards/courtyards, three. Note that, in half of the incidences, rabbits were kept within dwelling houses like the much earlier instance of Katheren Bracye's 'Connye Chamber'. Smelly, and insanitary as it may seem, there were other such lofts in London in the eighteenth century. In 1730 one William Hunter had a rabbit loft in a garret of his house,[40] a cobbler's house in Westminster housed rabbits upstairs in 1771,[41] and a loft previously used to keep rabbits was rented by a counterfeiter in 1795.[42] In several instances, other parts of houses were rented by people who did not live there, but used them to house rabbits. In 1776 a former coachman rented a room and 'came backward and forward twice a day to feed his rabbits'. He had: 'Fourteen breeding does; he bred them and sold them'.[43] Rabbits were to be found in cellars, on their own or living with their owners. One poor girl died in a damp cellar, on a bed made from rabbit hutches,[44] and William Platten's wife shared a cellar with her rabbits.[45] Some cellars contained many rabbits. That of a lodging house

[39] University Library Sheffield, Hartlib Papers, HP 62/32/1A; BL, Sloane Mss 2216, fos. 50v–52; TNA, SP 46/66, fo. 144; Worlidge, *Systema agriculturae*, pp. 162–3; Bradley, *General treatise,* pp. 21–3.

[40] *Old Bailey Proceedings Online*, trial of Mary Boar, Oct. 1730 (t17301014–48).

[41] *Old Bailey Proceedings Online*, trial of Thomas Able and Thomas Walker, Jan. 1771 (t17710116–13).

[42] *Old Bailey Proceedings Online*, trial of Solomon Idswell, May 1795 (t17950520–26).

[43] *Old Bailey Proceedings Online*, trial of Robert Williams, Jan. 1776 (t17760109–24).

[44] *Old Bailey Proceedings Online*, trial of William Wade, Feb. 1784 (t17840225–63).

[45] *Old Bailey Proceedings Online*, trial of Susanna King, Elizabeth Crompton and Henry Jones, Jan. 1796 (t17960113–71).

in 1799 contained 'a parcel of rabbits' estimated at 150. The landlady admitted that some of the other 'lodgers complained very much' about this.[46] One amusing incident involves a rabbit in a cellar: Thomas Stephens, in his defence against a charge of drunken assault in 1746 explained:

> I am a Cabinet-maker by Trade … I went to see a Friend home that had come to see me and my Mother, and I drank at the Nag's-head in Hedge-lane. I being much fuddled, I would not go home till I had drank with her there. As I sat, I had three Pints of Beer. I met with another Neighbour, and would make her drink. I went in again, and had a Pot of Beer, and half a Pint of Gin'.

He was pretty drunk by this time. No doubt the drink made him hungry, so he:

> desired the man of the house, as he had a rabbet in the cellar, I desired to have it; I was so fuddled, that in catching the rabbet, I fell upon my face. My Mother sent the maid for me to fetch me home, but I would not go, but went a ramble.[47]

Rabbits were also kept in wash-houses, outhouses, and yards, loose or in hutches. Sometimes they had the run of the premises. A shoemaker from Wapping in 1750 explained, 'my dwelling-house, was broke open … at night, and from thence were taken out 23 rabbits, which were in the shop when I shut it up at a little after ten o'clock'.[48] Some of the more commercial rabbit-keeping enterprises however, did have specialist accommodation for their stock, special 'rabbit-houses' tended by 'rabbit-men'. One of several breeders occupying Kensington gravel pits, in the London suburbs kept 'rabbits in pens'. It is difficult to distinguish between private use and commercial rabbit keeping because, although some kept just one or two for personal consumption, many people seem to have kept a few both to eat and to sell. As William Ellis remarked in 1759 'Rabbits not only supply the markets, but also serve a family for variety and at a time of necessity'.[49]

Old Bailey evidence is more abundant for commercial than private breeders. Some we have already encountered – the Wapping shoemaker with rabbits in his shop, the Kensington man with rabbits in cages, and the one who had 150 in a cellar. A so-called 'rabbit-man' who, in 1736, had a walk-in rabbit house near Charterhouse, was also full-time producer.[50] A carter, who went to Oxford Street in 1789 to 'take up a load of rabbets dung' must have been visiting a substantial business.[51] The Old Bailey records therefore reveal that tame rabbits were definitely part of the economy of London in the eighteenth century, albeit that in many instances they were kept in an *ad hoc* manner by the poor or middling sort as an adjunct to their main occupation or as a desperate attempt to obtain any income, confirming the view of Middleton, quoted above, from 1798. The heyday of large-scale, intensive production, to judge by contemporary reports, was in the second half of the seventeenth century and the beginning of the eighteenth.[52]

[46] *Old Bailey Proceedings Online*, trial of Ambrose King, Sept. 1799 (t17990911–88).

[47] *Old Bailey Proceedings Online*, trial of Thomas Stephens, Dec. 1746 (t17461205–9).

[48] *Old Bailey Proceedings Online*, trial of John Allen and Elizabeth Davis, May 1750 (t17500530–33).

[49] *Old Bailey Proceedings Online*, trial of William Jenkins otherwise Jennings, June 1783 (t17830604–3); Ellis, *Practical Farmer,* p. 141.

[50] *Old Bailey Proceedings Online*, trial of Elizabeth Bailey, Dec. 1736 (t17361208–25).

[51] *Old Bailey Proceedings Online*, trial of Charles Lee, Jan. 1789 (t17890114–57).

[52] Middleton, *View ... Middlesex*, p. 377.

VI

Despite the complaint of one gentleman in 1741 that 'standing in close places, and in a gross air, is apt to taint their flesh',[53] the indications are that rabbit meat was familiar fare for many Londoners. Both published and manuscript recipe books of the period contain rabbit recipes and many of the references to rabbits in the eighteenth-century Old Bailey records confirm that they were on the menu for ordinary Londoners. In 1758 Anne Coulter, an old clothes seller living near Hanover Square, after successfully selling her wares, purchased a rabbit for 6*d*. to cook for her supper;[54] the common law wife of a counterfeit coiner passed a bad shilling to buy a rabbit in 1771;[55] in 1785 a thief stole a watch as she bargained in a shop for a couple of rabbits; and in June 1764 Mrs Oake, a lodger occupying one room, was given 2*s*. by a friend to buy a rabbit and fry it for his supper.[56] Many who lodged in London had to rely on their landlady for meals: one couple, in 1732 were given 'A goose roasted, a giblet-pye, and two rabbits' for dinner, a good meal, the judge in this case remarked, 'considering [the landlady] … boarded both a man and his wife for 7*s*. a week'. Another lodger, who *did* have cooking facilities, invited a friend to supper in 1763 announcing that, 'he had three rabbits, and he would smother them with onions'.[57]

Some inn- and tavern-keepers kept rabbits (like the landlord of the Nag's-head in Hedge-lane above). David Jones, who ran the Black Horse, George-yard, had his cellar broken open in 1788. No doubt the burglars were mainly interested in the 'three gallons of brandy … a gallon and a half of rum [and] three gallons of gin bitters' which they took, but they also went off with two live rabbits.[58] Other rabbit keepers were publicans. I have noted several instances in the Old Bailey trial records of customers going into a tavern and ordering a rabbit dinner, confident that there was one available to satisfy their hunger. It seems likely that London inn- and tavern-keepers commonly kept a few live rabbits as a ready supply of fresh meat. This was a sensible strategy – the meat kept fresh until needed, and a rabbit was a small animal – slaughterable for one meal.[59]

Many working people, criminals with money and some of the middling sort ate their main meals in modest public houses in London. Some small establishments cooked one dish for household and customers alike and this might include rabbit: Sarah Thompson shared the communal meal of rabbit at the King William Tavern, Charing Cross, in 1741. Some drinking establishments cooked meat brought in by customers. A murder victim in 1725 walked into 'the Feathers Alehouse in Holborn … and brought a couple of rabbits in his hand, which he order'd to be roasted for supper'. In 1695 Elizabeth Robinson went to one such establishment

[53] Anon., *Complete Family Piece*, p. 511.

[54] *Old Bailey Proceedings Online*, trial of Jane Widderington, Richard Coulter and Ann Coulter, Jan. 1758 (t17580113–9).

[55] *Old Bailey Proceedings Online*, trial of Samuel Byerman, May 1771 (t17710515–21).

[56] *Old Bailey Proceedings Online*, trial of Munday Musturs, otherwise Pawlet, Jan. 1764 (t17640113–3).

[57] *Old Bailey Proceedings Online*, trial of Corbet Vezey, Jan. 1732 (t17320114–12); trial of Richard Sinderbury, Oct. 1763 (t17631019–31).

[58] *Old Bailey Proceedings Online*, trial of Abraham Lee, John Myers, Feb. 1788, (t17880227–20).

[59] *Old Bailey Proceedings Online*, t17300116–8; t17350116–50; t17391017–3; OA17410916; t17971206–1; t17441205–62; t17570420–42.

'and brought a rabbet with her, intending to treat some soldiers with'. Instead, she stole two silver spoons, 'and pretended that she would go and buy parsley and onions for the rabbet, but went away with the goods, and left her rabbet behind her'.[60]

A meal at a tavern was something special for many Londoners. There they could order fashionable 'made' dishes, rabbit recipes included, which we find in cookery books written by the top London tavern cooks – the celebrity chefs of their day. A gentleman trying to seduce a woman he met in the Park in 1757, bought her gloves, then, 'At the New Inn he had a rabbet for dinner, and he drank to her three times'. Another woman picked up in the Park was taken to the Hercules Tavern, where her companion ordered 'a fryed rabbit, and he pressed her to eat some, but she would not'. Two young girls accused of theft had gone to a tavern where the boldest 'had wine, and a rabbit, a French cook frigaseed it'. The younger one, overawed by the place 'did not taste it, I had nothing but a bit of bread and butter. I sat crying'. At a more convivial meal at a London inn in 1741, two men 'supp'd together of a boil'd Rabbit smother'd with onions and a roasted fowl'.[61]

Thus rabbit meat, once a delicacy for the rich, seems by the eighteenth century to have been enjoyed by all classes, to judge from those consumers who came into contact with the Old Bailey. Prices for meat mentioned in these records place rabbit meat, on average, at some 90 per cent of the cost of beef, pork or lamb during the period.[62]

VII

To conclude, some thoughts on the origins of commercial tame rabbit production near London. Rabbits in hutches go back at least to 1543. Tame rabbits are said to have been bred by monks in pit systems before the Dissolution[63] but I have found no English evidence to support this. It seems strange that, in the absence of earlier examples or comment by writers, Sir Hugh Plat in the 1580s presents us with a sophisticated pit system with individual cells for does, flaps and moveable ceiling boards to count and isolate the animals, feeding racks, controlled breeding and so on, as advised in French textbooks. I feel it is unlikely that the technology was copied by Plat's schoolfriend from a French agricultural manual, neither is it probable that it was developed over a number of years in England without anyone remarking on it. It is possible that one or more people skilled in this system arrived from abroad and demonstrated its viability to men such as Plat's friend. If so, where did they come from?

The obvious answer is from northern France or the Low Countries, Protestant refugees fleeing persecution in the second half of the sixteenth century. Many settled in London and the suburbs, bringing new crops and new ways of operating intensive agriculture and gardening. It has been argued that both Estienne and Liebault's *Maison Rustique* of 1570 and the French

[60] *Old Bailey Proceedings Online*, trial of Elizabeth Robinson, Aug. 1695 (t16950828–6); trial of Foster Snow, Oct. 1725 (t17251013–25); trial of Henry Baynes, Sarah Baynes, alias Bird, Susanna Thompson, Hannah Randal and Thomas Blewet, Apr. 1731 (t17310428–66).

[61] *Old Bailey Proceedings Online*, trial of Daniel Lackey, Apr. 1757 (t17570420–42); trial of Ann Hedley, Dec. 1744 (t17441205–62); Ordinary's Account, 16 Sept. 1741 (OA17410916).

[62] I have estimated the weight of meat on a tame rabbit at 2.5 lbs for this calculation.

[63] Bob D. Whitman, *Domestic rabbits and their histories: breeds of the world* (2004), p. 346.

Protestant writer Olivier de Serres's book on agriculture of 1600 reflected a bourgeois attitude to estate management – a willingness to try new things, to farm intensively near large towns and with an eye to the market and it is reasonable to suppose both works were reporting types of rabbit production well under way in France. It may be also be significant that Worlidge, in 1669, recommends 'The great *Dutch Rabbit*'. This is an admittedly thin case for the development of a sophisticated pit system by Continental Protestants but I live in hopes of finding a refugee Dutchman or Frenchman in 1580s London breeding rabbits.[64] For the moment though, we can conclude that domestic rabbit breeding should not be seen as an aspect of alternative agriculture in the sense intended by Joan Thirsk, but as a way in which a metropolitan population, both rich and poor, could have ready access to fresh meat.

[64] Chandra Mukerji, 'Bourgeois culture and French gardening in the sixteenth and seventeenth centuries', in Michel Conan (ed.), *Bourgeois and aristocratic cultural encounters in garden art, 1550–1850* (2002); Worlidge, *Systema agriculturae,* pp. 162–3.

Dutch investors and the drainage of Hatfield Chase, 1626 to 1656*

by Piet van Cruyningen

Abstract

This article tries to disentangle the financial consequences of the drainage of Hatfield Chase by Sir Cornelius Vermuyden and a group of Dutch investors. Recently discovered documents in the Noord-Holland Archives at Haarlem throw a new light on this enterprise. They show that losses incurred by the investors were not just caused by the actions of disgruntled commoners, but also by Vermuyden's chaotic financial management. These losses may have been more limited than has commonly been assumed in the past, because the costs of drainage were relatively low compared with projects in the Netherlands. It is argued that only those investors who had not sold their land before the outbreak of the Civil War incurred heavy losses.

'Only optimists dare to invest in land reclamation' was the conclusion of the Dutch engineer Jacobus Korthals Altes in 1925 after he had studied several seventeenth-century drainage projects.[1] But in the early seventeenth-century Dutch Republic the mood was optimistic. Trade and shipping were booming and entrepreneurs were desperately looking for investment opportunities, and compared with alternatives like tulip bulbs or privateering, participation in land reclamation must have seemed a safe investment. What is more, investors in marshland reclamation in the south west of the Republic had made handsome profits in the 1610s and the drainage of Lake Beemster in North Holland (1607–12) was judged to be a financial success.[2] Hence it seemed a good idea to continue to invest in drainage projects. After 1620, however, opportunities to do this within the Dutch Republic decreased, especially since the lucrative marshland reclamation in the south west came to a standstill because of the resumption of war with the Habsburgs in 1621. Dutch entrepreneurs started looking for investment opportunities abroad, for example in France and Germany.[3]

* I would like to thank Petra van Dam, Heleen Kole, Milja van Tielhof, Maarten Prak and two anonymous referees for their comments on earlier versions of this article. The research for this article was financed by the Netherlands Organization for Scientific Research (NWO).

[1] J. Korthals Altes, 'De eerste bedijking der Groote en Kleine Moeren in West-Vlaanderen', *Annales de la Société d'Emulation de Bruges* 68 (1925), p. 190.

[2] P. van Cruyningen, 'Profits and risks in drainage projects in Staats-Vlaanderen, *c.*1590–1665', in *Jaarboek voor Ecologische Geschiedenis 2005/2006* (2006), pp. 133–4; H. van Zwet, *Lofwaerdighe dijckagies en miserabele polders: een financiële analyse van landaanwinningsprojecten in Hollands Noorderkwartier, 1597–1643* (2009), p. 401.

[3] R. Morera, *L'assèchement des marais en France au XVIIe siècle* (2011), pp. 73, 114–22; O. S. Knottnerus, 'Culture and society in the Frisian and German North Sea coastal marshes', in S. Ciriacono (ed.), *Eau et développement dans l'Europe moderne* (2004), pp. 148–9.

Another opportunity was offered by the vast fenlands of Cambridgeshire, Lincolnshire and Yorkshire, and the levels in Somerset. Plans to drain these potentially fertile areas had already been mooted in the sixteenth century, but due to lack of capital, resistance from the local population and often unrealistic expectations, little had come of them.[4] By the 1620s, however, the time had come to launch a serious attack on these 'wastes'. On the one hand the English Crown, the most important landlord in these areas, was desperate for money and saw improvement of its fenland possessions as a means to raise income, and on the other hand the Dutch were looking for investment opportunities.[5] The young Dutch engineer Cornelius Vermuyden had already migrated to England in 1621, hoping to get the opportunity to reclaim parts of these wetlands.[6] In 1626 he got his first chance, when Charles I granted him the right to reclaim some 70,000 acres of wetlands in Hatfield Chase on the border of Yorkshire and Lincolnshire.[7] Dutch engineering and Dutch capital were supposed to change the fens of Hatfield Chase into fertile fields and generate handsome profits to Vermuyden and the investors. The outcome was less than satisfactory.

The problems encountered by the Hatfield Chase project were partly caused by conflicts with the commoners of the surrounding manors who lost large parts of their grazing rights and saw their pastoral economy endangered.[8] Previous writing on the drainage projects in Hatfield Chase and the Great Level of the fens has strongly concentrated on the conflicts between drainers and the commoners who tried to defend their rights through litigation and riots.[9] Much less attention has been paid to the financial aspects of these projects.[10] This is no doubt partly caused by the fact that there are few sources that provide insight into the way these enterprises were financed and even fewer that permit profits and losses to be gauged. In this respect Hatfield Chase is an exception. In the 1920s Vermuyden's first biographer Korthals Altes had already discovered a collection of documents on the draining of Hatfield Chase in Leiden University Library, which he transcribed and published in the Dutch edition of his biography.[11] These are mostly letters from participants in the drainage of the level, but they also contain some financial information. Much more on the financial aspects of the project is

[4] H. C. Darby, *The draining of the Fens* (sec. edn, 1956), pp. 18–22, 28–38; R. W. Hoyle, 'Introduction: custom, improvement and anti-improvement', in R. W. Hoyle (ed.), *Custom, improvement and the landscape in early modern Britain* (2011), p. 18.

[5] R. W. Hoyle, 'Disafforestation and drainage: the Crown as entrepreneur?', in R. W. Hoyle (ed.), *The estates of the English Crown, 1558–1640* (1992), p. 367.

[6] L. E. Harris, *Vermuyden and the Fens: a study of Sir Cornelius Vermuyden and the Great Level* (1953), p. 33.

[7] J. Korthals Altes, *Sir Cornelius Vermuyden. The lifework of a great Anglo-Dutchman in land-reclamation and drainage* (1925), App. II.

[8] J. Thirsk, 'The Isle of Axholme before Vermuyden', *AgHR* 1 (1953), pp. 16–28.

[9] K. Lindley, *Fenland riots and the English revolution* (1982); C. Holmes, 'Drainers and fenmen; the problem of popular consciousness in the seventeenth century', in A. Fletcher and J. Stevenson (eds), *Order and disorder in early modern England* (1985), pp. 166–95; H. Falvey, 'Custom, resistance and politics: local experiences of improvement in early modern England' (unpub. Ph.D thesis, University of Warwick, 2007); J. Bowring, 'Between the Corporation and Captain Flood: the fens and drainage after 1663', in Hoyle (ed.), *Custom, improvement and the landscape*, pp. 235–61.

[10] An exception is M. Albright, 'The entrepreneurs of fen draining in England under James I and Charles I: an illustration of the uses of influence', *Explorations in Entrepreneurial History* 8 (1955), pp. 51–65.

[11] J. Korthals Altes, *Polderland in Engeland. De geschiedenis van een Zeeuwsch bedijker uit de Gouden Eeuw en zijn grootsche Hollandsch-Engelsche onderneming* (1924), pp. 96–116.

to be found in the archives of the Van Valkenburg family, now in the Noord-Holland Archives at Haarlem.[12] These documents have never been used to study the drainage of Hatfield Chase. Most of them were written or collected by Marcus van Valkenburg, one of the investors in the drainage of Hatfield Chase, in the course of several lawsuits in which he was involved during the 1630s and 1640s. There are dozens of letters to and from his lawyers, but more interesting are the documents he collected to substantiate his claims against Vermuyden and others. Apart from two letters by Vermuyden himself, these are mostly contracts between Vermuyden and the investors, contracts between the investors themselves, estimations of costs and excerpts of account books of some of the investors. The documents in Leiden and Haarlem cover the years 1626–56, so this paper will mainly focus on that period.

'Everything to do with Vermuyden's business affairs is obscure' Hoyle wrote more than two decades ago.[13] This paper aims to bring some enlightenment by analyzing the Leiden and Haarlem documents. It will especially focus on the relationship between Vermuyden and his Dutch backers, the way in which the project was financed and the outcome for Vermuyden and the investors. The conflicts with the commoners will only be treated in as far as they are relevant in this context.[14] The Dutch documents contain very little information about them. Complete clarity will not be achieved, because Vermuyden's business affairs were confused and because there is also considerable uncertainty about this controversial man, who was either uncritically admired or intensely hated and gave rise to 'far-fetched imaginative stories', as his biographer Harris said.[15] So it is useful to first provide some background information on 'that monster of a man'.[16]

I

Cornelius Vermuyden (1590–1677) – from 1629, Sir Cornelius – was born in the small town of Sint-Maartensdijk on the island of Tholen (Map 1). The south-western part of the Netherlands, where this island is situated, is the estuary of the rivers Rhine, Meuse and Scheldt. The islands in the estuary profited from sedimentation, which offered opportunities to embank fertile marshes, but also suffered from erosion and catastrophic floods, especially in the sixteenth century. From the late Middle Ages a group of 'professionals' emerged, individuals who possessed the technical knowledge to embank marshes and to deal with dike erosion and the consequences of floods. These 'engineers' did not receive much formal schooling; they were mostly trained on the job. An impressive amount of knowledge about hydraulic engineering was handed down from generation to generation. Men like Cornelius Werckendet (*c*.1520–75) from Zierikzee and Andries Vierlingh (*c*.1507–79) from Steenbergen became famous authorities and their advice on drainage issues was sought throughout the Low Countries. The Werckendet and Indervelde families even developed into dynasties of drainage experts. These men were more than just engineers. The basis of their expertise was surveying and several of them were

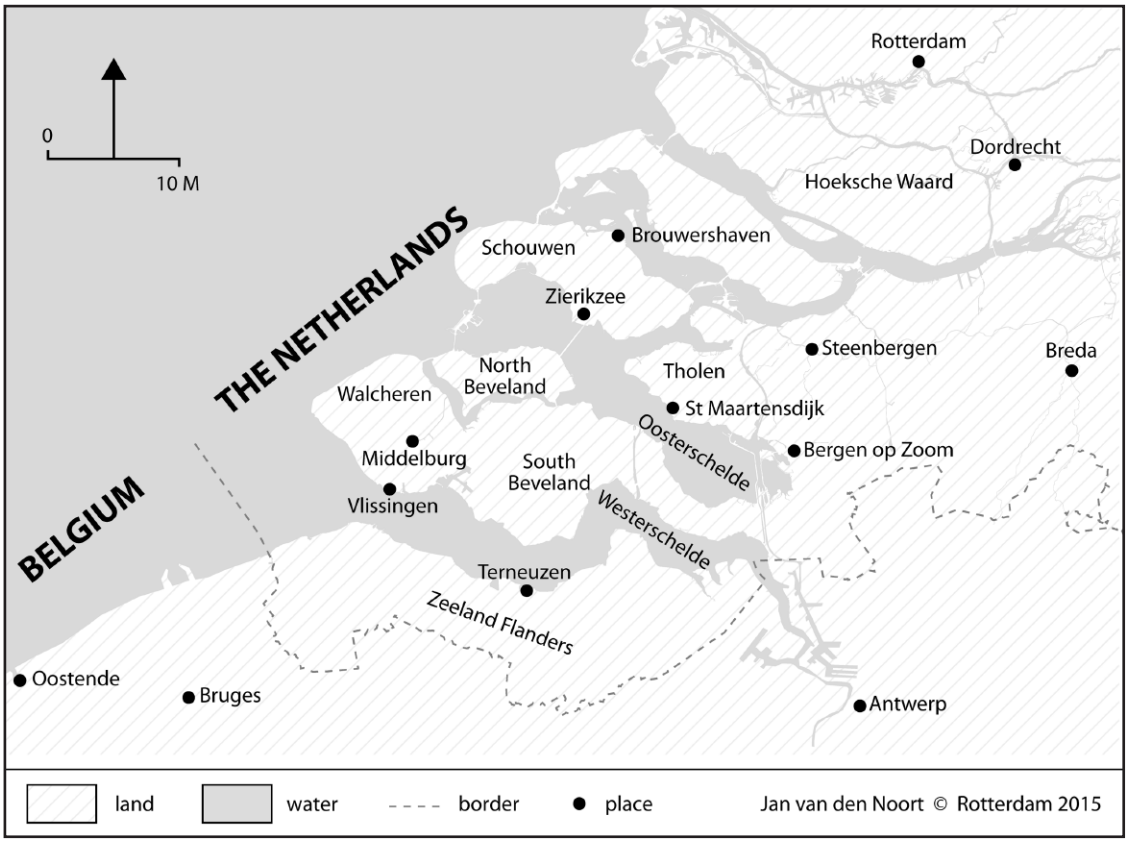
[12] Noord-Hollands Archief, Haarlem (NHA), Van Valkenburg Family (VVF), 943–977.

[13] Hoyle, 'Disafforestation and drainage', p. 382.

[14] For an extensive account see Lindley, *Fenland riots*, pp. 23–33, 71–83, 137, 140–42, 146–57, 188–222, 233–52.

[15] Harris, *Vermuyden and the Fens*, p. 147.

[16] Contemporary quoted in Holmes, 'Drainers and fenmen', p. 187.



MAP 1: The south west of the Netherlands indicating Vermuyden's birthplace and other places mentioned in the text

accomplished cartographers. They also had agricultural expertise and knew how to manage estates. Vierlingh, for example, was for many years the estate steward of the prince of Orange.[17]

Vermuyden's father, Gillis, who died when Cornelius was only eight years old, was a yeoman farmer and alderman of Sint-Maartensdijk. As far as we know, he was never involved in drainage affairs. Grandfather Bartel Vermuyden, however, was bookkeeper of the company that re-embanked the island of Noord-Beveland in 1598. The fact that he participated in this large-scale project and was even member of the board of the company shows he was both wealthy and possessed expertise in drainage.[18] Bartel Vermuyden died in 1609, so Cornelius may have received some training from his grandfather. More interesting, however, are Vermuyden's maternal relatives. His mother was Sara Werckendet, a daughter of the famous expert Cornelius Werckendet. His uncle Lieven Werckendet was also a famous drainage expert

[17] J. Renes, 'Water management and cultural landscapes in the Netherlands', in H. S. Danner *et al.* (eds), *Polder pioneers. The influence of Dutch engineers on water management in Europe, 1600–2000* (2005), pp. 13–32; G. P. van de Ven (ed.), *Man-made lowlands. History of water management and land reclamation in the Netherlands* (2004), p. 132.

[18] J. B. V. Welten, *Droogleggers aan de Oosterschelde. Bewint der dijckagie, 1594–1610* (1993), pp. 23–4, 58; *Genealogie Vermue* (s.l., 1996), p. 5.

and his uncle Marinus was dike reeve of Noord-Beveland. Moreover, his cousin Johan Liens, son of Philippina Werckendet, was also an expert in this field. As a member of the famous Werckendet dynasty, it is not surprising young Cornelius Vermuyden became an engineer too.[19]

During the Twelve Years Truce between the Dutch Republic and Spain (1609–21), Vermuyden had ample opportunities to learn his trade because in those years more than 20,000 hectares of marshland were drained in the south-western Netherlands. In 1614, his cousin Johan Liens was in charge of the draining of a large polder in present-day Zeeland Flanders.[20] It is very well possible that young Cornelius assisted him since young engineers were often trained on the job by older relatives. In England Liens and Vermuyden cooperated too, although the hierarchical relation was changed: Liens became Vermuyden's faithful lieutenant. When war was resumed in 1621, drainage activities in the south west collapsed and Vermuyden had to look for other work. In that year he worked as tax collector on his native island of Tholen.[21] Later that year he moved to England and Harris supposes that his cousin Joachim Liens, who was then Dutch ambassador to the court of St James's, introduced him to James I.[22] That Vermuyden had access to court and received royal protection is evidenced by the fact that James I granted him the drainage of Windsor Park in 1623.[23] The Liens and Werckendet families were not only important for Vermuyden because they passed their knowledge of hydraulic engineering on to him. Since they belonged to the elite of *regenten* – office holders in the main cities and in the provincial and federal government – they could also support his career. His paternal family, although wealthy, did not belong to that elite.

Shortly after his arrival in England, Vermuyden was entrusted with the reconstruction of a breached embankment along the Thames near Dagenham. There were complaints about the quality of the work he performed there, but in 1625 the Crown granted him land at Dagenham as recompense for this work.[24] In 1622 he seems to have formed a partnership with Joos Croppenburg, a Dutch merchant living in London. Together they embanked some 500 acres of flooded marshes near Erith in Kent.[25] In the same year Croppenburg contracted with Sir Henry Appleton to provide Canvey Island in the Thames estuary in Essex with seawalls.[26] It has long been disputed whether Vermuyden was involved in this project, but there is now documentary evidence that Vermuyden and Croppenburg together embanked Canvey Island.[27] On Canvey Island Vermuyden was only the director of works; Croppenburg was the entrepreneur who contracted with Appleton. Late in 1623 the drainers received their reward in the form of one third of the land on the island, and around that time Vermuyden married Croppenburg's stepdaughter. He was to become (in)famous by his involvement in the draining of Hatfield Chase from 1626 and of the Great Level of the Fens from 1639, and attempts to drain King's Sedgemoor in Somerset, which earned him the reputation of being both a ruthless entrepreneur and an incompetent engineer.

[19] *Genealogie Vermue*, p. 5; Welten, *Droogleggers*, pp. 69–71, 75–6.

[20] P. van Cruyningen, 'Bedijkingen in het Deltagebied tussen 1540 en 1700', *Historisch-Geografisch Tijdschrift* 32 (2014), pp. 29–38; M. de Vleesschauwer, *Het Vrije van Sluis. Polders en waterschappen in West-Zeeuws-Vlaanderen, 1600–1999* (2013), p. 77.

[21] *Genealogie Vermue*, p. 9.

[22] Harris, *Vermuyden and the Fens*, pp. 26, 32.

[23] Ibid., p. 38.

[24] Ibid., pp. 37–8.

[25] Ibid., p. 39.

[26] B. Cracknell, *Canvey Island: the history of a marshland community* (1959), pp. 20–1.

Vermuyden deserved his reputation for ruthlessness; even his biographer and admirer Harris was aware of this dark aspect of his hero and described him as 'a man who knew what he wanted, and was prepared to sacrifice anything, except his own interests, to get it'.[28] The interests of commoners, local landlords, business partners, friends, all were sacrificed on the altar of Vermuyden's self-interest. His reputation for bad engineering was not deserved and can be mostly attributed to the pernicious influence of Samuel Wells, the nineteenth-century historiographer of the Bedford Level, a man with a lively imagination and a deep dislike of all foreigners, including the Scots.[29] It is not surprising that the foreigner Vermuyden became the bad guy in Wells's story: the 'fatal origin' of all the engineering errors made during the drainage of the Bedford Level.[30] Beginning with Darby in 1940 English scholars have refuted most of Wells's claims and it is now generally accepted that Vermuyden's plans, although far from flawless, were basically sound.[31] The most damning evidence against Wells's fantasies was provided by Margaret Albright Knittl, who showed that the initial design for the drainage of the Bedford Level was not Vermuyden's. In the early 1630s, when this design was made, Vermuyden was not even involved in the Bedford Level project.[32] He was not only competent, but also innovative, as is evidenced by the creation of 'washes' in both Hatfield Chase and the Fenlands. These were areas with lowered embankments where excess water could be stored when the water level of the rivers became too high. By flooding the washes inundation of more valuable land could be prevented.[33] In the lead mines of Wirksworth in Derbyshire, in which he had a share, Vermuyden constructed the first efficient drainage system which led to a considerable increase in productivity.[34] In spite of all this debunking, several of the products of Wells's imagination are still quoted as the truth about Vermuyden, as in a recent book about the fenlands of Yorkshire.[35] The myths that have formed around this controversial personality die hard.

According to Wells, Vermuyden was financially ruined when he died.[36] Harris proved Wells was wrong; in 1693 Cornelius Vermuyden jun. still owned King's Sedgemoor and the share in the lead mines of Wirksworth, which he had inherited from his father. The share in the lead mines alone was worth £5000, so Sir Cornelius certainly did not die a poor man.[37] Part of this prosperity was due to the Hatfield Chase project. In this project, Vermuyden introduced a

[27] In the Verney Archives at Claydon House in Buckinghamshire. I would like to thank the anonymous referee who provided this information.

[28] Harris, *Vermuyden and the Fens*, p. 57.

[29] S. Wells, *History of the drainage of the Great Level of the Fens called the Bedford Level* (2 vols, 1830): for examples, see I, pp. 87, 105–6.

[30] Ibid., I, p. 289.

[31] Darby, *Draining of the Fens*, pp. 257–8; Harris, *Vermuyden and the Fens*, pp. 123–8; M. Chisholm, 'Navigation and the seventeenth-century draining of the Fens', *J. Historical Geography* 32 (2006), pp. 731–51.

[32] M. Albright Knittl, 'The design for the initial drainage of the Great Level of the Fens: an historical whodunit in three parts', *AgHR* 55 (2007), pp. 23–50.

[33] Harris, *Vermuyden and the Fens*, pp. 45, 129–30.

[34] R. Slack, 'Case history: aspects of the late seventeenth century lead industry in Wirksworth, Derbyshire, revealed in the courts', *Mining History. The Bulletin of the Peak District Mines Historical Society* 13 (6) (1998), p. 7.

[35] I. D. Rotherham, *Yorkshire's forgotten fenlands* (2011), pp. 27, 102–10. This author even accepts the entirely fictitious story, invented by Wells, about Vermuyden being present at a hunt in Hatfield Chase with Prince Henry in 1609, which had already been debunked by Harris, cf. *Vermuyden and the Fens*, pp. 35–6.

[36] Wells, *Great Level*, p. 97.

[37] Harris, *Vermuyden and the Fens*, pp. 147, 150–1.

financial innovation. In the Netherlands large drainage schemes were financed by a company of investors. Sometimes the engineers in charge of such a company's project were granted a share of the land that was to be drained to recompense them, but normally they received a salary.[38] The engineer was always an employee of the drainage company. In Hatfield Chase, Vermuyden undertook to pay for drainage himself, financing this by selling land from his share in the Level to investors. The only other case in which something comparable happened, was the draining of the Groote and Kleine Moere on the Franco-Belgian border by Wenceslas Cobergher in the early 1620s. Cobergher, however, did this for only a small share (about one-seventh), not for the whole project as Vermuyden did.[39] This innovation turned out to be one of the main causes of the problems surrounding the draining of Hatfield Chase.

II

Hatfield Chase is a wetland area, mostly consisting of silt fens, near the confluence of the rivers Don, Torne, Idle, Aire, Went, Trent and Ouse (Map 2). Most settlements are situated on riverbanks or on 'isles' of pre-Holocene deposits, the most important of which is the north-south oriented ridge of the Isle of Axholme. In the Middle Ages part of the lower lying area was drained by Selby Abbey, but most of it was used as commons by the inhabitants of the adjacent villages.[40] The Crown owned the manor of Hatfield and most of the manors of the Isle of Axholme, so it could easily grant the drainage of the area to Vermuyden. He only had to drain the land; enclosure was left to the owners, after adjudication. He was to receive one third of the drained land as reward for his investment and the king was to receive another third, so the commoners stood to lose two thirds of their commons.[41] The General Drainage Act of 1600 required permission of the majority of those commoners and the contract of 1626 stipulated that the king was responsible for gaining their consent. Although royal commissioners appointed to this task did not manage to reach an agreement with the majority of the commoners, Vermuyden was permitted to start draining the Level in 1627.[42]

The failure to reach an agreement with the commoners resulted in costly litigation, obstruction and destruction of embankments. It should be stressed, however, that the western part of the Level was quite different from the eastern part. In the west, Hatfield Chase proper, commons were limited to rights of turbary (peat digging) and wood cutting. Moreover, this part of the Level was situated in Yorkshire, where the Council of the North had jurisdiction. This Council's president, Viscount Wentworth, did not follow the Crown's policy of blindly supporting drainage schemes. In 1630 he negotiated a compromise between the commoners and Vermuyden and his associates which was generous towards the commoners. Vermuyden was not pleased with this outcome, but the result was that the Hatfield part of the Level was pacified and would remain peaceful for the rest of the century. In the Isle of Axholme, the eastern part of the Level, the commons included extensive grazing rights, which were crucial

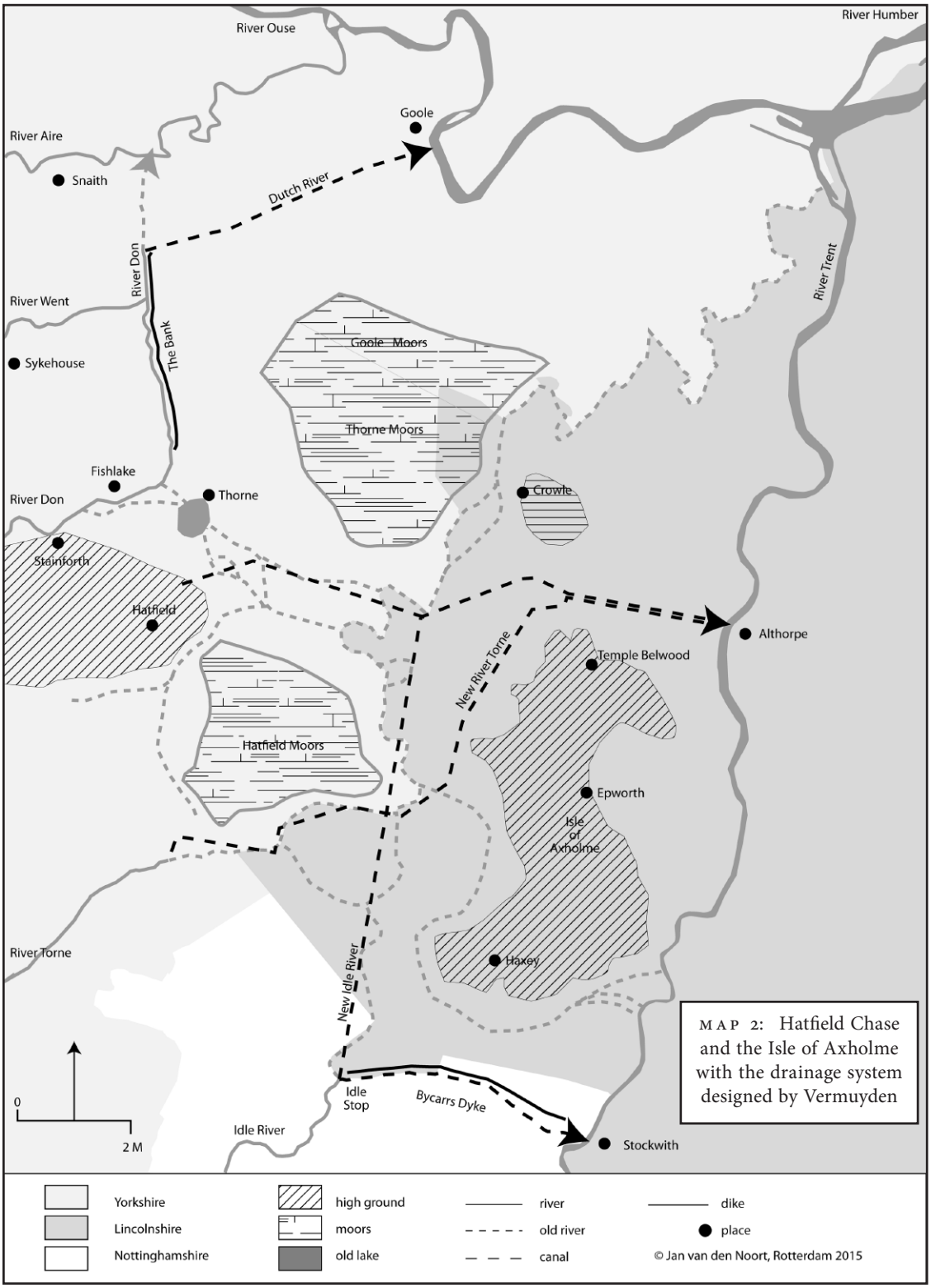
[38] Van Cruyningen, 'Profits and risks', pp. 130–2; Morera, *L'assèchement des marais en France*, pp. 99–100.

[39] Korthals Altes, 'Groote en Kleine Moeren', p. 163.

[40] R. Van de Noort, *The Humber wetlands: the archaeology of a dynamic landscape* (2004), pp. 135, 139–40.

[41] Albright, 'Entrepreneurs of fen draining', p. 55.

[42] Harris, *Vermuyden and the Fens*, p. 50.



MAP 2: Hatfield Chase and the Isle of Axholme with the drainage system designed by Vermuyden

to the pastoral economy of the Isle. The commoners of Epworth, the most important manor on the Isle, were to lose 7400 of their 13,400 acres of commons. Moreover, an indenture of 1359 had guaranteed the commoners of Epworth that the lords of that manor would refrain from improving common land.[43] So it is not surprising that in this part of the Level resistance to drainage was both fiercer and more enduring.

Vermuyden clearly preferred not to negotiate but to rely on royal support. Since the king was in favour of improvement and Vermuyden had a powerful ally in the person of the Attorney General, Sir Robert Heath, he knew he could rely on that backing.[44] His attitude was less reckless than it might at first seem. After some initial unrest, the Level remained relatively calm during the 1630s. Some riots occurred, but the damage remained limited. Tenant farmers and some of the investors settled in the Level and brought the land into cultivation.[45] It was the outbreak of civil war and the collapse of royal power in 1642 that plunged the Level into chaos. As in the Bedford Level and elsewhere, the commoners realized that the investors could no longer rely on support by the Crown and they took the opportunity to take their revenge and regain their commons.[46] The area was flooded, houses and farmsteads were demolished and the damage was estimated at £20,000.[47] Until that year, it seemed Vermuyden had been right. Between *c.*1628 and 1642 the main problem was not the conflict with the commoners, but the lack of efficient organization of the project.

Vermuyden's ruthless attitude is exemplified by the way he concentrated the waters of the river Don, which hitherto had flowed in three channels, into one channel with an outfall into the river Aire. Because this channel and the river Aire now had to carry much more water, the risk of flooding increased. Vermuyden had foreseen this and a strong embankment was constructed on the Hatfield Chase side of the river. Since there was no strong dike on the other side of the river, this would inevitably result in flooding of the villages on that side.[48] As an experienced and competent engineer Vermuyden must have realized these villages were going to flood, but he did nothing to prevent this. Even Vermuyden's participants sympathized with the villagers who breached the new dike of Hatfield Chase and appealed to the Council of the North.[49] Again he seems to have counted on royal support to protect him from the consequences, but this time he was mistaken. In the case of the villagers of Fishlake, Sykehouse and Snaith against Vermuyden and the participants the Council of the North ruled in 1630 that Vermuyden had to cut a new outfall of the river Don towards the river Ouse. Eventually, the cost of digging this 'Dutch River' would amount to £20,000.[50] These extra costs threw the drainage consortium into financial chaos.

[43] Lindley, *Fenland riots*, pp. 24, 26; Korthals Altes, *Vermuyden*, pp. 109–11.

[44] Harris, *Vermuyden and the Fens*, p. 58; Hoyle, 'Introduction: custom, improvement and anti-improvement', pp. 21–4.

[45] Lindley, *Fenland riots*, pp. 76–9; H. S. van Lennep, *Van Valkenburg: een Haarlems regentengeslacht* (2000), p. 58.

[46] J. Thirsk, *English peasant farming: the agrarian history of Lincolnshire from Tudor to recent times* (sec. edn, 1981), p. 125; Albright Knittle, 'Initial design', p. 49.

[47] W. Dugdale, *The history of imbanking and draining of divers fens and marshes in foreign parts and this kingdom and of the improvements thereby* (sec. edn, 1772), pp. 145–6.

[48] Harris, *Vermuyden and the Fens*, pp. 49–50.

[49] NHA, VVF 974, plea of Lucas van Valkenburg c.s., 1642.

III

From the beginning it was clear that the capital to finance the project would have to be found among Dutch investors. On the same day Vermuyden signed the contract with Charles I to drain the area, 24 May 1626 (old style), he also received a passport to travel to the Netherlands to look for investors in the drainage scheme: people willing to purchase part of Vermuyden's share in the drained area. They had to be found among the economic and political elite of the Republic, to which he had access through the relatives of his mother. In 1628 he also purchased the king's share, which increased the total number of acres he could sell to 24,505.[51] Vermuyden was to pay for the construction of the main drainage works. After completion of those and the 'adjudication' of the land in the Level, it was intended that the buyers themselves would be responsible for the digging of ditches and construction of roads.[52] After adjudication, a Corporation was to be created that could raise rates for maintenance. Only those who had purchased land from Vermuyden were to pay for maintenance, but they were also granted the right to elect the members of the board of the Corporation, so they would have a say on the level of taxation and the way in which the money was spent.[53]

The investors could pay in installments, the full sum only being paid after adjudication of the land. What made Vermuyden's proposal even more attractive, was that the participants were only liable for the purchase sum of the land. Normally, a participant in a drainage company was liable for a proportionate share in the costs of the project. If for some reason the costs turned out much higher than expected, he or she had to pay proportionately more.[54] In this case, Vermuyden alone would be liable for any increase in expenditure.[55] Despite those attractive conditions, Vermuyden's trip to the Netherlands in 1626 was not a success. Only his cousin Johan Liens and Johan de Knuyt, deputy of Zeeland in the federal Chamber of Accounts, both bought at least one thousand acres.[56] He had more success in London, where he had access to the Dutch merchant community through his brother-in-law Jacob Struys. Several merchants of Dutch and Flemish descent were prepared to purchase land in the Level. Success could also be reported from Dordrecht, where Abraham Struys, merchant and mayor of that city, started selling land as an agent for Vermuyden. He was probably a relative of Jacob Struys. Before 1627, he managed to sell about 2500 acres.[57] This provided Vermuyden with enough money to start the drainage works in the spring of 1627.[58]

[50] Korthals Altes, *Vermuyden*, pp. 35; Harris, *Vermuyden and the Fens*, p. 53.

[51] NHA, VVF, 955, 30 Mar. 1630; 966, plea of Lucas van Valkenburg c.s., undated [*c.* 1635].

[52] NHA, VVF, 974, plea of Lucas van Valkenburg c.s., 1642. 'Adjudication' happened after the main works were completed. The reclaimed land was measured by a surveyor, who divided it into plots of comparable size and quality. The land was then 'adjudicated' to the investors according to the size of their share in the project. In the Low Countries this was often done by lottery. We do not know how it was done in Hatfield Chase.

[53] Korthals Altes, *Sir Cornelius Vermuyden*, app. II; Dugdale, *History*, p. 144.

[54] Van Cruyningen, 'Profits and risks', p. 132.

[55] NHA, VVF, 956, 7 Mar. 1628; VVF, 977, 'Memorie op den handel met Sr. Cornelis Vermuyden', defence of the behaviour of Jacob Cats, undated [*c.* 1630].

[56] NHA, VVF, 955, 1 June 1631.

[57] Ibid.

[58] Lindley, *Fenland riots*, p. 71. Because the area was flooded in autumn and winter, drainage could only take place in spring and summer. Since Vermuyden travelled to the Netherlands in June 1626, it is unlikely that much work was done in 1626.

TABLE 1: Residence and occupation of participants in the drainage of Hatfield Chase, 1626–1631

	Merchant	*Regent*	*Army officer*	*Professor*	*Unknown*	*Total*
London	9		2		2	13
Amsterdam	9				1	10
Dordrecht	2	5			3	10
Middelburg		2			1	3
The Hague		2				2
Haarlem	2					2
Leiden				1		1
Rotterdam	1					1
St Maartensdijk		1				1
Unknown					2	2
Total	23	10	2	1	9	45

Main sources: NHA, VVF, 955, 968; Korthals Altes, *Sir Cornelius Vermuyden*, pp. 65–6; Van Lennep, *Van Valkenburg*, pp. 157–9; W. J. C. Moens, *The marriage, baptismal and burial registers, 1571 to 1874, and monumental inscriptions of the Dutch Reformed Church, Austin Friars, London* (1884).

The amount of land sold until early 1627 was insufficient to pay for the cost of the whole scheme, which had been estimated at £30–40,000.[59] But in the summer and autumn of 1627 Vermuyden was lucky. Interest in his project was increasing, which caused the price of land he offered for sale to increase. The first plots had been sold for 20*s*. per acre, but in 1627 the price had increased to 80*s*. By the spring of 1628 it had slightly decreased to 70*s*. Even speculation occurred: in August 1627 Johan de Knuyt sold the land he had purchased the year before with a profit of 150 per cent.[60] Even more important was that the Dutch lawyer, statesman and poet Jacob Cats (1577–1660) was sent to London as an envoy of the Dutch Republic. Like Vermuyden, Cats was born in the northern part of Zeeland, in the town of Brouwershaven (Map 1), and it was widely known that he had become rich by investing in wetland reclamation in Zeeland Flanders. The two men met in the summer of 1627 and reached an agreement. This resulted in Cats purchasing no less than 9472 acres of land in Hatfield Chase.[61]

Jacob Cats bought this land with the intent of selling most of it to investors in the Netherlands. In fact, from the autumn of 1627 he acted as a kind of real estate agent for Vermuyden, like Abraham Struys had done earlier in Dordrecht. Cats was ideally placed to do this because of his marriage with Elisabeth van Valkenburg, member of a wealthy Amsterdam merchant family. He sold large tracts of land to his brothers-in-law Lucas, Marcus and Mattheüs van Valkenburg, Willem van Wely (married to Maria van Valkenburg) and Fabiaen de Vliet (married to Suzanna van Valkenburg). Except Fabiaen de Vliet, all were merchants and most of the others who bought from Cats were also prominent Amsterdam merchants. Cats did not

[59] Hoyle, 'Disafforestation and drainage', p. 382.

[60] NHA, VVF 956, contract of 7 Mar. 1628; Korthals Altes, *Polderland in Engeland*, p. 97.

[61] NHA, VVF 955, 1 June 1631; 968, plea of Vermuyden, 2 Apr. 1635.

offer his services for free; he charged three guilders per acre from the purchasers. Since he managed to sell 9,405 acres, this may have yielded some 28,000 guilders.[62]

All in all, 45 people bought land in Hatfield Chase before completion of the project in 1631. Table 1 demonstrates that most of them were merchants and *regenten* from London, Amsterdam and Dordrecht. There were only two Englishmen among them; the others were Dutch or had roots in the Netherlands, including Flanders and Brabant. In the Netherlands, drainage companies were often formed by tightly knit networks of family and friends and the members were selected either for their ability to provide capital or for their influence on government.[63] Among Vermuyden's associates three networks can be discerned: the Dutch merchants in London, dignitaries and merchants in Dordrecht, and the friends and family of Jacob Cats, mostly Amsterdam merchants. All of them were wealthy, but there were few with political influence in England. Apart from Vermuyden himself only Sir Philibert Vernatti, a Dutchman living in London since 1628, seems to have had some influence at court.[64]

IV

The enthusiasm of Dutch investors for the Hatfield Chase project in 1627 was understandable. In the autumn of that year Vermuyden claimed the drainage scheme was almost completed and petitioned the king for the appointment of commissioners to adjudicate the drained land, so it seemed the investors could start reclaiming and settling their lands in 1628.[65] They only had to pay the purchase price agreed with Vermuyden or Cats, at most 70–80*s*. per acre (or 93–107 guilders per hectare[66]), which was a modest price compared to similar projects in the Netherlands. They were soon to be disappointed.

Vermuyden had promised the investors they could start reclaiming their lands in 1628, so in the spring of that year they shipped tenant farmers and farm equipment to Hull only to discover that most of the Level was still flooded and nothing could be done. Later Vermuyden denied he had promised this, but it is highly unlikely that the participants would have sent their tenants without any guarantee from him that the land could be cultivated.[67] The same thing happened the next year, when the Van Valkenburg brothers sent farmer Cornelius de Munck to Hatfield Chase to build a farmhouse and sow their land for them.[68] It took until 1631 to complete the drainage scheme and only in the spring of that year could the investors start to reclaim and settle the land.[69] Obstruction and sabotage by the commoners certainly was a cause of the delay, but technical problems may have played a part too since Vermuyden had no experience with large-scale fenland drainage; actually, nobody had experience with such projects at that time.

Another factor that caused delay was that Vermuyden was almost continually short of cash. The installments the investors had to pay were not sufficient. As soon as he had sold

[62] NHA, VVF 955, 1 June 1631; Korthals Altes, *Polderland*, p. 97. Cats' profit may have been smaller, because it is not certain he charged this from all purchasers.

[63] Van Zwet, *Lofwaerdighe dijckagies*, p. 54.

[64] Korthals Altes, *Sir Cornelius Vermuyden*, pp. 53–4.

[65] Harris, *Vermuyden*, p. 49.

[66] Accounts in NHA, VVF 955, show that £1 sterling = *c*.£1.8 Flemish = *c*.10.8 guilders.

[67] NHA, VVF 968, plea of Vermuyden, 2 Apr. 1635; 974, plea of Lucas van Valkenburg c.s., 1642.

[68] Van Lennep, *Van Valkenburg,* p. 45.

[69] NHA, VVF 955, 1 June 1631.

land to Jacob Cats, he started to draw bills of exchange on the sums Cats owed him to get his hands on some cash. Within a month from the signing of the contract whereby Cats sold land in the Level to his friends and relatives – 7 March 1628 – Vermuyden and his clerk and business partner Marcellus van Deurne started to draw bills of exchange on them too.[70] This behaviour and the delays caused the investors to lose trust in Vermuyden. In a letter to his brother-in-law Mattheüs van Valkenburg dated 13 November 1628, Cats made clear he had lost all faith in Vermuyden, who continued to draw bills of exchange without conferring with Cats.[71]

In 1629 the Dutch investors reached the conclusion that Vermuyden could no longer be trusted with the financial management of the drainage project. They decided to establish a company that would from then on raise *omslagen* (rates) from all participants to guarantee a steady flow of cash to continue the project. From 18 April 1629 to 15 July 1634 a rate was raised 11 times, varying from 2*s*. to 6*s*. per acre. Apart from that, the participants continued to pay the installments on the purchase sum.[72] Like Dutch drainage companies, this company had a board (in Dutch: *College van Heemraden*) elected by the participants from their midst. For practical reasons, the members of the board were elected from amongst the participants living in England. The treasurer of the company was Mattheüs, the youngest of the Van Valkenburg brothers, sent to England to keep an eye on the family interests. Its clerk was Marcellus van Deurne, a Dutch merchant in London and Vermuyden's financial assistant.[73] Vermuyden himself transferred his responsibility as undertaker for the Hatfield Level to the drainage company in 1630.[74] He was a participant in the drainage company himself because he still owned land in the level and he continued to be the company's technical expert. For the next couple of years, the company and Vermuyden continued to cooperate. In May 1632, for example, Vermuyden and board members of the company Sir Philibert Vernatti, Samuel van Peenen, Mattheüs van Valkenburg and Johan Corselis together purchased the land required to cut the Dutch River and in 1634 Vermuyden was asked for advice about improvement of drainage in the southern part of the Level.[75]

The creation of the company meant an improvement of the financial organization of the drainage scheme, but it still had one weak spot: unlike Dutch companies it was not incorporated and could not impose sanctions on free riders. As long as only the payment of the ordinary rates was concerned, this did not pose many problems. All participants had joined the company of their own volition and accepted the obligation to pay rates. In the case of exceptional expenses, however, difficulties could arise. Charles I had granted the settlers the right to have their own church in the Level and in 1639 Sir Philibert Vernatti, Mattheüs van Valkenburg and other members of the company's board made a contract with Isaac Bedloe to build a church at Sandtoft. Bedloe built the church, but in 1660 the bill still had not been paid. The other participants claimed the board members had to pay for the church themselves and refused to pay rates for it.[76]

[70] NHA, VVF 974, plea of Lucas van Valkenburg c.s., 1642; Korthals Altes, *Polderland*, p. 104.

[71] Korthals Altes, *Polderland*, pp. 104–6.

[72] NHA, VVF 966, plea of Lucas van Valkenburg c.s., undated [*c.* 1635].

[73] Korthals Altes, *Vermuyden*, p. 89.

[74] Albright Knittl, 'Initial drainage', p. 25.

[75] Korthals Altes, *Vermuyden*, pp. 119–20 and App. VIII.

[76] Ibid., App. IX, p. 87; X, pp. 119–20.

The high rate of July 1634 (6*s*. per acre) seems to have been paid by the participants,[77] but afterwards they ran up arrears. This was caused by the construction of the Dutch River. Although the Council of the North had ruled in 1632 that the participants had to pay part of the costs of cutting this canal, all the participants refused to do this. They had good reasons to refuse because their contracts with Vermuyden stipulated that he alone was liable for extra expenditure. The Council of the North seems to have been aware of this condition because it permitted the participants to sue Vermuyden for 'any great sum of monies'. It still insisted, however, that the participants first had to pay their share 'according to every mans proportion of acres'.[78] Vermuyden also refused to pay because these extra costs would have wiped out most of the profit he was hoping to make (cf. section V). A stalemate ensued during which the work on the Dutch River was continually hampered by a lack of cash.

In 1629 a Commission of Sewers for the Level was created: a new one was established in 1635. Commissions of Sewers had existed since the later Middle Ages. Their task was to oversee the maintenance and repair of drains, embankments and sluices. They were composed of local landowners who could summon juries. On the basis of the presentment of these juries about the state of drains and embankments, what had to be done to repair them and which landowners were liable for maintenance, the Commission of Sewers could raise rates (scotts) from landowners and impound and sell their land if they refused to pay.[79] In Hatfield Chase, there was no doubt about which landowners were liable for maintenance of the new drainage system. They were the participants who had purchased the 24,505 acres sold by Vermuyden, the 'scotted lands'.[80] Among the 106 Commissioners of Sewers appointed in 1635, there were only 14 owners of scotted lands. So decisions about the scotts to be paid by the participants were to be taken by a group of landowners most of whom were not directly involved and would not have to pay those rates themselves. For the Dutch this was difficult to accept, because they were used to the rule that those who had an interest in the maintenance of drainage systems and embankments would have to pay for it, but also would themselves decide about how much was to be paid. It was unthinkable to them that people who had not contributed even one penny were to have a say in this. This resulted in a poor relationship between the Commission of Sewers and the participants. The participants even hired mercenaries to keep the tax collectors of the Commission of Sewers out of the Level. Moreover, the authority of the Commission of Sewers was undermined by Charles I. When the Commission impounded the land of Sir Philibert Vernatti and other participants, the king intervened in 1637 and forced the Commission to restore the land to the owners.[81]

The Commission of Sewers had authority – as long as the king did not intervene – but lacked legitimation in the perception of the ratepayers, while the company of drainers had legitimation but lacked authority. The solution to this stalemate would have been to implement the conditions of the 1626 contract between Vermuyden and the king and incorporate the company of the participants as a water board with authority to raise rates. In a last attempt to do this,

[77] NHA, VVF 966, plea of Lucas van Valkenburg c.s., undated [*c.* 1635].

[78] Korthals Altes, *Vermuyden*, App. VI, pp. 58–9.

[79] H. C. Darby, *The medieval Fenland* (1940), pp. 163–4.

[80] Korthals Altes, *Vermuyden*, pp. 43–4, App. II.

[81] Ibid., pp. 123–5.

the participants introduced a bill in parliament in 1660, but it was rejected.[82] For the next two centuries the participants and the Commission of Sewers were forced to cooperate as best they could. Only in 1862 was the Hatfield Chase Corporation created.

V

The usual verdict about the drainage of Hatfield Chase is that it was a financial failure. Technical mistakes, the conflicts between Vermuyden and the commoners and between the participants and Vermuyden caused an enormous increase in costs and made it impossible for the participants to settle the land and earn any income from it. Only William Dugdale painted a more positive picture of Hatfield Chase. As a propagandist for drainage, he is often supposed to have provided a far too rosy image of the results. However, he was also a conscientious antiquarian, who carefully researched the history of the seventeenth-century English drainage projects.[83] Documentary sources confirm several of Dugdale's remarks. For example, he was the only author who knew it had taken five years to complete the drainage of the level.[84]

When assessing the financial outcome of the project, it should be realized that Vermuyden and the participants had different interests. Vermuyden had to make a profit by selling land in the Level at high prices and restraining expenditure. The participants had to make a profit by selling the land they had purchased from Vermuyden at higher prices, or by leasing it to a tenant farmer at a good price, or by cultivating it themselves. Let us first take a look at the outcome for Vermuyden. In Table 2 an estimate is presented for his income from the project between 1627 and 1634. For the 20,000 acres of land and two manors, he received in those years almost £70,000. He still owned over 4500 acres and several manors (Hatfield, Thorne, Fishlake, Dowsthorpe and Stainforth), which he sold shortly afterwards to John Gibbon. The price Gibbon paid for these assets is not known, but an estimate can be made. Assuming Gibbon paid 40*s*. per acre for the land, that would have amounted to £9000. The remaining manors must have been worth more than those he had already sold, so on a conservative estimate, Gibbon must have paid at least about £20,000. Vermuyden's income from the project can be estimated at some £90,000.

According to Dugdale, the implementation of the basic drainage scheme cost £55,825.[85] To this we shall add the sum of £16,800 for which Vermuyden purchased several manors and the king's share in the drained land.[86] So his expenditure amounted to, at most, £72,625. In reality his expenditure must have been somewhat lower, because from 1630 the costs were no longer paid by Vermuyden, but by the company. Hence we can conclude that Vermuyden made an impressive profit of at least £20,000. The question is whether Vermuyden was able to make a calculation like this. As we saw, he was often in arrears and moreover he was working on several projects at the same time. It is questionable whether he had a good overview of his financial situation. Still, the fact that in the early 1630s Vermuyden spent large sums on the

[82] Ibid., App. X; W. B. Stonehouse, *History and topography of the Isle of Axholme: being that part of Lincolnshire west of Trent* (1839), p. 101.

[83] F. Willmoth, 'Dugdale's *History of Imbanking and Drayning*: a royalist antiquarian in the sixteen-fifties', *Historical Res.* 71 (1998), pp. 281–302.

[84] Dugdale, *History*, p. 145.

[85] Ibid.

[86] Korthals Altes, *Vermuyden*, App. III and IV.

TABLE 2: Estimated receipts of Cornelius Vermuyden for the drainage of Hatfield Chase, 1627–34

	Acres	*Price per acre (s.)*	*Estimated average per acre (s.)*	*Total (£)*
Sale of land from his own share	10,400	20–80	50	36,000
Sale of land from the king's share	9600	70–80	75	26,000
Sale of manors (Finningley, Althorp)				7850
Total				69,850

Sources: NHA, VVF 955, 956, 957.

purchase of Malvern Chase (£5000), King's Sedgemoor (£12,000) and a share in a lead mine in Derbyshire is an indication that he at least realized he was doing well at that time, although he may not have been able to calculate exactly how large his profits were.[87]

Whatever profit Vermuyden may have made, the obligation to pay for the cutting of the Dutch River would have diminished it, and what was worse: he had already spent it. It is unlikely that after the purchases of Malvern Chase and King's Sedgemoor, Vermuyden had much capital left. He had no choice but to avoid having to pay the bill. The participants began a suit in Chancery against him in 1633 and in that year even had him imprisoned for his refusal to pay. When he was released and somebody asked how the suit was proceeding 'he scoffingly answered that it would be time enough seven years hence to ask that question'.[88] Obviously, he intended to wear out his opponents in an endless lawsuit, and he succeeded: in 1642 the suit was still dragging on.[89] One of the reasons he could succeed in this was that he committed conspicuously little in writing. Letters from Vermuyden to the participants in the Netherlands hardly contained any information about the progress or the difficulties of the drainage scheme and most contracts with the participants were not signed by him, but by his cousin Johan Liens.[90] A contract of 30 March 1630, for example, was signed by Liens *weghen d'heer Vermuyden gereserveert seeckere open staende punten* (on behalf of Mr. Vermuyden apart from some outstanding issues).[91] These outstanding issues were not specified. Such vague clauses made it possible for him to deny having agreed to all conditions. He also denied that Abraham Struys and Jacob Cats ever sold land as his agents.[92] These were almost certainly all blatant lies, but the participants could not gather enough evidence to prove them to be so.

Because several participants had not bought directly from Vermuyden, but from Jacob Cats, they also began a suit in Holland against Cats. Cats had guaranteed them – albeit as agent for Vermuyden – that their liability would not exceed the purchase price of their land, so they tried to get their money back from him. In December 1633 Vermuyden warned Cats they were planning to do this and he advised him to negotiate a compromise with his brothers-in-law.[93]

[87] Harris, *Vermuyden*, p. 53.
[88] Ibid., p. 56.
[89] NHA, VVF 974, plea of Lucas van Valkenburg c.s., 1642.
[90] NHA, VVF 951, 13 Dec. 1633, 952, 9 Jan. 1629 (letters from Vermuyden) and 948, 12 Mar. 1641.
[91] NHA, VVF 955, 30 Mar. 1630.
[92] NHA, VVF 968, 2 Apr. 1635.
[93] NHA, VVF 951, 13 Dec. 1633.

In between the lines he warned Cats he was not to expect any support from him. Jacob Cats was caught between hammer and anvil: in Holland the participants were demanding recompense from him and in London Vermuyden was denying that he had ever had an arrangement with Cats. To some extent Cats could blame himself for this, because he had said to some of the purchasers that if problems arose, he would take care of them. Luckily for Cats this suit also came to nothing. It was still dragging on in 1641.[94] His reputation, however, was damaged and the relationship with his family-in-law ruined.

Estimating the profits or losses of the participants is less easy. Estimating their expenditure is not a problem. A claim of six participants in a Dutch lawsuit against Vermuyden provides an exact overview of everything they spent on purchase sums of land and rates for the drainage company until July 1634.[95] If we extrapolate their expenditure to all participants, who all had to pay the same rates, they contributed over £104,000 to the project. These costs included the draining of the level, repair of the damage done by the commoners and part of the expenditure of cutting the Dutch River. In all, this amounted to 139 guilders per hectare. Comparison with drainage projects in the Netherlands in which some of the participants also had shares shows this was a low sum. Draining Lake Beemster (1607–12), Lake Heerhugowaard (1625–30) and Lake Schermer (1633–35) cost 290, 373 and 514 guilders per hectare respectively.[96] Marshland drainage in Zeeland Flanders, in which Jacob Cats had participated, cost on average 180 guilders per hectare.[97] Admittedly, Schermer and Heerhugowaard were financial failures, but Beemster and marshland drainage generated large profits for the participants. For Hatfield Chase, the participants had to pay more than they had expected, but the cost of drainage still was still relatively low and it cannot have caused a failure of the project. Later it was claimed that the participants had spent a total sum of £200,000, £300,000 or even £400,000. The highest sum the participants themselves ever claimed to have spent was £200,000. This probably included the costs of reclamation and settlement. Since they made these claims *c.*1650 in a lawsuit against the commoners of Epworth, they probably overestimated their costs, so we can take this sum as the upper limit of their expenditure.[98] This means they spent at most 218 guilders per hectare. Of course, the lawsuits also cost considerable sums, as an ironic remark from the early eighteenth century proves: 'the gentlemen of the law reaped a long and plentiful harvest' from the litigation about the draining.[99]

It can be concluded that the costs of draining the Hatfield Level were not exceptionally high, but maybe the participants were not able to raise income from the reclaimed land because of defective drainage or destruction of their property by the commoners. Both commoners and participants claimed Vermuyden's drains were ineffective, but they did this in lawsuits in which both had an interest in painting the situation in the darkest colours. The participants wanted to show how little their investments had earned them and the commoners wanted to show Vermuyden not only robbed them of part of their commons, but had also diminished their quality. Dugdale painted a quite different picture: rape or coleseed was sown in the area, and

[94] Korthals Altes, *Polderland*, p. 98; NHA, VVF 948, 12 Mar. 1641.

[95] NHA, VVF 966, plea of Lucas van Valkenburg c.s., undated [*c.* 1635].

[96] Van Zwet, *Lofwaerdighe dijckagies*, p. 316.

[97] Van Cruyningen, 'Profits and risks', p. 139.

[98] Korthals Altes, *Vermuyden*, p. 39.

[99] Holmes, 'Drainers and fenmen', p. 187.

when he visited the Level in 1657 four windmills between Sandtoft and Thorne were bruising the seed to produce oil.[100] This number of mills means a considerable acreage was sown with rapeseed and since rape is a winter crop this implies that Vermuyden had drained a substantial part of the Level sufficiently that winter crops could be cultivated there.

Several other sources confirm Dugdale's opinion. Pieter Cruypenninck, an Amsterdam merchant who had bought 440 acres in the Level, which was in his direct exploitation, kept an account book of his income from this land. This shows that from 1632 quantities of rapeseed harvested in the level were regularly sold or exported to Rotterdam.[101] Letters from Marcus van Valkenburg to his lawyer from April 1636 mention large acreages of rapeseed and other winter crops that were promising good harvests.[102] It was widely known that rapeseed could yield enormous harvests on recently drained land. Dugdale demonstrated this was also the case in the Hatfield Level. In Haxey Carr a plot of rapeseed yielded seed worth 150*s*. per acre or 200 guilders per hectare.[103] One such harvest was almost enough to cover all the expenses of draining the land. It is known from other drainage schemes in England, the Netherlands and Germany that the first couple of harvests of rapeseed often were sufficient to cover the expenses of drainage.[104] It is also telling that although the commoners publicly vilified Vermuyden's scheme, in private their views were less negative. In a meeting in October 1651 they agreed that the drainage scheme should be maintained.[105] If Vermuyden's drainage scheme was entirely deficient, why would anyone want to maintain it? Of course, the participants might have been prevented from reaping their harvests because the commoners destroyed them. Part of the harvest was indeed destroyed in 1633,[106] but afterwards hardly any destruction occurred until 1642 and after that year the commoners limited their attacks to the 7400 acres of the manor of Epworth that were disputed. The remaining 17,100 acres were undisputed and remained in peaceful possession of the participants.[107] Hardly any mention of the conflicts with the commoners is made in the correspondence of the drainers in the 1630s; they were worried about the conflicts with Vermuyden and the Commissioners of Sewers, not about the commoners. Illustrative of the situation of the 1630s is the testament of Michael Corselis, a Dutch merchant from London, who had settled at Temple Belwood and died there peacefully in his bed in 1637, leaving money to the poor of Belton and Epworth, the two most rebellious parishes.[108] Until 1642, participants were able to reap rich harvests, but it should be kept in mind that not all of them were so lucky as to be able to sow much of their land with rapeseed. In 1631, one of the participants complained that of his 600 acres only 30 could be used as arable.[109]

Many of the original participants sold their land in the 1630s. That was not unusual. In the Netherlands too, a proportion of the investors in drainage companies considered their participation to be a short-term investment and sold their interest shortly after completion of drainage.[110] In the case of Hatfield Chase the number of owners selling quickly may have

[100] Dugdale, *History*, p. 145; Darby, *Draining*, p. 283.
[101] NHA, VVF 955, excerpt of Cruypenninck account book.
[102] NHA, VVF 948, 7 and 22 Apr. 1636.
[103] Dugdale, *History*, p. 145.
[104] Van Cruyningen, 'Profits and risks', p. 126; Thirsk, *English peasant farming*, p. 133.
[105] Lindley, *Fenland riots*, p. 206.
[106] Ibid., p. 78.
[107] Ibid., pp. 24, 211.
[108] TNA, PROB 11/175, 1 Nov. 1637.
[109] Korthals Altes, *Sir Cornelius Vermuyden*, p. 80.
[110] Van Cruyningen, 'Profits and risks', pp. 133–4.

been higher because many participants preferred not to be involved in long, drawn-out litigation. Another problem was that it was difficult to manage a large property in a foreign country.[111] Finding reliable stewards or tenants and communicating with them was not always easy, especially during wartime. In January 1629 Vermuyden wanted to send a letter to one of the participants in the Netherlands, but he had to wait until a convoy had arrived on the Thames. That such a convoy was not a luxury was shown in 1636, when one of Mattheüs van Valkenburg's reports to his brothers was never delivered because the ship carrying it was taken by privateers.[112] Those who sold their land very probably made a good bargain. A lively land market existed in the Level in the 1630s and land was sold at high prices. Again, this indicates that agriculture in the Level was doing well. Confirmation comes from by Daniel Noddel, the advocate of the commoners of Epworth, certainly not someone who had cause to paint a rosy picture of the situation in the Level.[113]

An argument in favour of the view that the drainage of Hatfield Chase was a failure, was that some of the original participants were said to have gone bankrupt. Statements about bankruptcies of drainers should not be taken at face value, however, because on both sides of the North Sea drainers were often claiming to have been ruined in order to get more state support. Moreover, when drainers went bankrupt, it was often caused by a combination of factors, one of which could be that they had financed their investment with borrowed money.[114] This can also be observed in the few cases of drainers of Hatfield Chase who went bankrupt. The Van Valkenburg brothers experienced financial difficulties and Marcus went bankrupt in 1642.[115] This bankruptcy was caused by several losses in enterprises and transactions. The main cause of trouble for the Van Valkenburg brothers seems to have been their brother-in-law Willem van Wely. This Amsterdam jeweler in 1629 and 1630 borrowed the enormous sum of 86,000 guilders from Marcus and Lucas van Valkenburg. The securities for these loans were jewels and 700 acres of land in Hatfield Chase purchased through Jacob Cats. This land was not yet drained nor paid for. To strengthen this fragile security Marcus and Lucas persuaded Cats to sign an IOU to them for 6,000 guilders.[116] When Willem van Wely was not able to pay the full purchase sum, Cats sold 350 acres of Van Wely's land to Philip Jacobsen, a Dutch merchant in London. This of course made Van Wely's security worthless.[117] Clearly, the financial problems of Van Wely cannot be blamed solely on the Hatfield Chase project. However, Cats's selling the land for a second time caused problems, and not just for Van Wely. The Van Valkenburg brothers, Van Wely, and Pieter Cruypenninck owned and exploited their land in the Level together, as one unit. When Jacobsen took possession of 'his land', he in fact confiscated land that belonged to Cruypenninck, including a farmstead Cruypenninck had built there.[118] In turn, this led to costly lawsuits.

Those who still owned land in the Hatfield Level in the 1640s, like the Van Valkenburg brothers and Vernatti, very probably incurred heavy losses, after the wave of destruction that swept over the Level in 1642 and especially after the commoners of Epworth regained

[111] Korthals Altes, *Polderland*, pp. 101, 115.

[112] NHA, VVF 948, 7 Apr. 1636, and 952, 6 Jan. 1629.

[113] Korthals Altes, *Vermuyden*, App. IX, p. 96. Noddel refers to a series of conveyances from the 1630s and 1640s and stresses the high prices paid for the land.

[114] Van Zwet, *Lofwaerdighe dijkcagies*, p. 355.

[115] Van Lennep, *Van Valkenburg*, pp. 41, 70.

[116] Ibid., p. 47; NHA, VVF 961, 20 Apr. 1630.

[117] NHA, VVF 970, 26 June 1635.

[118] NHA, VVF 970, 26 June 1635, and 971, 8 Dec. 1636.

their commons. For the Van Valkenburg brothers in particular, this must have been a bitter disappointment, because they had invested heavily in the improvement of the Level. In 1632, for example, they contracted with master carpenter and mill builder Hendrick Gijsbertsz from Vianen (near Utrecht), who was to construct sluices and windmills in the Level.[119] Between 1628 and 1635 Lucas van Valkenburg spent 55,400 guilders to drain 1000 acres, but at the time of his death in 1652, his land in the Hatfield Level was valued at only 49,000 guilders. During the intervening years, the commoners had caused much damage and had even regained possession of much of the land that had been awarded to Lucas.[120] But already by the early 1640s most Dutch investors had sold their land in Hatfield Chase. Only the Vernatti, Van Valkenburg and Van Peenen families owned land in the Level until the 1650s and after.

VI

Around 1660 Jacob Cats wrote an autobiography in verse, in which he described his successful political career – in 1636 he was appointed Grand Pensionary of Holland, one of the highest offices in the Republic – and how he had become a millionaire by reclaiming land. The tone of the poem is complacent, but now and then he had to admit to failures. One of those concerned '*vetten grond, die in het Brittenlandt alstoen te dijcken stont*' (fertile land in the land of the Britons that was then [in 1627] about to be drained). His decision to participate in the Hatfield Chase project had caused him a lot of trouble, because he did not know the people and did not have understanding of the issues.[121] He depicted himself as a naïve victim of untrustworthy people and unknown circumstances. This was only partially true. Cats was a shrewd lawyer. He knew England where he had lived for a while in his youth, and he could speak English. Moreover, the previous sections showed he himself added to the chaos by making promises he could not keep and selling the same land more than once. Nevertheless, Cats and the other Dutch investors in Vermuyden's project had to deal with people and circumstances they did not know and often failed to understand.

In the coastal provinces of the Low Countries commons had disappeared in the Middle Ages, so investors in drainage never had to deal with disgruntled commoners. Large-scale drainage projects were only allowed to start when agreements had been reached about compensation for landowners, villages or cities whose interests were harmed by the project. Conflicts were solved by arbitration without recourse to long-drawn-out lawsuits. In the Netherlands, a board elected by the investors themselves made decisions about rates, not a commission for the major part composed of people who had nothing to do with the project.[122] The conflicts, the violence and the lawsuits must have come as a surprise after Vermuyden's promises of easy profits. Although most investors probably did not incur great losses, it is understandable

[119] Van Lennep, *Van Valkenburg*, p. 64.

[120] NHA, VVF 11, probate inventory of Lucas van Valkenburg.

[121] J. Cats, 'Twee-en-tachtig-jaerig leven', in P. G. Witsen Geysbeek (ed.), *Dichterlijke werken van Jacob Cats* (1828), p. 13.

[122] P. van Cruyningen, 'State, property rights and sustainability of drained areas along the North Sea coast, sixteenth–eighteenth centuries', in B. van Bavel and E. Thoen (eds.), *Rural societies and environments at risk. Ecology, property rights and social organisation in fragile areas (Middle Ages-twentieth century)* (2013), pp. 181–207.

that they no longer wished to invest in drainage projects in England after the Hatfield Chase experience.

However, the problems of the Hatfield Chase project were not just the consequence of an unfavourable institutional environment. They were also caused by Vermuyden's ruthless behaviour. Many conflicts might have been prevented if Vermuyden had shown more respect for the interests of the commoners and local landlords. These were not Vermuyden's only victims, as this paper has demonstrated: the Dutch investors were just as much victims of their compatriot. He used them to keep the Hatfield Chase project going and when problems arose he let them fend for themselves. Margaret Albright Knittl was certainly right in supposing that in 1630 Vermuyden was not entrusted with the draining of the Great Level because potential Dutch investors had lost faith in him.[123] Sir Cornelius Vermuyden may have been a great engineer, but he was a disastrous entrepreneur.

[123] Albright Knittl, 'Initial design', pp. 29–30.

The Corbetts are 'victorious over all': agricultural implement making in Shropshire, *c*.1860 to 1914*

by Tamsin Bapty

Abstract

The agricultural implement makers were among the most energetic entrepreneurs in Victorian Britain. They combined the traditional trades of iron-founding and blacksmithing with modern production techniques and marketing; the agricultural and industrial revolutions were both epitomized in their work. Recent general surveys of the industry have highlighted their growth and impact as a group. Despite this, very few studies have been made of the individual firms. This article examines the progress of one family of Shropshire implement makers, the Corbetts, who set up competing firms in Wellington and Shrewsbury. Operating during a period of agricultural depression, the Corbetts had to deploy all the talents of modern industrialists in order to hold their own in a fiercely contested marketplace.

In 1840, a blacksmith called Samuel Corbett started making and selling ploughs in the Shropshire market town of Wellington. Over the next 50 years he and his son William went on to develop and manufacture an extensive range of agricultural machinery and equipment. The family firm enjoyed its finest moment at the Royal Agricultural Society show in Plymouth in 1890 when it submitted a grist mill to the 'most severe and exhaustive trials'. Having emerged 'victorious over all', the mill was jubilantly hailed as 'The World's Best'.[1] Samuel Corbett's rise from town blacksmith to internationally acclaimed engineer was an impressive demonstration of economic and social mobility. This was further emphasized by a younger son, Thomas, who left to found a rival company in Shrewsbury with equal success, becoming, within only ten

* I should like to express my thanks to a number of people for making this article possible: to Elizabeth Morris for generously allowing access to, and use of, archive material relating to Thomas Corbett and the Perseverance Ironworks in Shrewsbury; to Jonathan and Fearghal Corbett for pictures, trade literature, and other personal insights into S. Corbett and Son that would not have been obtainable elsewhere; to Ian Pritchard and Katie Brown at Blists Hill Victorian Town for providing information on the Corbett family and the company wood engravings respectively; to Matt Thompson for advice on nineteenth-century advertising; to the *Review's* referees and editor for their comments and suggestions on this paper; and to Ian Bapty, Joanne Smith and my other friends and colleagues at the Ironbridge Gorge Museum Trust for patiently aiding, abetting and nurturing my interest in nineteenth-century grinding mills.

[1] S. Corbett and Son catalogue, n.d. but *c*.1900, archive of S. Corbett and Son, the Ironbridge Gorge Museum Trust (hereafter IGMT), CORB. 54.

years or so, one of the biggest employers in the town.[2] During the latter half of the nineteenth century the Corbett name was associated with a wide variety of agricultural implements, from small domestic items such as name plates, fire buckets, cheese presses and knife stands, to ploughs, mangold drills and winnowers.[3]

Samuel Corbett came to prominence when agricultural implement manufacture was at its peak. The period of 'high farming' in Britain between 1840 and 1860 is considered to have been a golden age for these firms.[4] In its loosest and least contentious sense, 'high farming' was characterized by the use of new technology in combination with increasingly efficient methods of cultivation. Its development coincided with the so-called second industrial revolution, when cheap raw materials and efficient processes stimulated production. Opportunities abounded for manufacturing companies to thrive. Though the market was dominated by the likes of Ransomes of Ipswich, Bamfords of Uttoxeter and Burrells of Thetford, many hundreds of smaller firms – including the Corbetts – flourished alongside them.

However, the golden age of farming was not to last beyond the 1870s. Once the agricultural sector was hit by severe depression, the market forces that had previously worked in the farmers' favour were turned against them. Crop prices fell and farmers turned arable land over to grass for livestock. This presented a problem for the implement manufacturers, who mainly focused on tillage and cultivation.[5] Whilst engineering was still a boom industry, the customer base for agricultural tools and machinery was diminishing. What Peter Dewey identified as the period of 'brief supremacy' enjoyed by the manufacturers was over by 1875.[6] As a result, the remaining marketplace was fiercely contested. For the shrewd firm, there was still an opportunity to thrive. The high level of competition between the Victorian implement makers engendered a distinctive publicity culture which rested upon the twin foundations of printed trade literature and performances at ploughing matches and agricultural shows. These firms possessed a special talent for hyperbole, and were among the first to exploit modern marketing media to promote their products.

The history of the Corbetts, though seldom told beyond the county, exemplifies the trends in Victorian agricultural entrepreneurship identified above, and contributes to the scholarly interpretation of the national picture. Peter Dewey's *'Iron harvests of the field': the making of farm machinery in Britain since 1880* serves as an excellent general survey. However, single studies of local firms are still few and far between, given the number of firms that were active between the last quarter of the eighteenth century and the last quarter of the nineteenth. It is these studies that can help us build a more nuanced picture of the industry.

Through an examination of the approaches taken by both S. Corbett and Son and Thomas Corbett to agricultural shows and trade publications, this paper reflects on the complex relationship between the farming and manufacturing sectors. This relationship, it is argued,

[2] B. Trinder, 'Introduction', in Trinder (ed.), *Victorian Shrewsbury: studies in the history of a county town* (1984), p. 15.

[3] Francis Corbett, another of William's sons, took over John Williams and Son of Rhuddlan in 1908, forming Corbett-Williams and Son. See E. Scourfield, 'John Williams and Son, Phoenix Ironworks, Rhuddlan', *Flintshire Historical Society J.* 28 (1977–78), pp. 71–7.

[4] P. J. Perry, 'High farming in Victorian Britain: prospect and retrospect', *Agricultural Hist.* 55 (1981), p. 156.

[5] P. Dewey, *'Iron harvests of the field': the making of farm machinery in Britain since 1800* (2008), pp. 92–3.

[6] Ibid., p. 50.

directly influenced advertising practices at the time. The conditions under which the implement makers were forced to operate inspired innovations in marketing rather than engineering. With the downturn in agriculture, it became increasingly important to gain status and reputation. The Corbetts (alongside the other implement makers) contested hundreds of prizes, enthusiastically promoted their wares, and went to great lengths to secure overseas customers. Creating public spectacles and circulating flamboyant trade literature were characteristic of the industry's approach, rather than relying on major technological advances. These were fundamentally modern urban and industrial phenomena; they just happened to be playing out in an agricultural sphere. By examining the marketing activities of the Corbetts, we are able to shed valuable light on this unique facet of the Victorian economy.

I

Before the mid-nineteenth century, the introduction of a new agricultural implement was looked upon as a great novelty, if not something more foreboding. The *Farmers' and Gardeners' Almanack* of 1877 observed that 'the Winnowing Machine was an instrument of much superstitious dread when it was first introduced' in the last quarter of the eighteenth century.[7] Thomas Hardy's *The Mayor of Casterbridge* includes a memorable description of a horse drill resembling 'a compound of hornet, grasshopper, and shrimp, magnified enormously … a sort of agricultural piano'.[8] These gaudily coloured contraptions sat dissonantly in the rural landscape, and were obvious and unsettling symbols of change. In 1830, agricultural workers in Kent protested against low pay by destroying a mechanical threshing machine. This act of destruction marked the beginning of the so-called 'Swing Riots'. Anger was directed against the big landowners who were held to be depressing wages and inflating bread prices, causing great hardship. Farm labourers viewed the mechanization of agriculture as a threat to their employment.[9] However disruptive they were to the individual landowners, the Swing Rioters could not stop technological progress. By the end of the nineteenth century a plethora of implements had been unleashed on the populace. With a dizzying array of drills, presses, cutters, choppers, grinders and pulpers, the Victorians had brought the fields firmly under their dominion.

Trevor Wild argued that the burst of manufacturing activity that took place between 1840 and the 1890s was tantamount to a 'revolution in farming mechanization'. Following the repeal of the Corn Laws in 1846, farmers were fully exposed to market forces. As a consequence, their resistance to new technological advances slackened, and they chose to adopt new tools to help with tillage and cultivation. Mechanical threshing machines, formerly the targets of the Swing Rioters, reappeared in farm yards.[10] Increasing interest on the farms in turn expedited the

[7] Extracted in 'Opinions of the Press', Thomas Corbett's notebook (hereafter TCN), seen through the kindness of Mrs Morris, n.p.

[8] T. Hardy, *The Mayor of Casterbridge* (1998 edn), p. 167.

[9] J. E. Archer, *Social unrest and popular protest in England, 1780–1840* (2000), p. 16; Dewey, *'Iron harvests'*, p. 22.

[10] Ibid., p. 3. The promulgation of the later Acts of Enclosure also served as an encouragement to mechanized cultivation and tillage. Farmers with large contiguous tracts of land were more likely to invest in machinery to work them.

development of cottage blacksmithing industries into small urban factories.[11] In 1844 machine-maker James Slight remarked that the present age was 'perhaps the most remarkable … [for] the perfection of almost every kind of machine or tool required in the various departments of arts and manufactures'.[12] Peter Dewey called it a 'watershed'.[13] With iron both plentiful and cheap, the period between 1840 and 1860 saw the formation of several hundred new firms.[14] One of these was set up by Samuel Corbett.

For nearly 20 years Samuel plied his trade as a blacksmith and tinsmith in Wellington. He probably began as an apprentice at the premises of George Wycherley, on what is now King Street. The 1841 census shows that after he had served his apprenticeship he set up as a tinsmith. A little over ten years later, Samuel had earned enough to move to bigger premises on Park Street.[15] By the late 1850s, with his eldest son William on board, he had begun trading as S. Corbett and Son. When the 1861 census was taken, Samuel was described as an 'Agricultural Implement Manufacturer' employing 14 men and five boys at Park Street. At the same time he was supplementing his income as a 'Beer Seller' in an adjacent public house called 'The Travellers' Rest'.[16] However, by 1871 he appears to have devoted himself fully to his manufacturing business, and is listed as an 'engineer' employing 25 men and four boys.[17] In addition to the Park Street works, Samuel also owned an ironmonger's shop on Church Street, Wellington (Figure 1). After his death in 1885, control of S. Corbett and Son passed to his sons William and George. The business was in a flourishing condition, with Samuel's personal estate being worth nearly £4500.[18] At this time William also took sole ownership of the ironmonger's, later renaming it W. Corbett and Son. He remained at the helm of both firms until his death in 1904, at which time he also left an estate of considerable worth to his own son, Howard.[19] The success of the Corbetts shows that opportunities were available to cottage blacksmiths and tinsmiths to succeed in the field of agricultural implement manufacture.[20]

Whilst Samuel and William built up their business, Samuel's younger son Thomas Corbett also demonstrated the family's entrepreneurial spirit by turning his attention to Shrewsbury. Whether through ambition or necessity, when he was 20, Thomas severed all ties with the family firm in Wellington and went to work as an agent for Samuelson of Banbury's reaping machines in Shrewsbury.[21] Around 1867 he set up an ironworks on Chester Street, placing him in direct competition with his father and brother. Whilst the works was in its infancy, Corbett worked with the implement-seller, Richard Chipchase, of Albert Street and Castle Foregate in Shrewsbury. This arrangement lasted until 1877.[22] In 1869, Thomas purchased a

[11] T. Wild, *Village England: A social history of the countryside* (2004), p. 90; E. J. T. Collins, 'The age of machinery', in G. E. Mingay (ed.), *The Victorian countryside* (2 vols, 1981, new edn, 2000), I, p. 203; Dewey, *'Iron harvests'*, p. 11.

[12] J. Slight and R. Scott Burn, *Book of farm implements and machines* (ed.) H. Stephens (1858), p. 147.

[13] Dewey, *'Iron harvests'*, p. 29.

[14] Collins, 'Age of machinery', p. 205.

[15] J. Meeson, 'Samuel Corbett, blacksmith', *Wellingtonia* 16 (2014), p. 14.

[16] K. Corbett, 'Methodist churches in Wellington', in A. Smith and G. Evans (eds), *Latest memories of old Wellington* (1991), p. 26; 1861 census.

[17] 1871 census.

[18] Meeson, 'Samuel Corbett', 14.

[19] Ibid.

[20] Dewey, *'Iron harvests'*, pp. 11, 14.

[21] E. Morris, personal correspondence relating to Thomas Corbett (20 June 2014); B. Trinder, *The industrial archaeology of Shropshire* (1996), pp. 60–1.

[22] *London Gazette*, 5 Jan. 1877. When the partnership



FIGURE 1: S. Corbett and Son's Iron Merchants on Church Street, Wellington, before 1885. Courtesy of Ironbridge Gorge Museum Trust Library and Archives.

new yard on Castle Foregate (parallel to Chester Street) which, by 1871, had been developed as the Perseverance Ironworks. Not long afterwards he began working with another seller, Arthur John Peele, in a partnership that would continue until 1881. After this, Thomas became its sole proprietor, expanding the Perseverance works to the west of Castle Foregate in 1884.[23] By this date both Corbett firms appeared to be flourishing, producing thousands of items a year bearing the family name. But how did they achieve this, and at what cost?

II

At the beginning of this paper it was suggested that the success of the agricultural implement manufacturers rested upon their ability to exploit the chief marketing activities available to them, namely distributing advertising and trade literature, and making regular appearances at agricultural shows. Jonathan Brown, who researched this topic in the early 1990s, argued

Note 22 *continued*
dissolved, Chipchase continued as 'a seller' for 6 years, but was then declared bankrupt. See the *London Gazette*, 26 June 1883.

[23] Shropshire Historic Environment Record, HER number (PRN): 06746; B. Trinder, *Beyond the bridges: the suburbs of Shrewsbury, 1760–1960* (2006), pp. 146–7.

that the implement makers 'became some of the most dynamic of nineteenth-century manufacturers in their marketing efforts'.[24] Whilst Peter Dewey's work acknowledges the same phenomenon (referencing, among other sources, the literature produced for the 1851 Great Exhibition), its breadth precludes a detailed examination of individual firms.[25] A case study such as the Corbett family enables us to learn more about the implement makers' entrepreneurial style. The following section looks more closely at the phenomenon of the agricultural show, assessing its value to the implement makers and its impact on the sector more generally.

Brown identified agricultural shows as key battlegrounds on which the implement makers determined their market share. The engineer Robert Ransome of Ipswich was one of the first to realize their potential. Ransome and Co. (later Ransome and Sons) was exhibiting at shows at the beginning of the nineteenth century, and dominating them by the 1830s. The companies employed networks of agents to represent them nationwide. Ransomes were also among the first to enter ploughing matches as a way of demonstrating their products. Before this, matches were primarily regarded as tests for the individual ploughmen. However, the implement makers changed the nature of the competition by signing up the most skilled ploughmen to sponsorship programmes.[26] Ploughing matches were becoming places for items to be shown off, taking advantage of the Victorians' love of contraptions.[27] Shows were also broadening their appeal to manufacturers in other ways. The first show sponsored by the Royal Agricultural Society of England was held in 1839 and, from the 1840s, both the National and Royal Agricultural Societies were touring, and encouraging local people to attend by offering a variety of entertainments.[28] They were fast becoming social events at which the manufacturers could gain profitable exposure. This was affirmed in 1851 when around 300 companies came to the Great Exhibition in the Crystal Palace and around 50 prizes were awarded.[29] By the time S. Corbett and Son was established, these shows were firmly embedded in the agricultural implement makers' consciousness.

The Corbetts' home county of Shropshire had a vital role to play in their success. One of the birthplaces of the Industrial Revolution, Shropshire already had a long history of iron-founding and could boast the raw materials, processing plants and knowledge required for a successful manufacturing industry. It also remained a largely rural county, with arable and dairy farming mainly concentrated in the north and east of the county, and livestock rearing in the south and west.[30] In 1890 a writer for the *Shrewsbury Chronicle* remarked that 'Few counties in England give greater encouragement to the farm labourer than Shropshire, which outside its Agricultural Shows, [has] six societies giving prizes for ploughing, hedging &c'.[31] These gave similar encouragement to the implement makers. Ploughing matches were particularly common in the Welsh

[24] J. Brown, 'Success and adversity: entrepreneurship in agricultural engineering, 1800–1939', in J. Brown and M. B. Rose (eds), *Entrepreneurship, networks and modern business* (1993), p. 219.

[25] Dewey, *'Iron harvests'*, pp. 36–8, 81–5.

[26] Brown, 'Entrepreneurship', p. 220.

[27] 'Agricultural shows and their influence on agricultural progress', *Farmers' Magazine* (1866), p. 374.

[28] Dewey, *'Iron harvests'*, pp. 28–9; 'Agricultural shows and their influence', p. 374.

[29] Dewey, *'Iron harvests'*, p. 36; *Exhibition of the works of industry of all nations: reports by the juries on the subjects in the thirty classes into which the exhibition was divided* (1852), p. 242.

[30] R. Perren, '1875–1985', VCH *Shropshire*, IV, *Agriculture* (1989), pp. 232–69.

[31] Extracted from the *Shrewsbury Chronicle*, Oct. 1890, in TCN, n.p.

Marches, and these were eagerly contested by the Corbetts. An advertisement for Thomas's 'World Famed Ploughs' from the early 1890s gives some indication of the number of trials and competitions which took place in the county. On it, his machines are said to have made 'a clean sweep of prizes at the Great Clunside Match, Three Years in succession', taken 'Every First Prize at the Marshbrook Match for Several Years', and gained 'Many Champion and Other First Prizes' at Ludlow, Knighton, Tenbury and Much Wenlock.[32]

As well as attending the local ploughing matches, the Corbetts exhibited nationally at the major agricultural society shows. Both firms dined out on their triumphs. In 1890 the Royal Agricultural Society of England held its Disintegrator and Grist Mill Trials at Plymouth, which offered a prize of £20 for the overall winner. The purpose of the trial was, according to the Judges' Report, 'to select from among modern improvements upon the six venerable systems of grinding, that which is best fitted for a farmer's use'.[33] The category was contested by some of the biggest names in agricultural implement manufacture, including Lister of Dursley and Burrell of Thetford. William Corbett entered S. Corbett and Son's grinding mill with patent flat metal discs. William, who liked to appear in person at the big shows rather than appointing an agent, appeared to relish the challenge before him. *Implement and Machinery Review* remarked that:

> None of the exhibitors seemed half so happy [as him]. Mr Corbett was far merrier than any of the party present throughout the trials. [He] stood ready to personally set the mill in operation unattended. He was the only exhibitor who acted in this capacity. He appeared to be longing to begin.[34]

Having come through 'the most severe and exhaustive trials', S. Corbett and Son's mill claimed the top prize. In honour of the victory, the firm began producing the 'Plymouth' variant of the grinding mill. It became the defining work of S. Corbett and Son's *opus*, and was thenceforth termed 'The World's Best Grinding Mill' (Figure 2).

There is little doubt that these firms' achievements in the agricultural shows provided ample material for promotion and marketing. Thomas Corbett boasted of winning over 750 'Royal prizes' between 1865 and 1897, whilst Samuel declared his list of prizes 'too elaborate to publish'.[35] Customers were reminded of the virtues of their chosen implements with victories commemorated on name-plates or on machine beds. Of course, the Corbetts by no means gained success at all the shows they attended. For example, Thomas entered a three-horse whippletree at the RASE show at Preston in 1885, which was said by the judges to have 'a fatal defect'.[36] However, these failures were not reported in the company's own trade literature, as they clearly made for bad publicity.

This casts some doubt on the effectiveness of agricultural shows *per se* in relation to the growing influence of marketing literature. Indeed, it is not clear whether the principal effect of

[32] 'Some of the principal prizes gained by T. Corbett's "World Famed" ploughs', TCN, n.p.

[33] 'Judge's Report of RASE trials', in S. Corbett and Son catalogue, *c.*1900, IGMT, CORB. 32.3.

[34] Extracted from *Implement and Machinery Review* in S. Corbett and Son catalogue, *c.*1893, p. 21, IGMT CORB. 32.3.

[35] 'Startling successes', TCN, n.p.; 'Descriptive catalogue of implements and machinery manufactured by Samuel Corbett and Son', *c.*1870s, p. 5, IGMT, CORB. 13.

[36] C. G. Roberts, 'Report on implements at Preston', *JRASE* 21 (1885), pp. 694–6.

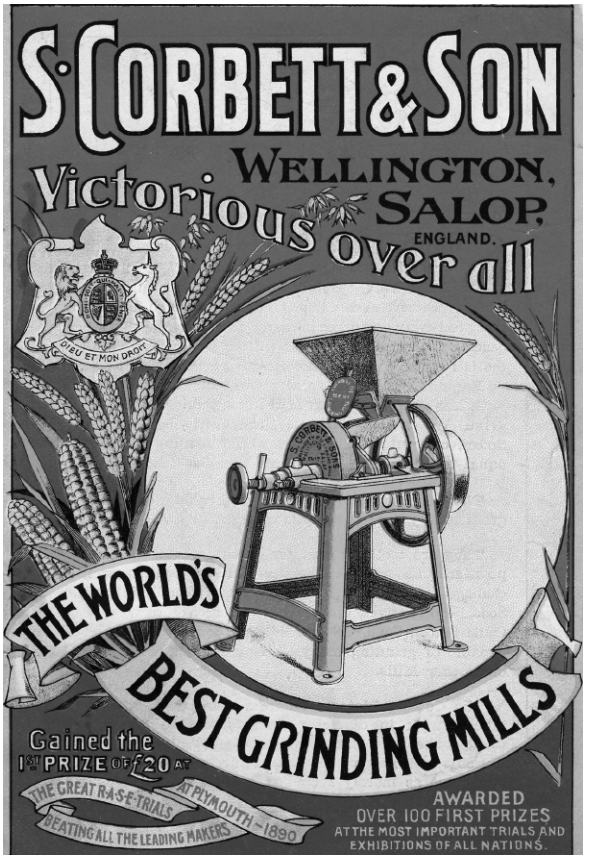


FIGURE 2: Advertising leaflet for S. Corbett and Son's 'World's Best Grinding Mill', *c.*1890. Courtesy of Ironbridge Gorge Museum Trust Library and Archives.

the agricultural show was, as it was doubtless intended, to encourage and stimulate innovation in the sector. In fact, the implement makers shrewdly exploited them for their own ends. For example, the design of S. Corbett and Son's grinding mill changed very little over the 60 or so years it was in production (Figure 3). However, once the firm had applied the moniker of the 'World's Best', they continued to market it as such. In the world of agricultural implement manufacture, prizes and titles were jealously guarded and incessantly trumpeted. Even at the time, farmers and manufacturers asked whether too many prizes were being awarded, and whether they in any way reflected the level of demand and importance accorded to them.

As early as 1855, the RASE modified its system of trials to better reward innovation within the different classes of machinery.[37] However, a decade later the matter once again became a subject for debate. In 1866 *The Farmers' Magazine* carried an article entitled 'Agricultural shows and their influence on agricultural progress', reporting on a meeting of the London Central Farmers Club. The meeting was addressed by Alfred Crosskill, a cart and waggon maker from Beverley in Yorkshire.[38] Whilst he acknowledged the beneficial effects that agricultural shows had had over the preceding 20 years, Crosskill wanted to draw attention to the problems they created for the agricultural engineering industry – above all, that they did not automatically

[37] Dewey, *'Iron harvests'*, pp. 81–2.

[38] 'Agricultural shows and their influence', 374–9.

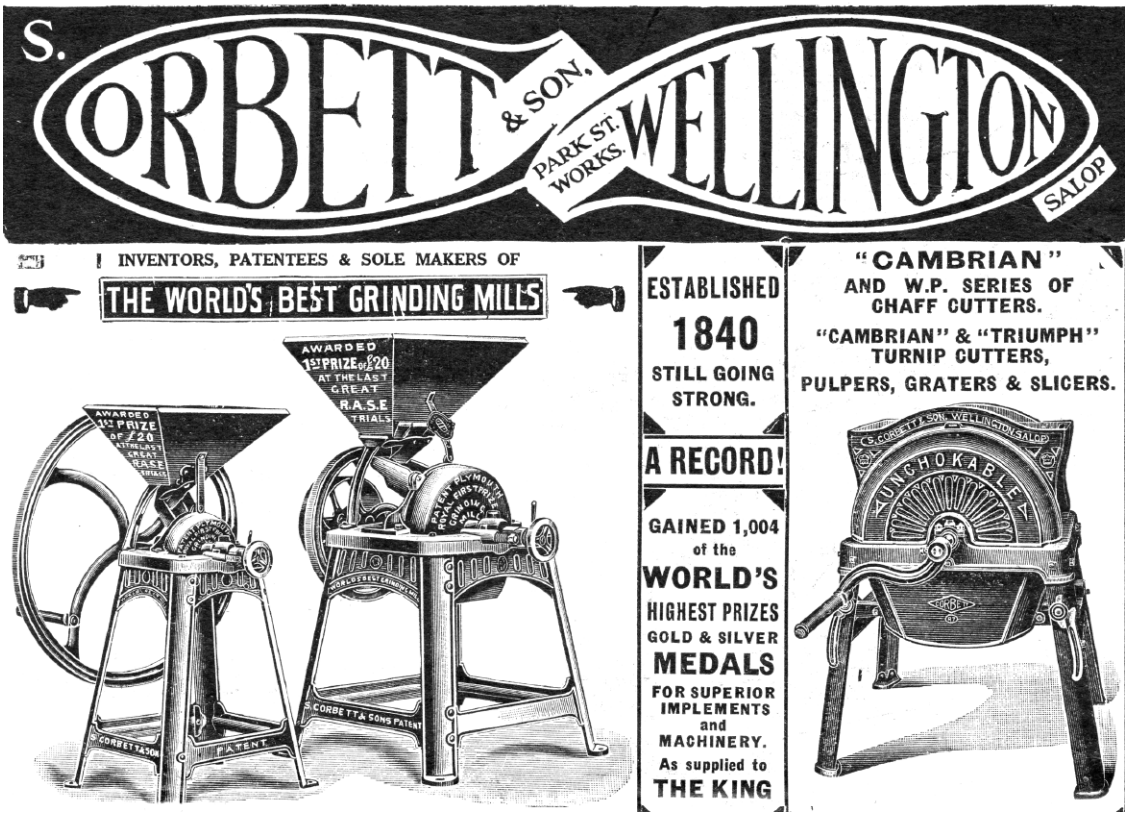


FIGURE 3: Advert for S. Corbett and Son's 'World's best grinding mills' from *The Implement and Machinery Review*, 1 Sept. 1931. The same wood engravings are still being used.

inspire engineering improvements. Whilst he noted that the shows gave companies ample opportunities to 'parade' their prizes, he proclaimed that 'The notion that these implement prizes are of any service to the practical agriculturist, is one of the strangest fallacies that has ever been impressed upon the public mind'.

In many cases the implement makers did not have to produce a new piece of equipment to win a prize. Crosskill criticized the number of prizes being awarded time and again to the same machines:

> If they had got as good an animal and as good an implement as could be produced, what was the use of constantly offering prizes for the same thing produced over and over again … How many hundreds, he might always say thousands, of pounds have been spent in the interval on prizes![39]

[39] Ibid., p. 378. My thanks to the *Review's* referee who pointed out that, ironically, Crosskill & Sons's own clod-crusher was in production for around 75 years.

The Corbetts themselves were serial winners. Thomas's 'Eclipse' winnowing machine was awarded 150 first prizes, and his 'Excelsior' plough won a staggering 300 first prizes. It is arguable that the incentive to innovate was diminished when a product or firm dominated trials for long periods and kept receiving prize money. Crosskill's critical assessment of the agricultural shows suggests there were differences of opinion among the implement makers regarding the real value of competitions. However, there is more than a hint of umbrage in Crosskill's remarks. He had a deep suspicion of the prize judges, whose capability, impartiality and fallibility were all brought into question in his report. 'After every important series of trials', he remarked, 'the columns of the agricultural journals are, for many weeks in succession, filled with remonstrances from spectators as well as competitors, all uniting in condemning the utter inadequacy of the tribunal … The system of trials and prizes cannot be defended'.[40]

Despite this, it should be remembered that the second half of the nineteenth century witnessed the real and rapid rise of the agricultural implement manufacturers. When Crosskill aired his grievances in 1866, it was within the period of high farming. Both Corbett works were still in their infancy, and the shows and prizegivings would only get more frequent as the century progressed. Crosskill's contemporaries were more inclined to acknowledge the beneficial effect of the great agricultural shows, and pointed out that farmers had 'learnt how to lay out their money on implements'.[41] But, it was conceded at the end of the report that the implement makers and the farmers were bound to have differing views on the significance of agricultural shows:

> The manufacturer used his implement every day of his life, and soon arrived at a just estimate of its value; but a great many of the implements of agriculturists were used only for one or two weeks in the year. How, then, could he be compared in that respect with manufacturers?[42]

Matches and shows inevitably took on a different complexion for the implement makers, and this underpinned their marketing strategies. Notwithstanding the inventive inertia that they seemed to abide, it is unsurprising that the Corbetts (and others like them) invested them with the significance that they did.

III

In 1914, King George V visited Thomas Corbett's stand at the Shrewsbury Royal Show. The meeting was widely reported in the local and trade press. Both *The Shrewsbury Chronicle* and *The Ironmonger* describe the king turning the handle of a machine which his father had also turned during the Paris Exhibition of 1878, an event that 'created a good deal of pleasure in the implement yard'.[43] The episode was even immortalized in an astonishing piece of self-congratulatory doggerel, circulated afterwards with the compliments of Mr Corbett: 'A Royal hand he offered you / The Royal hand you shook / As man to man he talked with you

[40] Ibid., p. 376.
[41] Ibid., p. 379.
[42] Ibid., p. 381.
[43] *Shrewsbury Chronicle*, 10 July 1914, and *The Ironmonger*, 11 July 1914, extracted in TCN, n.p.

/ While pleasant was his look … [etc.]'.[44] Whilst on the stand, the king was presented with a copy of the latest Perseverance Ironworks catalogue, encased in a red Morocco leather binding with gilt edges and tooling.[45] The trade catalogue was the second of the foundations upon which the implement makers' success rested and, as the episode with the king illustrates, was of special importance to the Corbetts. The following section looks at material produced by the family during the last quarter of the nineteenth century, and considers how it contributed to their marketing efforts.

The history of product advertising in the United States has been more extensively researched and discussed than that of Britain.[46] However, the North American scholarship identified a number of phenomena that have come to be accepted as the academic orthodoxy: that larger manufacturers began supplanting local craftsmen and sellers by creating 'brands'; that new technologies such as railways and telephone communication enabled these firms to effectively 'nationalize' their brands; that the ability to mass produce supported this process.[47] Roy Church points out that, in this scheme, the 'mass market' was almost entirely created by the manufacturers, and the consumers played only a peripheral role in its formation. Advertising, therefore, came to be viewed as something that companies did in order to mitigate the effects of rivals, rather than sell more products.[48] The same tendencies can be identified amongst the Victorian agricultural implement makers who created a competitive and publicity-heavy market without having a thriving consumer base.

In his work on Victorian entrepreneurship, Jonathan Brown identified the particular significance of trade literature to the agricultural implement manufacturers. He noted that they made use of the widest possible range of advertising literature, from catalogues and pamphlets through to postcards, calendars and railway timetables.[49] This is certainly borne out by the variety of material produced by S. Corbett and Son, which includes examples of all these items.[50] However, it was with the traditional trade catalogue that the implement manufacturers particularly excelled, being 'amongst the earliest to distribute illustrated literature'. Above all, they were pioneering in the use of fine line engravings, which other types of manufacturers were much slower to adopt.[51]

The refined technique of engraving – where images were scored into the end-grain of hardwoods such as boxwood or cherry – was first developed in the eighteenth century. The process enabled a wide variety of textures and tones to be captured for the first time. Implement makers recognized the potential in the technique for showing off the quality of their workmanship. Engravers could make accurate representations of wood grain, blades, wheels, and all manner of innovative and complex castings. If an engraving was destined for repeated use in the production of trade catalogues, a more robust 'electrotype' (a metal cast of the printing block), could be created.

[44] 'Congratulations to Mr Thomas Corbett on the occasion of His Majesty the King's visit to his stand at the Royal Show, 1914', original flyer from archive of Thomas Corbett (courtesy of Mrs E. Morris).

[45] Extracted from *The Shrewsbury Chronicle*, 10 July 1914, in TCN, n.p.

[46] R. Church, 'Advertising consumer goods in nineteenth-century Britain: reinterpretations', *EcHR* 53 (2000), p. 621.

[47] Ibid., p. 622; Dewey, *'Iron harvests'*, p. 32.

[48] Church, 'Advertising consumer goods', p. 624.

[49] Brown, 'Entrepreneurship', p. 219.

[50] IGMT, CORB. 1–120.

[51] Brown, 'Entrepreneurship', p. 219.

Like many other firms at the time, both S. Corbett and Son and Thomas Corbett employed the talents of the noted engraver, Jabez Hare (1798–1851), who was the craftsman of choice for the implement makers.[52] Hare made engravings for Ransomes in the 1840s, and established Hare and Co. in 1846 specifically to provide for this sector.[53] Even after the advent of photography, the need to produce clear crisp images meant that the skill of the engraver remained very much in demand.[54]

Trade literature was not only produced to display diagrams of machinery and product specifications, but also to help companies establish a brand. A measure of the importance of these publications is the amount of attention lavished on the cover artwork. Ransomes were using colour lithographs for the front covers of their catalogues in the 1870s although, as Brown points out, this was something of a novelty at the time.[55] Samuel Corbett's catalogue of the 1870s was more typical for the earlier period, printed in black and white with a plain blue card cover.[56] However, by the 1890s he was producing literature sporting colourful and exuberant designs. Other engineering firms followed suit. An 1883 newspaper article on the Perseverance Ironworks commented on Thomas Corbett's 'handsome [and] profusely illustrated' colonial catalogue 'printed throughout in two colours' with an 'admirably designed cover lithographed in several colours' (Figure 4).[57] The implement makers were looking to express the quality of their products through the quality of their advertising literature.

The self-assurance and exuberance of the artwork was carried through into the text itself, with both Corbett firms using inflated language to win the attention of prospective customers. Rhetoric has been an important feature of advertising since the late seventeenth century, when it was introduced into posters and broadsides selling goods. During the eighteenth century, with the proliferation of newspapers, it became ubiquitous. In the nineteenth century, advertising rhetoric needed to stand out more and more in order to be effective. Certain items received excessive treatment. Church identifies laundry products as particularly prone to 'the excesses of modern advertising'.[58] Though not discussed alongside these 'consumer' goods in the secondary literature, agricultural implements can certainly be placed in this category.

The implement makers' rhetoric was a necessary response to the conditions of their market at that time. Whilst the second half of the nineteenth century witnessed an explosion in the number of manufacturers and the numbers of products available, the agricultural depression meant that it was not matched by demand from British farmers.[59] The *Journal of the Royal Agricultural Society of England* reported a 'dull trade' in the home market in 1885.[60] Brown argued that the lack of demand was the very thing that galvanized the agricultural implement

[52] Dewey, *'Iron harvests'*, p. 27.

[53] B. Russell, 'The Coalbrookdale wood engravings' (unpublished paper, 2009), p. 1.

[54] There are one or two photographs of machinery in TCN. For a discussion on the imagery of industry, see G. Beegan, 'Finding Florence in Birmingham: hybridity and the photomechanical images in the 1890s', in M. Kang and A. Woodson-Boulton (eds), *Visions of the industrial age, 1830–1914: modernity and the anxiety of representation in Europe* (2008), pp. 81–107.

[55] Brown, 'Entrepreneurship', p. 219.

[56] 'Descriptive catalogue of implements and machinery manufactured by Samuel Corbett and Son', *c.*1870s, p. 5, IGMT, CORB. 13.

[57] *New Zealand Industrial Gazette* 3 (31) (1883), p. 1.

[58] Church, 'Advertising consumer goods', p. 642.

[59] C. MacLeod, *Inventing the industrial revolution: the English patent system, 1660–1800* (2002), pp. 99–100.

[60] C. G. Roberts, 'Report on implements at Preston', *JRASE*, sec ser. 21 (1885), p. 687. The export market was, however, a different proposition at this time.



FIGURE 4: 1892 colonial edition of Thomas Corbett's catalogue. Courtesy of Mrs E. Morris.

makers. Development was costly and competition was fierce. Firms were forced, in Brown's words, to 'employ all their powers of persuasion to coax, cajole and nurture interest in their products'.[61]

This being the case, it was essential that the implement manufacturers set their products – and themselves – apart from one another. Trying to distinguish one prize-winning double furrow plough from another cannot have been an easy task at the best of times, and the process had added significance for the likes of the Corbetts, who were competing against each other for business using the same name. Thomas Corbett employed lively language to draw in potential customers. Items in his catalogue were billed as 'Very special, worth reading' and full of 'Facts worth knowing'.[62] Those who took advice and read on were treated to accounts of 'startling successes', and were doubtless gratified to discover that 'the digging plough question [had been] settled!!!' S. Corbett and Son were slightly less exuberant in their approach, but their success at the Plymouth trials still moved them to describe it as their 'most triumphant victory'. Today it seems outlandish that ploughs, kibbling mills and mangold drills were subjected

[61] Brown, 'Entrepreneurship', p. 219.
[62] 'Very special, worth reading' and 'Facts worth knowing', advertisements in TCN, n.p.

to such hyperbole. However, it does show that the implement-manufacturers were pushing rhetoric to the limit in order to drum up interest in their products.

Strap-lines and brand names were accorded a similar level of importance by the Corbetts. As already shown, S. Corbett and Son started using the phrase 'The World's Best Grinding Mill' following their victory at the Plymouth Grist Mill Trials. This was later imitated by Bamfords, who styled their mill as 'The Best the World has Ever Produced'.[63] As a rule, however – the world's best grinding mill notwithstanding – S. Corbett and Son tended to name their products after local landmarks such as the Wrekin (a prominent hill on the outskirts of Wellington), which lent its name *inter alia* to a cattle crib, a wheeled trough and a chaff cutter. The Wellington firm appears to have focused its efforts on appealing to local consumers, using known and trusted names. Thomas, on the other hand, exhibited his more bullish tendencies by assigning to his machinery such monikers as 'Excelsior', 'Defiance' and 'Champion'.

This was not unusual in itself. Victorian manufacturers produced all sorts of items bearing these names, from golf clubs to lavatories. In many ways it was symptomatic of the confidence and ebullience of the period. Both firms were selling an idea as well as a product – something that began to characterize advertising in the latter half of the nineteenth century and into the twentieth.[64] Using a strong brand name was also a way of elevating a product above that of a rival in a challenging marketplace. The implement makers kept a close eye on their competitors' marketing strategies. Indeed, Dewey went as far as to suggest that 'industrial espionage was rife'.[65] Thomas Corbett had advertising material relating to the products of other companies glued onto the pastedowns of his private notebooks.[66] S. Corbett and Son likewise retained trade literature from A. C. Bamlett of York and Powell Brothers and Whitaker of Wrexham amongst others. The Corbett firms' attitudes to one another were slightly more ambiguous. The S. Corbett and Son archive contains nothing relating to Thomas. However, adverts for S. Corbett mills and barrel pulpers were found among Thomas's papers. Yet, he never expressly mentioned his father's firm in his notebooks. Indeed, in one of the adverts for an S. Corbett grinding mill that Thomas had kept, all references to the manufacturer's name were removed. On the illustration, the word 'Corbett's' has been erased from the casing of the grinding mechanism. The text below it, which appears verbatim in both S. Corbett's catalogues and the *Implement and Machinery Review*, has been altered. Where it originally read 'Mr Corbett', it now simply reads 'the Maker'.[67] While there is no overt evidence of enmity between the two branches of the Corbetts, they were certainly estranged by the 1860s. The manipulation of the image and text shows that trade literature mattered to Thomas Corbett; it was one of the public

[63] 'Bamford's "Rapid" grinding mills', advert available on: www.gracesguide.co.uk/File:Im19020911Ag-Bam.jpg [accessed 27 June 2014].

[64] See Church, 'Advertising consumer goods', pp. 639–41. This relates to the model of 'rational' and 'irrational' advertising put forward by scholars during the latter half of the twentieth century. 'Irrational' advertising is partially based on instilling 'ideas' rather than 'facts'. The implement makers demonstrate the use of both facts and ideas to sell their products.

[65] Dewey, *'Iron harvests'*, p. xv.

[66] Thomas Corbett's notebooks incorporate extracts from his catalogues as well as handwritten notes, designs, etc.

[67] 'Special advantages of the Patent Plymouth RASE First Prize Grinding and Kibbling Mills over all others', in TCN, n.p.

faces of the industry, and an important one at that. It also shows that local – even familial – rivalries shaped the attitudes of the implement makers as much as national ones. This was the case even as they began to look towards the international markets.

IV

Successful marketing at home, through both the trade literature and the agricultural shows, enabled the Corbetts to expand their businesses to more fertile markets abroad. S. Corbett and Son and the Perseverance Ironworks took different approaches to their overseas markets. S Corbett and Son mainly focused their attention on the United Kingdom and western Europe.[68] Thomas, on the other hand, embarked on a 'world tour' in 1882–83 to court the big Australasian markets. This was a shrewd move, not only because of the downturn in Britain, but also because protectionism hampered trade with many European countries.[69] He specially adapted many of the Perseverance Ironworks' machines to cope with the harsher conditions of Antipodean farms, and also to address a perceived lack of a skilled mechanical labour force. In Thomas's mind, he was 'in competition with the world' (although, in the 1880s–1890s at least, much of this competition was coming from within the United Kingdom).[70] Thomas Corbett took foreign markets seriously. As well as producing the exclusive 'Colonial' version of the Perseverance Ironworks catalogue, he participated in newspaper interviews for publications such as the *New Zealand Industrial Gazette* and the *Adelaide Advertiser* (both in 1883).[71]

However, as the nineteenth century drew to a close, and the twentieth century dawned, the international marketplace was becoming an ever more crowded one. Thomas and his firm in particular faced increasing competition in the export market from American manufacturers such as Massey-Harrison and Sawyer-Massey. Whereas in the 1870s British firms made 93 per cent of the agricultural implements sold in Victoria, Australia, by 1914 this figure was reduced to just 20 per cent.[72] Moreover, with the advent of the petrol engine and motor-tractor, markets both at home and abroad were set to be permanently transformed. Although the world wars created opportunities for the implement makers in terms of mass production, this was driven by necessity rather than invention.[73]

Lack of invention – particularly on the part of the second- and third-generation implement makers – was one of the reasons why the industry ultimately fell into decline.[74] It was Thomas Corbett's charisma that carried his firm through the first part of the twentieth century, including recovering from a major fire in 1905. When he died in 1917, the works continued to be operated by his executors. However, the firm was still selling the same products that had made its founder his fortune in the nineteenth century. In 1929 the Perseverance Ironworks closed,

[68] E.g., 'Moulins à meules métalliques "Corbett"' and 'Corbett's graanmolens', IGMT, CORB. 26–27.

[69] Dewey, *'Iron harvests'*, pp. 87–8, 94.

[70] 'Revised illustrated catalogue of improved patent agricultural implements and machinery', extracted in TCN, n.p.

[71] *New Zealand Industrial Gazette* 3 (31) (1883); *Adelaide Advertiser*, 10 Aug. 1893, p. 6.

[72] Brown, 'Entrepreneurship', pp. 223–4.

[73] Ken Corbett recalled the firm receiving a contract to make 1000 grinding mills for the United Nations Relief and Rehabilitation Association after the end of the Second World War. See K. Corbett, *Reminiscences of Wellington* (1989), p. 17.

[74] Dewey, *'Iron harvests'*, pp. 109–12.

and the buildings were taken on by an oil blending firm.[75] William Corbett's descendents, on the other hand, continued to manufacture agricultural appliances in Wellington until 1974.[76] Manufacture centred on troughs and sheep racks, small boilers, wheels and small iron and brass fittings, as well as updated versions of older implements. The company also produced some novelties, such as the 'Crark' farrowing ark for Harper-Adams College.[77] Overall, however, the spirit of innovation that characterized the heyday of the company had abated.[78]

V

This paper has examined the histories of two firms of agricultural implement manufacturers during a period of rapid development and change. Although other scholars have addressed different facets of the topic, the research has been couched in largely general terms. With the exception of A. E. Musson's study of Williams and Peel of Manchester, few local examples have been drawn out and situated within the wider historical context.[79] The present work has focused on a specific period in the history of the Corbett agricultural engineering firms of Wellington and Shrewsbury. The Corbetts embodied everything which was new and effervescent about Victorian agricultural engineering. Samuel's career attests to the opportunities presented to cottage blacksmiths to become fully-fledged industrialists. However, the conditions that created these opportunities – cheap raw materials, changes in farming practice – did not promise sustained success. A great many firms were established, and these had to compete with one another to survive during a period of depression in the agricultural sector.

The implement makers developed a particular way of operating that was not primarily based on manufacturing innovation. The impression of unbridled success that engineers such as the Corbetts cultivated was chiefly built on hyperbolic trade literature and public demonstrations of prowess at agricultural shows. By virtue of British colonial activity, these endeavours found expression at the furthest reaches of the globe. But, beneath the veneer of prizes, awards, and marketing puff was a much more insular economy. The manufacturers directed most of their attention towards one another. They also relied heavily on past achievements to promote current products.

The industrial and agricultural revolutions combined to shape many areas of the modern economy, and the rise of the implement makers was one consequence of this relationship. But, ultimately, these people pursued the activities and strategies of iron-founders and engineers rather than agriculturalists. This is demonstrated by the type of advertising and marketing that they employed. However, more fundamental technological changes would eventually revolutionize the face of farming, and finally a new group of manufacturers could lay claim to being 'victorious over all'.

[75] Trinder, *Industrial Archaeology*, p. 61. Morris Lubricants continue to occupy the buildings of the former Perseverance Ironworks.

[76] Meeson, 'Samuel Corbett', p. 15.

[77] See, for example, IGMT, CORB. 18, 82 and 98.

[78] I am grateful to David and Jonathan Corbett for sharing their memories of the later years of S. Corbett and Son.

[79] A. E. Musson, 'An early engineering firm: Peel, Williams and Co. of Manchester', in A. E. Musson and E. Robinson (eds), *Science and technology in the industrial revolution* (1969).

A neglected innovation: the double-furrow plough in Scotland, its early adoption and use, 1867 to 1880*

by Heather Holmes

Abstract

The double-furrow plough, which enabled two furrows to be ploughed at a time instead of a single one, allowed for significant savings in both manpower and horsepower. While it was regarded as a major innovation at the time, historians of agricultural implements and machines have given it little attention, its importance having been overshadowed by developments in steam ploughing. But for many areas of Scotland steam ploughing could not be used owing to the topography of the fields and soil types. Indeed, by 1878 it was estimated that there were no more than 50 sets of steam ploughs at work throughout the country. But double-furrow ploughs were widely and successfully adopted and had considerable success. This paper asks a number of key questions about the innovation, early adoption and use of the double-furrow plough in Scotland: how did its developer, Thomas Pirie encourage interest in his plough, and double-furrow ploughs more generally? How were his plough, and other double-furrow ploughs more generally, received by farmers and other agriculturists? How did plough makers respond to the demand for this new innovation? How was the plough adopted in particular areas of Scotland? And how was it incorporated into the ploughing technologies on farms?

In Britain, during the middle decades of the nineteenth century, a number of technologies were used for ploughing land. The oldest and most widely employed was the horse-drawn single-furrow plough, made of iron, which turned one furrow at a time. Scotland was strongly associated with swing ploughs while in England their role was taken by the wheeled plough whose wheels guided the plough and regulated its depth.[1] In the 1850s, '60s and '70s steam ploughing tackle started to challenge this familiar technology. Instead of taking one furrow at a time, a steam plough could plough multiple furrows, as many as five or six. In 1867 the 'modern' double-furrow plough, one that turned two furrows at a time, emerged as a competitor to the single-furrow plough and the steam plough.

In Scotland, Thomas Pirie's patent double-furrow plough of 1867 prompted the development of practical double-furrow ploughs that could work under a wide range of conditions. It also

* I would like to thank the Royal Highland and Agricultural Society of Scotland for access to their library in Ingliston House. I would also like to thank the *Review's* anonymous referees for their helpful suggestions.

[1] Henry Stephens, *Stephens' Book of the Farm* (fifth edn, revised and largely rewritten by James Macdonald, 3 vols, 1908), I, p. 370.

created a revolution in ploughs and ploughing.[2] However, the significance of the double-furrow plough as an implement that challenged other ploughing technologies has not been recognized. British agricultural historians have focused on steam ploughing as the most significant development of the period. Major writers on agricultural implements and machines of the period have not mentioned the double-furrow plough, or considered its role as an intermediate between the single-furrow plough and the steam plough.[3] This paper examines the early adoption and use of this innovative ploughing technology in Scotland between 1867 and 1880.

I

Patent no. 2088 of 16 July 1867, sealed on 14 January 1868, was for 'an improvement in ploughs' (Figure 1). In that patent, Thomas Pirie of Kinmundy, Aberdeenshire, registered a double-furrow plough in which the sole plate and the side plate were dispensed with and an innovative arrangement developed for the framework and mould boards. It was a design that Pirie and other plough makers continued to develop and modify in following years to bring it to a greater state of perfection, making it suitable for an even wider range of soils, including stony ones, and a more practical implement.[4]

Thomas Pirie was born on 11 August 1823 in the parish of Longside, Aberdeenshire.[5] In the 1840s he set up a blacksmith and ploughwright's shop at Nether Kinmundy, also in that parish, by the name of Thomas Pirie & Company; he was its sole partner.[6] In 1853 he described himself as a 'smith, millwright and house carpenter'.[7] In 1871 his census return records him as an implement maker; in that year his business employed ten men and four boys.[8]

Pirie was one of a large number of agricultural implement and machine makers in Scotland. They generally had small businesses serving a local area of a parish, a few parishes, a county or even a region; but few had a national standing, even in the early 1870s. They developed, manufactured and sold agricultural implements and machines, generally their own. Some of them also extended their range of manufactures to include the making of patented designs under licence, or acted as agents for other manufacturers. The making of ploughs was associated with specific makers, their shops and foundries, towns and villages. By 1870 the leading Scottish plough makers included John Gray & Co., Uddingston, and George Sellar & Son, Huntly.[9]

The idea of the double-furrow plough was not a new one when Pirie patented his 'improvement in ploughs' in 1867. It had a long history in other parts of Britain. G. E. Fussell notes that one was included in Blyth's drawings of ploughs around 1650. Lord Somerville patented an improved one in 1802 which was recommended by the Board of Agriculture and manufactured

[2] National Records of Scotland [hereafter NRS], SC275/31/87. See *Brisbane Courier*, 25 Jan. 1873.

[3] Peter Dewey, *'Iron harvests of the field': The making of farm machinery in Britain since 1800* (2008).

[4] *Aberdeen Journal* [hereafter *AJ*]), 26 July 1871.

[5] General Register Office for Scotland (GROS), 218/0000300026.

[6] GROS, Census 1871 218/00002/00002. SC1/36/81, SC1/37/80. *North British Agriculturist* [hereafter *NBA*], 29 Mar. 1871.

[7] *Cornwall's New Aberdeen Directory for 1853–54* (1853).

[8] ScotlandsPeople, www.scotlandspeople.gov.uk, 1871, 218/00002/00002.

[9] *Highland and Agricultural Society of Scotland* (1870), pp. 52, 73.

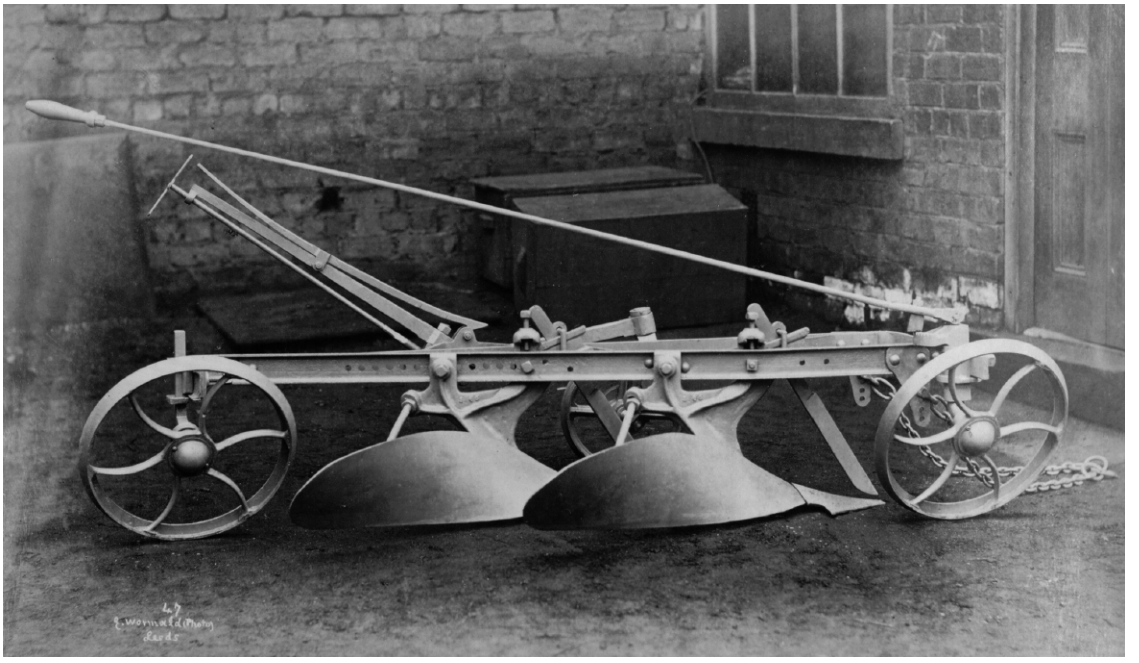


FIGURE 1: Pirie's double-furrow plough, 1868.

Source: University of Reading, Museum of English Rural Life, John Fowler & Co. (Leeds) Ltd, FOW PH/1/32

in later years by Ransome at Ipswich (later Ransomes, Sims and Head), one of the leading English plough makers.[10] J. & F. Howard, Bedford, another of the leading English plough makers, had manufactured them 'for a great many years' prior to the 1870s, and 'had been very successful' in doing so.[11] Double and other multiple-furrow ploughs were also developed and used in steam ploughing: reversible turnwrest ploughs which turned two furrows at a time, and balance ploughs which could turn larger number of furrows.[12] The balance ploughs of John Fowler & Co, Leeds, used with the company's double-engine system of traction engines, were the most popular way that steam ploughing was undertaken in Britain from the 1870s onwards.[13]

Aspects of the plough design used by Pirie were already known. As J. F. Howard observed, 'the main features of it were not new'.[14] But Pirie's invention 'had not been publically known or used previous to his patent'. Indeed, J. E. Ransome asserted that to Pirie

> belongs the credit of bringing out the double plough in an entirely new form, and especially of fitting to it a friction wheel to run behind the plough in the angle of the furrow in place of the slade, in order to reduce the draught.[15]

[10] G. E. Fussell, *The history of the farmers tools: British farm implements, tools and machinery, AD 1500–1900* (1981), p. 59; *NBA*, 26 Jan. 1870.

[11] *NBA*, 29 Mar. 1871.

[12] Jonathan Brown, *Steam on the Farm* (2008), p. 90.

[13] Dewey, *'Iron harvests'*, p. 66.

[14] *NBA*, 29 Mar. 1871.

[15] *NBA*, 7 Feb. 1872.

II

Agriculturists quickly recognized that Pirie's plough was an 'important invention'.[16] In March 1868 the Royal Northern Agricultural Society considered that it was 'one of the most important agricultural implements exhibited for many years'.[17] According to the *North British Agriculturist*, the Scottish agricultural newspaper, it 'wrought a revolution in the manufacture of agricultural implements'.[18] It created a sensation in ploughs, plough making and ploughing. One leading agriculturist, and an ardent enthusiast for steam ploughing and cultivation, George Greig, believed that Pirie's plough was the greatest improvement that had been effected on ploughing for the last 50 or 60 years.[19] By July 1868 it had 'attracted a great deal of attention from machine makers and agriculturists'.[20] Less than a year later in March 1869 it was considered to be 'famous', and by August 1870 Pirie was reported to have gained a pre-eminence as a manufacturer of double-furrow ploughs.[21] In the following year he suggested that his plough:

> has gained for itself a reputation with the practical farmer, not only in Great Britain, but over the whole of the civilized world, such as was never achieved by any other agricultural implement in so short a time.[22]

By 1878 James Melvin and Thomas Milne believed that Pirie's plough had been 'a considerable success'.[23]

Pirie's plough, and double-furrow ploughs made by other makers, became widely used throughout Scotland and further afield; in England they had been heavily advertised in districts as far apart as Northumberland and Oxfordshire.[24] By November 1870 Pirie could assert that his plough was 'now in regular use both at home and abroad'.[25] Their early manufacturing figures were impressive. In March 1871, two reports suggested that 'considerably over 3000' ploughs had been manufactured using Pirie's patent while there was 'an incalculable number of [double-furrowed] ploughs made by other manufacturers'.[26] During that month there was a 'steadily growing demand' for it: by 1874 had become 'so widely spread over the country'.[27] In 1908, James MacDonald, writing in *Stephens' Book of the Farm* could comment that 'double furrow ploughs are used to a considerable extent'.[28]

[16] *AJ*, 26 Feb. 1868, 17 Nov. 1869.

[17] *AJ*, 11 Mar. 1868.

[18] *NBA*, 9 May 1877.

[19] *Bell's Weekly Messenger*, 28 Dec. 1868.

[20] *The Times*, 31 July 1868.

[21] *NBA*, 3 Aug. 1870, *The Scotsman*, 6 Mar. 1869.

[22] *NBA*, 19 July 1871.

[23] James Melvin and Thomas Milne, 'Farm machinery', *Report on the Present State of the Agriculture of Scotland, arranged under the Auspices of the Highland and Agricultural Society* (1878), p. 148.

[24] For example, *Newcastle Courant*, *Oxford J.* in 1869.

[25] *AJ*, 30 Nov. 1870.

[26] *AJ*, 8 Mar. 1871, *Glasgow Herald* [hereafter *GH*], 4 Mar. 1871.

[27] *GH*, 4 Mar. 1871, *NBA*, 29 July 1874.

[28] James Macdonald (ed.), *Stephens' Book of the Farm* (5th edn, Edinburgh, 1908), I, p. 372.

III

While Pirie had some capacity to manufacture his plough at Nether Kinmundy, he must have anticipated that this would have been insufficient to deal with demand. He made arrangements to increase its production, ensure its distribution and manage his patent and its rights, by means of various deeds of arrangement. He put in place arrangements that allowed authorized makers to manufacture and sell it. While they were 'busily employed' manufacturing it in October 1868, it was not until the summer of 1869 that deeds of arrangements were made and signed. In June 1869 a share of the patent had been assigned to two directors of John Fowler & Co., Leeds: Robert Fowler and Robert William Eddison. They were given exclusive rights and privileges to use the patent and to manufacture and sell Pirie's plough in England and Scotland south of the Forth, excluding Glasgow, for a period of 14 years.[29] The choice of that maker is significant: Fowler was the largest maker in Britain of steam ploughing engines and ploughing and cultivating tackle, for which it had a world repute. But while steam ploughing represented an innovative ploughing technology, it was also one that competed against the double-furrow plough. The deed of arrangement gave Fowler the potential to spread multiple-furrow ploughing more widely, even with horsepower. Another deed of arrangement was made with John Fraser and Alexander Mitchell of Robert Mitchell & Son, Peterhead (hereafter referred to as Mitchell). It permitted them to manufacture Pirie's plough for sale in Scotland, Ireland and for export to the British Colonies. The company had been in business since the early 1850s as a general maker of a broad range of agricultural implements and machines; it had a reputation for its manufactures. By 1870 it described itself as agricultural implement makers, ironfounders, mechanical engineers and smiths.[30]

Further agreements were made in 1871 and 1872, which enabled the manufacture and sale of Pirie's plough to be extended further. In 1871 agreements were made with a number of Scottish implement makers, including well-known and renowned ones. In 1871 Alexander Jack and Sons, Maybole, Ayrshire, a prominent implement maker, was able to exhibit at the general show (or the Highland Show) of the Highland and Agricultural Society of Scotland a 'double furrow plough with triple adjustment cast steel skife and mould board, and two sets irons, invented by Thomas Pirie, made by exhibitors'.[31] George Sellar & Son, Huntly, Aberdeenshire, exhibited six double-furrow ploughs 'invented by Thomas Pirie, made by exhibitors', while in the following year, 1872, Sellar also exhibited a range of double-furrow ploughs 'invented by Pirie & Sellar'.[32] George Sellar & Son was the largest plough maker in Scotland, again with 'a world-wide reputation as ploughmakers'.[33] A further arrangement was made with another leading Scottish plough maker, John Gray & Co., Uddingston, Lanarkshire, after it lost the court case brought against it by John Fowler & Co. for breach of Pirie's patent in 1871. Gray

[29] University of Reading, Museum of English Rural Life, TR FOW C05/83; NRS, SC275/31/87.

[30] *NBA*, 8 Sept. 1858, *The Post Office Directory of the Engineers and Iron and Metal Trades* (1870).

[31] Highland and Agricultural Society of Scotland (HASS), *Catalogue of Implements, Machines, and Other Articles, at the Perth Show* [hereafter *Catalogue*], *26, 27, and 28 July 1871* (1871), p. 66.

[32] Ibid., p. 82; *Catalogue 1873*, p. 69.

[33] James Black, 'On the agriculture of Aberdeenshire and Banffshire', *THASS* (fourth ser., 3, 1870–1), p. 70.

thus developed and manufactured double-furrow ploughs which combined the 'patents of Pirie & Gray'.[34] In January 1872 a further deed of arrangement allowed Pirie's plough to be more easily and widely produced and sold by the leading English plough makers, Ransomes, Sims & Head, Ipswich, J. & F. Howard, Bedford, and Richard Hornsby & Sons, Grantham, who were able to grant licenses under the patent.[35]

IV

Pirie created an interest in his plough by careful promotion, which in turn stimulated an interest in double-furrow ploughs more generally. He wanted to ensure that agriculturists, including farmers, were aware of it and its advantages. As an implement maker and farmer, he would have been aware of the benefits of seeing implements and machines at work so that they could be examined and fully assessed. He used means already available to promote and stimulate interest in agricultural implements and machines in Scotland: agricultural shows, trials of implements and machines, private and public, ploughing matches, and the Scottish agricultural press, represented by the national agricultural newspaper, the weekly *North British Agriculturist.* Each had their own roles in undertaking promotional activities and in doing so at different times of the year: the agricultural shows, ploughing matches and trials were shaped by the cycle of the agricultural year. In turn, their annual cycle shaped the activities of plough and implement makers in developing and exhibiting their manufactures. The summer shows, especially those of the regional and national societies, were important for launching new implements and efforts were made to ensure that manufacturers were ready for them; societies sometimes arranged spring and winter shows, though each had a distinct focus. For plough makers, it was also important that new ploughs were ready for sale before the early winter when ploughing started. The ploughing match season was another important focal point and new ploughs, including competition models, had to be available at the start of it. Trials of implements and machines were generally undertaken at the appropriate season when they were to be used in practice. Trials were usually high profile events, and because of this, early notice could be given of the implements and machines that were to be assessed, and submissions sought, giving makers time to finalize their designs and manufacture them.

V

Between 1867 and 1869 Thomas Pirie undertook a number of steps to draw attention to his plough. The first public exhibition of his plough appears to have been at the show of the Royal Northern Agricultural Society, which then entered it for trial in September 1867 alongside a number of reaping machines.[36] After the end of the show season, he trialled it at various ploughing matches and trials. In February 1868, he made 'various trials of its capabilities' in Aberdeenshire, Banff and Morayshire, and demonstrated it at ploughing matches, including

[34] For example, HASS, *Catalogue 1871*, p. 61.
[35] MERL, TR FOW C05/84, deed of arrangement.
[36] *AJ*, 18 Sept. 1867. *NBA*, 15 Dec. 1869.

the 'great annual ploughing match' arranged by the Morayshire Farmers' Club. He also conducted private trials for 'several eminent agriculturists'.[37]

In 1868 he exhibited his plough at a number of the major agricultural shows, notably the Royal Northern Agricultural Society's spring show in March, and the Highland Show in July, where Mitchell also exhibited the plough.[38] The Highland and Agricultural Society of Scotland selected Pirie's plough for trial as part of a wider trial of ploughs; it gained second prize behind Mitchell while Fowler's plough came third.[39] In December 1868 Fowler exhibited Pirie's plough at the Smithfield Club Show in London, a major forum for the showcase of new implements and machines, especially English ones.[40] After ploughing commenced at the end of 1868, he continued to demonstrate his plough; a trial was arranged at Hatton of Carse, Angus in early December.[41]

During 1868 Pirie also started to establish a network of agents in Scotland. The use of of agricultural implement agents was not, however, widely used at this time in the Scottish agricultural implement and machinery industry. Pirie's first agent appears to have been a local one: Ben. Reid & Co., Aberdeen, a firm which had arranged a public trial of Pirie's plough at Laurencekirk, Kincardineshire, in February 1868.[42] A second one was appointed in Angus by early December: W. D. Brown, Turin.[43]

In the first half of 1869 Pirie built on the strong presence that he had developed at trials, ploughing matches, locally important agricultural shows and the Highland Show. He again exhibited his plough at the spring show of Royal Northern Agricultural Society and at the Highland Show where Mitchell and Fowler also exhibited their ones. Again, both societies set aside his plough for trial; those of Mitchell and Fowler were also selected.[44] As Fowler had its own show circuit in England, it also entered the plough for trial at the meeting of the Bath and West of England Society in June.[45]

Pirie continued to appoint agents during 1869. They included major implement agents. In the South of Scotland, John Pringle, 33 Horsemarket, Kelso, and 1 Victoria Street, Edinburgh, was appointed by June; Pringle exhibited Pirie's plough at Glasgow Agricultural Society's show.[46] In western Scotland, the sole agent was P. & R. Fleming & Co., 29 Argyle Street, Glasgow, appointed in November; it announced its agency with a series of adverts in the Scottish provincial press, principally the *Glasgow Herald* and *The Scotsman*.[47] The agents changed in following years as new ones were appointed and others discontinued.[48]

Although Pirie's plough was widely reported in the national, provincial and local press, as well as Scottish agricultural press, it was not advertised in the *North British Agriculturist* until early 1869. Fowler and Pirie both undertook their own promotional activities. (Mitchell did not advertise the plough in that newspaper.) Fowler was an extensive advertiser from 10

[37] *AJ*, 26 Feb.1868.
[38] HASS, *Catalogue of Implements*, *1868*, p. 52.
[39] *AJ*, 28 Oct. 1868.
[40] *NBA*, 16 Dec. 1868.
[41] *Dundee Courier* [hereafter *DC*], 3 Dec. 1868.
[42] *AJ*, 26 Feb. 1868, 21 July 1869.
[43] *DC*, 3 Dec. 1868.
[44] *AJ*, 28 July 1869, *The Scotsman*, 6 Mar. 1869, 18 Aug. 1869, HASS, *Catalogue of Implements*, *1869*, p. 73.
[45] *NBA,* 9 June 1869, HASS, *Catalogue of Implements*, *1869*, p. 49.
[46] *NBA*, 16 June 1869.
[47] For example, *GH*, 20 Nov. 1869; *The Scotsman*, 9 Dec. 1869.
[48] Thomas Scott, Edinburgh, is recorded as an agent in 1870 (*The Scotsman*, 30 Apr. 1870).



FIGURE 2: Fowler's first advert in the *North British Agriculturist*, 24 March 1869.

February 1869. However, rather than announce it as a new implement, promoting its merits and importance as might be expected for an important innovation, that first advert drew attention to Fowler's rights to Pirie's patent and the dangers of infringement. This notice was repeatedly issued in following weeks, with an invitation to send reports of any infringements of the patents to Fowler's Scottish agent, George Greig, Harvieston, Stonehaven.[49] Fowler's name is first associated with the plough a few weeks later, on 24 March 1869 (Figure 2). This advert, the largest one that the company placed in this newspaper to advertise the plough, was to draw 'the attention of the public to this New Implement'.[50] The plough was advertised separately from its steam ploughing and cultivating machinery, though adverts for both could be published next to one another. Fowler continued to advertise the plough throughout the summer months, seeking to build up a market for the winter ploughing season of 1869–70.[51]

VI

Pirie's plough quickly stimulated a wider interest in double-furrow ploughs amongst farmers and other members of the farming community, who were eager to see both his plough and the similar ones that were starting to be made by other makers. While the ploughs were inspected by large numbers of visitors at agricultural shows, including district ones, it was at the trials and ploughing matches where they had the opportunity to see them at work that they received the greatest attention.[52] As one commentator observed in January 1870: 'ploughing match follows ploughing match, and still the double-furrow is in the ascendant'.[53] Especially

[49] *NBA*, 10 Feb. 1869.
[50] *NBA*, 24 Mar. 1869.
[51] For example, *NBA*, 24 Mar. 1869, 21 July 1869, 22 Sept. 1869.
[52] *GH*, 28 Apr. 1869; *NBA*, 12 July 1870; *The Scotsman*, 28 Apr. 1870.
[53] *GH*, 25 Jan. 1870.

until 1871, ploughing matches that had double-furrow ploughs attracted crowds of a significant size.[54] Some even drew their largest-ever attendances.[55] Even at private trials, large crowds assembled.[56]

Double-furrow ploughs made by other makers started to appear at agricultural shows, ploughing matches and trials in increasing numbers. There is a distinct increase in their numbers and in the range and number of events where they are recorded, especially between 1868 and 1871. At agricultural shows, there were few double-furrow ploughs from other makers exhibited during the show season of 1868. The number of makers and the shows at which they exhibited increased in 1869, when they were also recorded at a wider range of shows, including regional ones such as Ayrshire Agricultural Association and local shows such as Biggar Cattle Show in Lanarkshire.[57] Their diffusion from the regional show in the geographical area of the plough's invention, and the Highland Show, to more local ones is especially important, showing its acceptance by agriculturists as a practical implement. That expansion continued in 1870 when double-furrow ploughs were recorded at an even larger number of shows and over a wider geographical area of the country, including counties such as Easter Ross, Perthshire, Stirling, Midlothian, Lanarkshire and Ayrshire, all some distance from Aberdeenshire.[58]

They were also present at specially arranged trials, though the numbers of these were small in 1867 and 1868.[59] In 1868 they included one arranged in November by the Garioch Farmer Club; a further one was arranged by Fyvie Agricultural Association, which invited makers and 'others'.[60] Further trials were not common until the autumn of 1869. During the winter of 1869–70 there were no less than 28 such trials specifically set up to test double-furrow ploughs (15 were held between October and the end of December 1869). This was the largest number held in any season. Most of them were arranged by agricultural societies, both local and county, as well as some ploughing societies (demonstrations were an innovative feature as the focus of the event was on competitive ploughing). Regional and national societies which had held trials in previous years held further ones: the Highland and Agricultural Society of Scotland had ploughs by seven makers including Pirie, Mitchell, and Fowler, and the Royal Northern Agricultural Society had 'a dozen entries of double-furrow ploughs', including ones from Pirie and Mitchell.[61] A few makers or their agents also arranged special ones.[62] Trials were held throughout a wide geographical area of the country. They included, for example, five arranged in Aberdeenshire, and one in Morayshire.[63] There were seven in the Lothians,[64] three in Stirlingshire,[65] two in Lanarkshire,[66] two in Renfrewshire,[67] and two in Dumbartonshire.[68] There was one at Fife,[69]

[54] For example, *AJ*, 9 Dec. 1868; *GH*, 20 Dec. 1869; *NBA*, 22 Dec. 1869; *The Scotsman*, 29 Nov. 1869.

[55] *GH*, 9 Feb. 1870.

[56] *GH*, 24 Nov. 1869.

[57] *GH*, 28 Apr. 1869; *The Scotsman*, 27 Aug. 1869.

[58] *GH*, 9 July 1870; *NBA*, 11 May, 12 July, 20 July, 27 July, 3 Aug. 1870; *The Scotsman*, 28 Apr., 5 May, 18 July, 26 July, 28 Sept. 1870.

[59] *AJ*, 18 Sept. 1867.

[60] *AJ*, 11 Nov., 2 Dec. 1868.

[61] *AJ*, 17 Nov. 1869; *The Scotsman*, 18 Aug., 15 Nov. 1869.

[62] *AJ*, 10 Nov. 1869; *GH*, 24 Nov. 1869; *The Scotsman*, 12 Oct., 15 Oct. 1869.

[63] *AJ*, 10 Nov., 17 Nov., 1 Dec., 21 Dec. 1869, 2 Feb., 9 Mar. 1870; *The Scotsman*, 4 Mar. 1870.

[64] *The Scotsman*, 12 Oct., 15 Oct. (2 references), 6 Nov. 1869, 8 Jan., 19 Jan., 9 Feb. 1870.

[65] *The Scotsman*, 6 Nov. 1869; *GH*, 24 Nov. 1869, 8 Feb. 1870.

[66] *GH*, 29 Oct. 1869, 12 Jan. 1870.

[67] *GH*, 17 Dec., 31 Dec. 1869.

[68] *GH*, 17 Dec., 20 Dec. 1869.

[69] *The Scotsman*, 4 Mar. 1870.

and a further one in Perthshire, at Coupar Angus.[70] The earliest ones were held in the Lothians, a progressive district, followed by those in Aberdeenshire, Stirlingshire and Renfrewshire, though competitions in Midlothian continued into January.[71] Some of the trials were large events. At Stirling some 16 double-furrow ploughs were entered for trial, while there were also 16 entries at Fettercairn.[72] At Morayshire Farmers' Club there were 13 entries, though, two or three 'did not put in an appearance'.[73]

Further trials were held during the winter ploughing season of 1870–71. Although a smaller number were held than in the previous season, they were recorded throughout the major agricultural districts such as Aberdeenshire, Midlothian, Lauderdale, Dumbartonshire, and Perthshire. They were, however, generally larger competitions than had been previously held, with a significant number of ploughs by different makers being entered at each. At Niddrie Mains, Edinburgh, there were some 21 double-furrow ploughs, while at Halkerston, also in Midlothian, 22 ploughs were entered, though only 12 came forward.[74] The ploughing season of 1871–72 had a smaller number of trials, though they continued to be large competitions. By this time, the competition at Dalkeith, Midlothian, had become an established annual event; it was to become the 'Midlothian double furrow plough competition' and continued to be held each year until 1878.[75]

Classes for double-furrow ploughs started to be arranged at ploughing matches. The first matches with such a class were all held in Aberdeenshire, at Formartine, Ythanside and Belhelvie, in December 1868.[76] By 1870 they were recorded in many districts of Scotland, though such a class was by no means universal.[77] Between January and March 1870 they are recorded in 15 of the 42 ploughing matches whose results were published in provincial newspapers and the *North British Agriculturist*.[78] Not only were they found in the north-east,[79] but also throughout Lowlands areas, including Renfrewshire,[80] Argyll (Cardross),[81] Stirlingshire, West Lothian,[82] Campbeltown (Argyll), Dumbartonshire, Dumfriesshire, Ayrshire,[83] Perthshire,[84] Fife, the western district of Midlothian,[85] and East Lothian.[86] They were also found in highland districts, such as Kilfinan (Argyll).[87]

Their presence continued to grow at ploughing matches in 1871, though again, they were not found at all of them. Between January and March they were recorded at 22 of the 40 matches reported in the provincial press and the *North British Agriculturist*.[88] They were recorded for the first time as an established class.[89] Between January and March 1872 they are recorded at

[70] *The Scotsman*, 18 Mar. 1870.
[71] *The Scotsman*, 8 Jan., 24 Jan. 1870.
[72] *The Scotsman*, 6 Nov., 6 Dec. 1869.
[73] *AJ*, 1 Dec. 1869; *The Scotsman*, 29 Nov. 1869.
[74] *NBA*, 25 Jan., 1 Feb., 15 Feb. 1871.
[75] *NBA*, 25 Jan. 1871, 1 Jan. 1873, 13 Jan. 1875, 2 Feb. 1876, 24 Jan. 1877, 23 Feb. 1878; *The Scotsman,* 17 Feb. 1872, 7 Dec. 1874.
[76] *AJ*, 9 Dec., 23 Dec., 30 Dec. 1868.
[77] For example, Renfrewshire (*NBA*, 26 Jan. 1870), Currie, Midlothian (*NBA*, 26 Jan. 1870), Blairdrummond, Stirlingshire (*NBA*, 9 Feb. 1870), Falkirk, Stirlingshire (*NBA*, 9 Feb. 1870), Kirkcaldy, Fife (*NBA*, 23 Feb.1870).
[78] Evidence from *GH*, *NBA*, and *The Scotsman*.
[79] *NBA*, 5 Jan., 30 Mar. 1870.
[80] *NBA*, 12 Jan. 1870.
[81] *GH*, 29 Jan. 1870.
[82] *NBA*, 9 Feb. 1870.
[83] *NBA*, 16 Feb. 1870.
[84] *NBA*, 9 Mar. 1870.
[85] *NBA*, 21 Dec. 1870.
[86] *The Scotsman*, 7 Mar. 1870.
[87] *GH*, 12 Mar. 1870.
[88] Evidence from *NBA*, *The Scotsman* and *GH*.
[89] *The Scotsman*, 21 Dec. 1870, 23 Jan. 1871.

seven of the 12 matches reported in the press. For that same period in 1873, they are recorded at eight of the 14 matches. At them, there was generally a small entry of double-furrow ploughs, though at the Western District of Midlothian match in January 1871 there were 19.[90]

VII

The impact of Pirie's plough on the manufacture of ploughs in Scotland can be traced through evidence from accounts of agricultural shows, trials, ploughing matches and the Scottish agricultural press. Because of the importance of Pirie's innovation, other makers quickly began to make double-furrow ploughs. The speed of adoption stands in comparison to the decades that the steam ploughing engine and tackle or the reaping machine took to be adopted in Scotland. This paper sets out that adoption by other makers in the period 1867 to 1875, with an account of how the fully established makers exhibited their ploughs in the years between 1876 and 1880.

Underpinning the making of the double-furrow plough by other makers was a number of considerations: their awareness of developments in ploughs; their ability to make a design that would not infringe on Pirie's patent; the demand for the plough in their customer area; the awareness of other local makers also making double-furrow ploughs; and the seasonal round of promotional events at which they could announce and exhibit new manufactures such as a double-furrow plough. This last factor was especially important in the shaping when plough and implement makers announced and brought forward their new double-furrow ploughs.[91] We can break down the adoption of the plough by other manufacturers into six stages. The manufacturers are named in Table 1.

(a) Stage 1: Early steps taken by other makers to manufacture double-furrow ploughs by the time of the Highland Show in July 1868

Until the Highland Show of July 1868 only a small number of other implement and machine makers had started to manufacture their own double-furrow ploughs (Table 1). Three are recorded, all in north-eastern Scotland, especially Aberdeenshire, the home county of Pirie's plough. Of the three plough makers with ploughs at the Highland Show of 1868, the plough of at least one, William Shivas of Kinmundy, Longside (also residing and working in the same parish as Pirie), was of a 'simpler construction than Pirie's, but upon the same principle'.[92] Shivas' plough demonstrates the early stages of the diffusion of Pirie's design, using the same principles, though with some modification. During this period the double-furrow plough was still an innovation, though other local makers were trying to adapt the design.

[90] *The Scotsman*, 23 Jan. 1871.

[91] For example, John R. Walton, 'Mechanization in agriculture: a study of the adoption process', in H. S. A. Fox and R. A. Butlin (eds), *Change in the Countryside: Essays on Rural England, 1500–1900* (1979), pp. 23–42.

[92] *AJ*, 28 Oct. 1868; *NBA*, 28 Oct. 1868.

TABLE 1: New makers of double-furrow ploughs recorded in the agricultural and general press and at the general show (Highland Show) of the Highland and Agricultural Society of Scotland following Pirie's plough of 1867, 1867–75.

Date	*Names of maker*
Stage 1	
July 1867	Thomas Pirie, Kinmundy, Aberdeenshire
July 1868	Robert Mitchell & Son, Peterhead, Aberdeenshire
	William Shivas, Kinmundy, Longside, Aberdeenshire
Stage 2	
By October 1868	John Fowler & Co., Leeds
	Robert Mitchell & Son, Peterhead, Aberdeenshire
November 1868	Alexander Brodie, Auchterless, Aberdeenshire
	J. & F. Howard, Bedford
	G. W. Murray & Co., Banff Foundry, Banff
December 1868	George Coutts, Menie, Aberdeenshire
	Mr Craig, Tarves, Aberdeenshire
	William Craig, Old Meldrum, Aberdeenshire
	Mr Duncan, Tarves, Aberdeenshire
	Mr Philip, Newscat, Aberdeenshire
	Mr Tough Pitmedden, Aberdeenshire
By July 1869	John Anderson, Monifieth, Dundee, Angus
	William Mitchell, Montrose Foundry, Montrose, Angus
	David Hinton, Lunan, Arbroath, Angus
	Benjamin Bisset, Brechin, Angus
	John Gray & Co., Uddingston, Lanarkshire
	Alexander Guthrie, Craigo, Montrose, Angus
	William Horn, near Rothmaise, Rayne, Aberdeenshire
	Alexander Jack & Sons, Maybole, Ayrshire
	George Ponton & Son, Linlithgow, West Lothian
	James Robertson, Coupar Angus, Perthshire
	George Sellar & Son, Huntly, Aberdeenshire
Stage 3	
November 1869	Picksley & Sons, Bedford Foundry, Leigh, Lancashire
December 1869	A. R. Guthrie, Crags, Renfrewshire
	Mr McCreath, Cadder, Renfrewshire
	Mr McRaith, Cadder, Renfrewshire
	Ransomes, Sims & Head, Ipswich
January 1870	James Geddes, Manderlee, Alvah
	Willian Gossip, Parkhill, Aberdeenhire
	Mr Skinner, Rhynie, Aberdeenshire
March 1870	Auchinachie & Simpson, Keith, Morayshire
	William Dewar, Couttie Bridge, Perthshire
	Mr Ross, Stonehaven, Kincardineshire
February 1870	William Kirkwood, Lothian Bridge, Midlothian
	Law, Duncan & Co., Glasgow
	Mr McIllwraith, Cadder, Dumbartonshire
	John McKirdy, Bute
	Peter Winton, Thorn, Stirlingshire
By July 1870	William Black, Lockerbie, Dumfries
	John Bonella, Foodieash, Fife
	Halliday & Thompson, Dumfries
	J. & F. Howard, Britannia Iron Works, Bedford
	Alexander Jack & Sons, Maybole, Ayrshire
	John Kerr, Mouswald, Dumfries
	William McCormick, Dumfries
	A. & J. Main & Co., Glasgow
	David Scoular & Co., Forest Mill, Clackmannan
	James Taylor & Sons
Stage 4	
November 1870	Alexander Newlands, Inverurie, Aberdeenshire
December 1870	John Barrowman & Co., Saline, Fife
	Mr Martin, Dalkeith, Midlothian
January 1871	Thomas Hunter, Maybole, Ayrshire

TABLE 1: *continued*

Date	*Names of maker*
February 1871	David Paterson, Carnock, Stirlingshire
March 1871	Charles Robertson, Maryculter, Banchory
May 1871	Robert Miller, Mauchline, Ayrshire
By July 1871	James D. Allan & Sons, Culthill, Dunkeld, Perthshire
	Richard Bickerton & Sons, Berwick on Tweed
	Richard Hornsby & Sons, Grantham
	Kemp, Murray & Nicholson, Stirlingshire
	Thomas McCulloch & Co.
	Mellard's Trent Foundry Co., Rugeley, Staffordshire
	Robert Roxburgh, Kinross
Stage 5	
January 1872	Robert Kennedy, Halls of Airth, Stirlingshire
	Mr Young, East Calder, Midlothian
By July 1872	R. Hornsby & Sons, Grantham
	Ransomes, Sims & Head, Ipswich
	Peter Winton, Falkirk, Stirlingshire
July 1874	Northern Agricultural Implement and Foundry Company, Inverness
July 1878	A. Thompson, Dumfries

Source: *Aberdeen Journal*, 28 Oct., 2 Dec., 9 Dec. 23 Dec., 30 Dec. 1868, 21 July, 28 July, 10 Nov., 17 Nov. 1869, 12 Jan., 19 Jan., 9 Mar. 1870, 8 Mar. 1871; *Glasgow Herald*, 22 Dec. 29 Dec., 31 Dec. 1869, 21 Jan. 1871, 9 Feb. 1870, 11 Feb. 1871, *North British Agriculturist*, 28 Oct., 2 Dec. 1868, 28 July, 29 Sept. 1869, 9 Mar., 13 July, 27 July, 21 Dec. 1870; 29 Mar., 3 May, 17 May, 13 Sept., 27 Sept., 4 Oct., 11 Oct., 18 Oct., 1 Nov., 8 Nov., 22 Nov., 29 Nov., 6 Dec., 20 Dec., 27 Dec. 1871, 24 Jan. 1872, *The Scotsman*, 26 July, 15 Nov. 1868, 10 Nov., 15 Nov. 1869, 9 Feb., 7 Nov. 1870, 26 July 1871, 2 Apr. 1873, Highland and Agricultural Society of Scotland, *Catalogue of Implements, Machines and Other Articles, 1868, 1869, 1870, 1871, 1872, 1873, 1874, 1878*.

(b) Stage 2: Steps taken by other makers after the Highland Show of 1868 and the following Highland Show of 1869

In the year following the Highland Show of 1868 there were significant developments in the manufacture of double-furrow ploughs, and in particular an increase in the number of new makers recorded, their character and their geographical location (Table 1). The period until December 1868 continued to see the local developments in north-east Scotland, and especially Aberdeenshire, where the plough was starting to be made by an increasing number of makers; this was also a trend that continued in the following months. In November 1868, G. W. Murray & Co., Banff Foundry, Banff, entered a plough into a double-furrow plough competition at Fyvie.[93] Murray was one of the major agricultural implement and machine makers in that part of Scotland and had a national (and indeed international) standing.[94] The company was to extensively advertise its ploughs in the *North British Agriculturist* in the following months and years and to take its double-furrow plough to the Vienna International Exhibition of 1873.[95] The appearance of Murray marked an important development: a major implement and machine maker in Scotland that recognized the significance of the double-

[93] *AJ*, 2 Dec. 1868.

[94] *The Scotsman*, 2 Apr. 1873, *NBA*, 15 July 1874.

[95] G. W. Murray advertised in *NBA* on 28 July, 11 Aug., 18 Aug., 25 Aug., 1 Sept., 15 Sept., 29 Sept., 13 Oct., 27 Oct., 10 Nov., 24 Nov., 8 Dec., 22 Dec. 1869 and 5 Jan. 1870. Murray also launched a further intensive advertising campaign in *NBA* from 6 July 1870. *The Scotsman*, 2 Apr. 1873.


PATRONISED BY HER MOST GRACIOUS MAJESTY THE QUEEN.

PATENT COMBINED PLOUGH AND SUBSOILER, CONVERTIBLE AT WILL INTO A PATENT DOUBLE-FURROW PLOUGH.

PRICES.

G. L. M., for Light Land, £9 15s. Steel Sheaths, £1 Extra.
G. L. P., for Medium Soil, £10 15s. Steel or Iron Shares, 10s per Pair Extra.
D. M. R., for Heavy Land, £12 12s. *No Extras.*

Either of the foregoing Ploughs are convertible at pleasure to the Patent Combined Subsoiler; but only D. M. R. are recommended as having abundant strength for such work.
Subsoiler, £3 3s (Extra).

G. W. MURRAY AND CO.,
AGRICULTURAL ENGINEERS, BANFF FOUNDRY, N.B.,

Beg to call the attention of Agriculturists to their
NEW PATENT IMPROVED DOUBLE-FURROW PLOUGH,
AND TO THEIR
NEW PATENT COMBINED SINGLE-FURROW AND SUBSOILER,
As Sold to Her Majesty THE QUEEN for the Royal Farm at Windsor.

At the Highland and Agricultural Show at Edinburgh, 1869, G. W. M. & Co. gained the LARGE SILVER MEDAL for these Ploughs and other Exhibits; and their Patent Double-Furrow Ploughs are pronounced by all who have seen them to be the Lightest in Draught, the Simplest, and the Best Constructed, of any yet invented.

G. W. M. & Co. manufacture these Ploughs in three varieties, marked G. L. M., G. L. P., and D. M. R.

In consequence of reports circulated in the interest of the Proprietors of Pirie's Patent Double-Furrow, to the effect that G. W. M. & Co.'s Patent is an infringement on that of the latter, G. W. M. & Co. beg to intimate that they are in a position to, and do, give in every Receipt a Guarantee, freeing their Customers from all Penalties.

FIGURE 3: G. W. Murray and Co.'s advert for his double-furrow plough in *North British Agriculturist*, 10 November 1869.

furrow plough and made and sold their own design (Figure 3). Murray was followed by another of the major plough and implement makers of Aberdeenshire, George Sellar & Son of Huntly, who first exhibited their double-furrow plough at the show of the Royal Northern Agricultural Society in July 1869 and entered it into a trial arranged by that Society; it also entered a plough for trial at Inverurie in November 1869.[96]

Some of the larger manufacturers from other areas of the Lowlands also started to make double-furrow ploughs. They included John Gray & Co., Uddingston Iron Works, Uddingston, Lanarkshire, a leading plough maker (Figure 4). As Gray stated that he started to make his double-furrow ploughs in August 1869, his display at the Highland Show must have been of models to advertise their forthcoming availability.[97] Thereafter, Gray extensively advertised his double-furrow plough in the *North British Agriculturist*.[98] Alexander Jack & Sons, Maybole,

[96] *AJ*, 28 July, 17 Nov. 1869, *The Scotsman*, 15 Nov. 1869.

[97] *NBA*, 29 Mar. 1871.

[98] John Gray & Co., Uddingston, extensively advertised in the *NBA* between 29 Sept. 1869 and 15 Dec. 1869, throughout 1870, and from 4 Jan. to 26 July 1871.



FIGURE 4: John Gray and Co.'s advert for his double-furrow plough in *North British Agriculturist*, 16 February 1870.

was a leading implement maker in Ayrshire, while George Ponton & Son, Linlithgow, West Lothian, was a well-known plough maker who had received awards for his ploughs from the 1850s onwards from the Highland and Agricultural Society of Scotland.[99]

The exhibition of double-furrow ploughs at the Highland Show of 1869, held at Edinburgh (one of the larger shows for the exhibition of implements and machines) reflected these developments. It confirmed the large numbers of makers that had emerged in a short time. There were 34 such ploughs on display, displayed by 17 exhibitors, which made up a significant part of the 85 exhibits, shown by 31 exhibitors.[100] Some ten of the exhibitors of double-furrow ploughs displayed ploughs that they had manufactured themselves. A further seven – including Pirie, Mitchell, and Fowler, and some of Pirie's agents – exhibited Pirie's plough or Fowler's plough which used Pirie's patent.[101] A further five displayed only ploughs made by

[99] For example George Ponton & Son was awarded two sovereigns for the best two-horse plough for general purposes (*THASS*, new ser. (1849–51), p. 409). He also won the bronze medal for second-best two-horse plough for general purposes in 1861 (Highland and Agricultural Society of Scotland, *Perth Show, 30th and 31st July and 1st and 2nd August 1861*. Award of Premiums. Perth: printed by C. G. Sidey, Post-office, Perth, 1861, p. 20). Alexander Jack & Son was recorded as an implement maker as early as 1844 (*Ayrshire Agriculturist*, 22 Oct. 1844).

[100] Royal Highland and Agricultural Society of Scotland [HASS], *Catalogue of Implements, Machines, and other Articles at the Edinburgh Show, 28th, 29th, and 30th July, 1869*. Edinburgh: printed by Neill and Company, 1869, pp. 23, 25, 27, 43, 44, 49, 52, 53, 54, 59, 63, 64, 67, 73, 76.

[101] Agents included Kemp, Murray & Nicholson, Stirling, John Pringle of Edinburgh, Berwick and Kelso, Alexander Jack & Sons, Maybole, A. and J. Main & Co. of Glasgow (HASS, *Catalogue of Implements*, *1869*, pp. 25, 27, 59, 66).

other makers, and for which they acted as agent, including Pirie's and Fowler's ploughs, thus helping to spread the availability and use of the plough.

There were a number of improvements made to the design of the double-furrow ploughs: as early as July 1868 some of these were significant. In that month, David Hanton, smith at Lunan, Arbroath, had effected an 'ingenious improvement on Pirie's plough'.[102] By the following summer, there was a greater variation in designs as makers were seeking to make the plough more versatile and applicable to a greater range of soil types. At the Highland Show of 1869 some of the exhibitors had started to display a number of models. While local plough makers generally exhibited one, Pirie and Mitchell had three each; Fowler had seven.

(c) Stage 3: Steps taken by other makers after the Highland Shows of 1869 and 1870

This was a stage that saw a number of trends that built upon earlier developments in the first two stages: the continued strengthening of the north-east as the centre for double-furrow plough manufacture, with further new makers in the area; the spread of makers over a wider geographical area of the Lowlands to include counties such as Renfewshire, Dumbartonshire, Stirlingshire, Dumfriesshire, Fife, Clackmannanshire and Midlothian and there was increasing use made of agents to sell Pirie's plough (Table 1).

One important development was the increased presence of English plough makers in Scotland, through exhibition at trials and demonstrations. While Mr Leslie, a banker, of Turiff entered a plough made by J. & F. Howard, Bedford, at the trial at Fyvie in November 1868, that firm participated more extensively in these events in late 1869, entering a plough at a trial in the Lothians in October 1869; it also displayed its plough at the Smithfield Club Cattle Show in December that year.[103] However, it did not advertise its double-furrow plough widely in the Scottish agricultural press until the latter part of 1871.[104] Picksley & Sims, Bedford Foundry, Leigh, Lancashire, competed at another trial in the Lothians in November 1869.[105] In addition, by late 1869, Ransomes, Sims and Head, Ipswich, appointed A. & J. Main & Co., of Glasgow, as its Scottish agents for its double-furrow plough.[106]

The Highland Show of 1870, held in Dumfries, which usually had the smallest exhibition of implements and machines, demonstrates the developments in plough making that had taken place since the last show. A total of 19 exhibitors exhibited 56 double-furrow ploughs. These accounted for a significant proportion of the overall display of ploughs, of which there were 94 by 26 exhibitors.[107]

As with the earlier Highland Shows, the exhibitors displayed a number of trends in the manufacture and exhibition of double-furrow ploughs. There were five new exhibitors who have not previously been recorded as having manufactured one of these ploughs. There were also exhibitors that had been at the 1869 Show. There were seven of these, including Pirie, Mitchell, and Fowler, as well as some of the most important plough makers in Scotland who were now playing an increasingly important part in the development and manufacture of

[102] *The Scotsman*, 26 July 1868.

[103] *AJ*, 2 Dec. 1868; *The Scotsman*, 15 Oct., 16 Oct. 1869; *The Times*, 10 Dec. 1869.

[104] *NBA*, 13 Sept., 27 Sept., 4 Oct., 11 Oct., 18 Oct., 1 Nov., 8 Nov., 22 Nov., 29 Nov., 6 Dec., 20 Dec., 27 Dec. 1871.

[105] *The Scotsman*, 10 Nov. 1869.

[106] *GH*, 31 Dec. 1869.

[107] HASS, *Catalogue of Implements*, *1870*.

double-furrow ploughs: G. W. Murray & Co. and John Gray & Co. Another, Alexander Jack & Sons, Maybole, who had exhibited Pirie's plough until at least the end of 1870, exhibited for the first time a plough of their own manufacture.[108] There were also makers that had exhibited at other events, but not at the Highland Show, and were now exhibiting there for the first time, of which the most important was George Sellar & Son. The ploughs of J. & F. Howard, Bedford, were also exhibited at it for the first time, by an agent, R. L. MacTaggart of Edinburgh.[109]

The exhibitors displayed ploughs from a wider range of provenances than in earlier years. John Pringle of the Scottish Implement Depot, an agent for Pirie in 1869, exhibited 'double furrow ploughs, from different makers'.[110] The backbone of the display was ploughs made by Pirie and Fowler and other major makers in the north-east such as G. W. Murray & Co. and George Sellar & Son. Other major makers from outwith this area were also starting to gain inroads into the south-west. They included John Gray & Co., whose ploughs were distributed by John Gordon, Castle Douglas.

Exhibitors also displayed a larger number of ploughs and a wider range of models. For example, Pirie and Fowler each displayed eight different models while Robert Mitchell & Son had a further three, all of which were different to those of Pirie. In addition, G. W. Murray & Co. had some six models. Other exhibitors, including local makers from the south-west, and some of the smaller makers from elsewhere, had two or three.

(d) Stage 4: Steps taken by other makers after the Highland Show of 1870 until the Highland Show of 1871

Developments in this stage built on earlier ones. Additional makers of double-furrow ploughs continued to appear, some in the north-east, but most were from outwith this area and were scattered throughout the Lowlands. Most of them were local makers serving a small geographical area, but they also included noted plough makers such as John Barrowman & Co., Saline, Fife, and the implement maker Thomas Hunter of Maybole.

The Highland Show of 1871, held at Perth, demonstrated that there had been significant changes in the making of double-furrow ploughs. The show had a larger demonstration of these ploughs than either of the previous two: in fact it was the largest one ever. A total of 62 double-furrow ploughs were displayed by 17 exhibitors; they accounted for a significant part of the exhibition of ploughs, of which a total of 105 ploughs were exhibited by 29 exhibitors.[111] The size of the show not only reflected interest in the double-furrow ploughs but also the size of the market for them and the large number of makers.

The character of the exhibitors had changed significantly. While the earlier shows had a large number of local makers, only a small number of them were at the 1871 Show. Those that did exhibit were located in the neighbouring show district and were seeking to expand their markets. Most of the exhibitors were the larger and more important plough and implement makers. At least two of them, James D. Allan & Sons, Culthill, Dunkeld, Perthshire, and Kemp, Murray & Nicholson, Stirling, were also exhibiting for the first time their own double-furrow

[108] HASS, *Catalogue of Implements*, *1870*, p. 56, *GH*, 1 May 1869, *NBA*, 21 Dec. 1870, 17 May 1871.

[109] HASS, *Catalogue of Implements*, *1870*, p. 32.

[110] HASS, *Catalogue of Implements*, *1870*, p. 34.

[111] HASS, *Catalogue of Implements*, *1871*.

ploughs rather than ones by Pirie, which they had at earlier shows. Their manufacture shows a move away from Pirie's patented design to new designs from the influential makers that were also located outwith the home district of the plough.

There was for the first time a significant presence of English manufacturers – Richard Bickerton & Sons, Berwick on Tweed, Richard Hornsby & Sons, Grantham, and Mellard's Trent Foundry Co, Rugeley, Staffordshire – all of whom had their own stands.[112] This marked the firm establishment of English makers in Scotland that was to continue in following years.

The exhibitors also displayed the largest selection of models that had been seen at the show, demonstrating that they had been able to further extend the application and practicality of the plough. There were models for different types of soil, as well as ones that had different features such as lifting levers and lifting apparatus, subsoiling apparatus, governing steerage, and improved frames. The largest makers had some of the most extensive displays. Pirie exhibited 12 ploughs, including eight models, while Mitchell had four different models. George Sellar & Son displayed eight models, and G. W. Murray & Co. some seven. John Gray & Co., with 11 ploughs, had eight models.

(e) Stage 5: Steps taken by other makers between 1872 and 1875

By 1872 there were few new makers exhibiting their double-furrow ploughs at the Highland Show; all were from areas outwith the home district of the plough (Table 1). By this time the largest makers in Scotland – as well as the most renowned implement makers – had established themselves as makers of double-furrow ploughs and had a reputation for them. That the double-furrow plough was no longer seen as a new implement was reflected in the scale of its exhibitions at the Highland Show. In each of the years between 1872 and 1875, the show had a much smaller display of double-furrow ploughs, both in terms of the number of exhibits and exhibitors. These four shows, held in Kelso, Stirling, Inverness and Glasgow, each had 29, 27, 15 and 18 ploughs on display by 14, 10, 8 and 9 exhibitors respectively. The overall display of ploughs declined after 1872 while the number of overall exhibitors of ploughs varied between 21 in 1872 and 16 in 1875. By the 1872 Show the double-furrow plough had ceased to be a new innovation; it had become an established agricultural implement. It therefore followed the trajectory as other new agricultural innovations: when they were no longer considered to be an innovation, and were generally accepted by the farmers, they were given less prominence and exhibited in smaller numbers. Their place was taken by other innovations and new manufactures.

The exhibition of double-furrow ploughs at the Highland Show from 1872 to 1875 shows further changes to their manufacture. While Pirie and Mitchell continued to make ploughs from Pirie's patent, a number of other makers, all leading agricultural Scottish implement and machine makers, also become recognized for their double-furrow ploughs and closely associated with them: G. W. Murray & Co., George Sellar & Son, Alexander Jack & Sons, and John Gray & Co. In addition, English manufacturers also established a role as exhibitors, the most important being Richard Hornsby & Sons, and Ransomes, Sims & Head, Ipswich. (The latter used agents to exhibit at the 1872 and 1875 Shows and did not start to exhibit in its own

[112] HASS, *Catalogue of Implements, 1871*, pp. 14, 52, 63.

right until the Highland Show of 1877.)[113] Most of the exhibitors made the ploughs that they exhibited. Only a small number of exhibitors acted as agents for other makers.

The increase in the number of prominent and leading double-furrow plough makers raises the question of whether local makers continued to manufacture them. This cannot be easily determined. There are, however, only a few references to them at the Highland Show, or at other shows and ploughing matches after the early 1870s.

(f) Steps taken by other makers between 1876 and 1880

Between 1876 and 1880 there were relatively few reports of the double-furrow plough in the agricultural or general press. The implement was regarded to have become well-established in Scotland. Its assimilation was reflected by the Highland Show, where there was a decline in the number of double-furrow ploughs and exhibitors. While there were 13 such ploughs exhibited in the display of 57 ploughs at the Aberdeen show of 1876, their numbers declined sharply after the 1878 show at Dumfries, when they comprised 15 of the 62 ploughs at the Show. The 1879 and 1880 shows at Perth and Kelso each had eight and two ploughs respectively; each had 45 and 26 ploughs respectively exhibited at them. The number of exhibitors of double-furrow ploughs also fell sharply after 1879.

During this period all of the exhibitors were well-established makers of double-furrow ploughs; there were no longer any local makers exhibiting. The exhibitors included all the major players that had emerged in earlier years: G. W. Murray & Co., George Sellar & Son, and John Gray & Co., Uddingston. Pirie exhibited until the 1876 Show, but he died in April 1877. Mitchell exhibited sporadically at the shows in 1876 (Aberdeen) and 1879 (Perth). The presence of English makers continued to grow, with three of them becoming well-established exhibitors: Richard Hornsby & Sons, and Ransomes, Sims & Head, and J. and F. Howard. Those who had previously employed agents to exhibit at the Show now had their own stands, which they continued to have in the early 1880s.

VIII

Between 1868 and 1880 a total of 50 exhibitors displayed double-furrow ploughs at the Highland Show. Of them 31 made their own ploughs or exhibited Pirie's plough. While a large number of them exhibited for only one or two years, largely as a result of the peripatetic nature of the Show as it moved around the eight show districts, which largely corresponded to the different agricultural regions, all the major makers took their ploughs to successive shows (Table 2).

The innovators of the double-furrow plough, Pirie and Mitchell, started to exhibit their double-furrow ploughs at the Highland Show in 1868 (Table 3). Most of the important makers started to exhibit their double-furrow ploughs in the following year, with four of them being recorded: J. Fowler & Co, Leeds (with Pirie's patent), G. W. Murray, Banff Foundry, Banff, John Gray & Co., Uddingston, and Alexander Jack & Sons, Maybole. George Sellar & Son, the largest plough maker in Scotland, did not start to exhibit at the Show until 1870. While they

[113] HASS, *Catalogue of Implements, 1872*, pp. 48, 60, HASS, *Catalogue of Implements, 1875*, p. 73.

TABLE 2: The major exhibitors of double-furrow ploughs at the Highland Show 1868–80

Double-furrow plough maker	*Years exhibited at Highland Show*
Thomas Pirie & Co., Kinmundy, Longside, Aberdeenshire	1868, 1869, 1870, 1871, 1872, 1873, 1874, 1875, 1876 (died 1877)
Robert Mitchell & Son, Peterhead	1868, 1870, 1871, 1873, 1874, 1875, 1876, 1879
J. Fowler & Co, Leeds	1869, 1870, 1871, 1872
G. W. Murray, Banff Foundry, Banff	1869, 1870, 1871, 1872, 1873, 1874, 1875, 1876, 1877, 1878, 1879, 1880
John Gray & Co., Uddingston	1869, 1870, 1871, 1872, 1874, 1875, 1876, 1877, 1878,
Alexander Jack & Sons, Maybole	1869, 1870, 1871, 1872, 1873, 1874, 1875, 1878, 1879
George Sellar & Son, Huntly	1870, 1871, 1872, 1873, 1874, 1875, 1876, 1877, 1878, 1879, 1880
R. Hornsby & Sons, Grantham	1871, 1872, 1875, 1876, 1877, 1878, 1879
Ransomes, Sims & Head, Ipswitch	1877, 1878, 1879
J. & F. Howard, Bedford	1873, 1877

Source: Highland and Agricultural Society of Scotland, Show catalogues, 1868–80.

TABLE 3: Ploughs exhibited by the leading makers of double-furrow ploughs, 1878–1880

Double-furrow plough maker	*Years ploughs exhibited at Highland Show by maker or agent and number of ploughs exhibited (in brackets)*
Thomas Pirie & Co., Kinmundy, Longside, Aberdeenshire	1868 (2), 1869 (6), 1870 (13), 1871 (27), 1872 (11), 1873 (7), 1874 (6), 1875 (9), 1876 (5) [Pirie d. 1877]
Robert Mitchell & Son, Peterhead, Aberdeenshire (Pirie's patent)	1868 (1), 1870 (2), 1871 (4), 1873 (2), 1874 (1), 1875 (1), 1876 (10, 1879 (1)
J. Fowler & Co, Leeds (Pirie's patent)	1869 (13), 1870 (10), 1871 (3), 1872 (1)
G. W. Murray Banff Foundry, Banff	1869 (4), 1870 (7), 1871 (7), 1872 (5), 1873 (7), 1874 (3), 1875 (1), 1876 (1), 1877 (2), 1878 (2), 1879 (2), 1880 (1)
John Gray & Co., Uddingston, Lanarkshire	1869 (4), 1870 (5), 1871 (6), 1872 (2), 1874 (2), 1875 (5), 1876 (4), 1877 (4), 1878 (4)
Alexander Jack & Sons, Maybole, Ayrshire	1870 (1), 1871 (1), 1872 (2), 1873 (2), 1874 (2), 1875 (2), 1878 (2), 1879 (1)
George Sellar & Son, Huntly, Aberdeenshire	1870 (3), 1871 (8), 1872 (6), 1873 (3), 1874 (1), 1875 (1), 1876 (1), 1877 (1), 1878 (1), 1879 (1), 1880 (1)
R. Hornsby & Sons, Grantham	1871 (3), 1872 (2), 1875 (2), 1876 (1), 1877 (1), 1878 (3), 1879 (1)
Ransomes, Sims & Head, Ipswich	1872 (3), 1875 (1), 1877 (2), 1878 (2), 1879 (1)
J. & F, Howard, Bedford	1870 (1), 1872 (1), 1873 (1), 1877 (1), 1879 (1)

Source: Royal Highland and Agricultural Society of Scotland, *Catalogue of Implements, Machines, and other Articles, 1868–1880*.

represented the first wave of adopters, who followed the innovators, the English manufacturers largely exhibited at the Show as later adopters. They entered their ploughs for exhibition at a time when the market for double-furrow ploughs was already established and where they could use their stature and reputation to secure sales. The stages from innovators to early adopters and then later adopters was a very short period, confirming Pirie's words that his plough 'has gained for itself a reputation with the practical farmer, not only in Great Britain, but over the whole of the civilized world, such as was never achieved by any other agricultural implement in so short a time'.[114]

IX

Why were Pirie's plough and the introduction of the double-furrow plough so successful in the late 1860s and early 1870s? Evidence from John Gray of John Gray & Co., Uddingston, suggests that the double-furrow plough was only developed and manufactured at a time when there was a need and a demand for it. On being asked why he had not manufactured one before July 1869, he replied 'Because I had never had an order for one … Because I did not think the time had arrived for manufacturing them'.[115] J. E. Ransome, of Ransomes, Sims & Head, Ipswich, speaking at Framlington Farmers Club, added that 'when, however, the "Pirie" plough made its appearance in 1868, the time *had* come when farmers were well prepared to adopt any new implement that would help them in their labour department'.[116]

A number of factors contributed to the need for the double-furrow plough. In the late 1860s economic conditions were changing.[117] Farmers had to be more competitive and reduce the costs of production in the face of foreign imports, especially from Canada, the United States and North America. As an agricultural commentator writing in *The Scotsman* commented:

> Any instrument which will enable the agriculturist to work his land with economy must in these days of immense competition of the home and foreign trades be peculiarly acceptable: and the trials of different double-furrow ploughs are, therefore of great importance to farmers.[118]

That point was also emphasized by the Royal Northern Agricultural Society, which believed that Pirie's plough 'was more calculated than any to facilitate the work of the farm'.[119]

The supply and cost of labour were also important factors. In the late 1860s and 1870s there was increasing pressure on both, and difficulty in obtaining skilled labour. J. E. Ransome believed that 'the daily increasing scarcity of labour has been a most powerful stimulus during the past few years to the introduction of the double plough'.[120] By 1874 the rise in labour costs also made 'the improvement of farm implements of increasing importance to agriculturists'.[121]

[114] *NBA*, 19 July 1871.
[115] *NBA*, 29 Mar. 1871.
[116] *NBA*, 7 Feb. 1872.
[117] T. M. Devine, 'Scottish farm labour in the era of agricultural depression, 1875–1900', in T. M. Devine (ed.), *Farm sand labour in Lowland Scotland, 1770–1914* (1984), p. 243.
[118] *The Scotsman*, 24 Jan. 1870.
[119] *AJ*, 11 Mar. 1868.
[120] *NBA*, 7 Feb. 1872.
[121] *NBA*, 29 July 1874.

The terms of Pirie's patent suggest that he developed his plough as a labour-saving implement. It had 'for its chief object the diminution of the labour of draught, that is to say the horses are enabled to draw the improved plough with greater ease than they can draw a plough of the arrangement and construction hitherto adopted'.[122] The double-furrow plough had significant savings in labour savings over the single-furrow plough. A ploughman with a double-furrow plough could undertake double the amount of work of one using a single-furrow plough.[123] As it was worked in a different manner to the swing plough with the ploughman guiding it rather than holding it, it was considered to require less skill to use and less experienced ploughmen could be employed to work one.[124]

With the reduction in draught, less horsepower was required, allowing a third horse to be employed so that two furrows could be ploughed at once, instead of one. On some lighter soils, two horses could pull a double-furrow plough, thus effecting an even greater saving.[125] These savings could be significant. In Dumfriesshire, one farmer observed that 'my own experience has been that one man and three horses can do more than double the work of two men and four horses'.[126] It had an impressive output. It was suggested that 'with two horses in eight hours, one double plough turns over two imperial acres of light loamy lea'.[127] The plough was considered to be an important way to reduce the number of horses required on a farm.[128]

The use of the double-furrow plough could lead to significant reductions in costs on the farm. By November 1873 Thomas Pirie could assert that 'the practical farmer being now satisfied that land can be ploughed at a much cheaper rate … than by using the swing plough'.[129] Between 1868 and 1872 a number of agriculturists sought to calculate their extent. Even on an 'ordinary-sized farm' they were said to be 'very considerable'.[130] This figure varied from farm to farm, and the calculations of the observers. Thus, on a 200-acre farm with two single ploughs, one farmer calculated that the double-furrow ploughs could save 'nearly £60 per annum', a figure that was not considered to be fully representative of all the savings that could be achieved.[131] Another farmer suggested that on an 'average' sized farm, a 'direct saving of about £100 a year would be at once effected'.[132] For another, this figure was between £70 and £80 a year.[133] In 1872 Pirie suggested that his plough would allow a saving 'from 30 to 50 per cent in the cultivation of his land'.[134] He revised that figure in October 1874, calculating that land could be ploughed at from 30 to 40 per cent less cost.[135]

The double-furrow ploughs made after 1867 were considered to be practical to use. According to J. E. Ransome, 'the old form of double ploughs was not so convenient and easy for the ploughmen to manage as those lately introduced'.[136] The new ones could be turned more easily at the headlands. They were 'suitable for the general work of the farm' and could work on a

122 NRS, SC275/31/87.
123 *NBA*, 6 Dec. 1871.
124 *AJ*, 11 Nov. 1868, 17 Nov. 1869.
125 *NBA*, 20 Dec. 1871.
126 *NBA*, 21 Feb. 1872.
127 *The Scotsman*, 26 Feb. 1867.
128 *AJ*, 11 Mar. 1868, 20 Dec. 1871.
129 *NBA*, 5 Nov. 1873.
130 *AJ*, 20 Dec. 1871.
131 *NBA*, 21 Feb. 1872.
132 *AJ*, 20 Dec. 1871.
133 *AJ*, 26 Feb. 1868.
134 *NBA*, 4 Sept. 1872.
135 *NBA*, 21 Oct. 1874.
136 *NBA*, 7 Feb. 1872.

wider range of situations than formerly, their use having been confined 'almost entirely to light soils'.[137] Indeed, by 1871 Pirie noted that 'we have now specially adapted [ploughs] for all different soils and classes of ploughing, both at home and abroad'.[138]

In discussions of its practicality, it was the draught of the double-furrow plough that was the most widely debated issue. This was because it was critical to how the horses undertook their work. At most of the trials and demonstrations its draught was tested and was frequently compared with that of the single-furrow plough. While this varied according to ploughs, soil types, type of land to be ploughed (lea, stubble, potato), the best double-furrow ploughs had less draught than some of the single-furrow ploughs.[139]

There was significant debate about the quality of work, an important aspect of ploughing which affected the crop raised. The question was asked: 'can a plough, turning over two furrows at once, and drawn by three horses, do its work as thoroughly and efficiently as two single ploughs each drawn by a pair of horses?'[140] Its work was closely compared and scrutinised with that of the single-furrow plough. There were numerous comments that the double-furrow plough turned over better quality work compared to that of the single-furrow one. In January 1870, one observer commented that:

> On every occasion on which a fair trial between double and single furrow ploughs has been made, the superiority of the former over the latter has been demonstrated, and all the leading agriculturists who have witnessed the operations of the two ploughs have pronounced that there will be a considerable saving by the use of the double plough.[141]

Because of the intense scrutiny under which double-furrowed ploughs were placed, as a result of the keen competition at matches and trials, their design, and hence their quality, improved from year to year. Thus, at the trial of the Royal Northern Agricultural Society in November 1869, the work performed 'was the best and most satisfactory yet accomplished'.[142] This improved performance continued. By 1871 and 1872 there were general comments that 'the work is better done': 'in the general work of the farm the double-furrow plough makes the most regular and best ploughing, its work being marked by a good, solid, honest-cut furrow slice firmly packed together'.[143] When Pirie advertised his plough in November 1873, he suggested that 'the practical farmer being now satisfied that land can be ploughed … in a much superior manner, than by using the swing plough'.[144]

The double-furrow plough was also compared with another ploughing technology: steam ploughs. In particular, comparisons were made between their costs and output. One observer thought that the double-furrow plough 'will compare favourably with the steam plough as a handy, economical, and efficient cultivator'.[145] In East Lothian, the leading district for steam ploughing in Scotland from the 1860s onwards, it was considered that 'the steam plough sometimes did not do more than double the work in a day which the three horses would have done themselves with double-furrow ploughs'.[146] Compared to steam ploughing tackle, the

[137] *NBA*, 30 Nov. 1870, 7 Feb. 1872.
[138] *NBA*, 19 July 1871.
[139] *GH*, 14 Feb. 1871.
[140] *The Scotsman*, 24 Jan. 1870.
[141] *The Scotsman*, 24 Jan. 1870.
[142] *The Scotsman*, 15 Nov. 1869.
[143] *AJ*, 20 Dec. 1871, *NBA*, 21 Feb. 1872.
[144] *NBA*, 5 Nov. 1873.
[145] *NBA*, 6 Dec. 1871.
[146] *The Scotsman*, 2 Mar. 1872. See also *The Scotsman*,

cost of which varied according to the system used (a double-engine set of 12 horsepower with associated tackle, by John Fowler & Co., Leeds, cost around £1280), with its one-off cost being seen as a hindrance to its introduction, the double-furrow plough was relatively modest.[147] While the first ones that Pirie manufactured cost between £25 and £30, drawing comment in November 1868 that such a price would hinder 'more general adoption',[148] this was quickly reduced, and many of the double-furrow ploughs could be purchased for between £10 and £13. By comparison with the steam plough and its tackle, the double-furrow plough was considered to be 'within the reach of every farmer'.[149]

In Scotland, the double-furrow plough allowed multiple-furrow ploughing to be extended on a much wider scale than could be achieved by steam ploughing. Indeed, steam ploughing was undertaken to only a very limited extent in the country by the early 1870s. By 1878, at the height of its use (and of the manufacture of steam ploughs in Britain) there was 'probably not more than fifty sets of steam ploughing tackle' in the country.[150] Most of them were only introduced in the 1870s when Pirie's plough and double-furrow ploughs were known and already widely used.[151] In some parts of the country steam ploughing was rarely used or not used at all. As already indicated, the double-furrow ploughs quickly reached highland districts such as Kilfinan in Argyllshire.[152]

The double-furrow plough was considered to have other advantages. It let farmers arrange and manage their work in more flexible ways. One observer suggested that:

> If even one-half more ploughing can be accomplished within a given time, by the adoption of this implement, of which we entertain no doubt, then on a farm having three pairs of horses, one pair might be spared for other purposes; and on a farm of a larger extent perhaps one man and a pair of horses might be spared altogether.[153]

The increased range of double-furrow ploughs allowed some farms to work even more flexibly. One model of Pirie's plough allowed farmers to work their land more efficiently on 'braeset farms': two horses could take two furrows downhill and one uphill, the second plough being 'slipped'. Therefore, three furrows could be turned against two with the single-furrow plough by using the same number of horses.[154]

The double-furrow plough enabled ploughing to be undertaken more quickly, thus ensuring that 'less risk is entailed from the weather'.[155] One farmer considered that 'one of the chief advantages arising from their use is found in having the work well forward at all times and

Note 146 *continued*
4 Jan. 1868. Robert Scott Skirving, 'On the agriculture of East Lothian, with special reference to the progress made during the last twenty-five years', *THASS* fourth ser. 5 (1873), p. 25.

147 *The Scotsman*, 11 July 1871.

148 *AJ*, 26 Feb. 1868, 11 Nov. 1868.

149 *GH*, 22 Dec. 1869.

150 James Melvin and Thomas Milne, 'Farm machinery', p. 149. See also William Macdonald, 'On the agriculture of Inverness-shire', *THASS,* fourth ser. 4 (1872), p. 20. *NBA*, 29 Mar. 1876. Jane S. McCutchan, 'The steam mechanisation of agriculture, 1840–1930' (unpublished PhD thesis, University of Reading, 2013), p. 323.

151 For example, James Macdonald, 'On the agriculture of the county of Fife', *THASS* fourth ser. 8 (1876), p. 34, Thomas Farrall, 'On the agriculture of the counties of Edinburgh and Linlithgow', *THASS,* fourth ser. 9 (1877), p. 53.

152 *GH*, 12 Mar. 1870.

153 *AJ*, 26 Feb. 1868.

154 *NBA*, 21 Feb. 1872.

155 *NBA*, 6 Dec. 1871.

so being able to get everything done in proper tid and season'.[156] They also allowed land to be ploughed in different ways. These were summed up at a much later date in *Stephens' Book of the Farm* of 1908. Revising that book, James Macdonald suggested that they:

> are especially suitable for spring ploughing where a shallow furrow is desired. They expedite the preparation of land for sowing, and in a late spring this is a matter of great importance.[157]

Land ploughed by them in spring, including turnips land, was considered to be 'much more friable and easily harrowed than when done by the common plough'.[158]

The adoption of Pirie's plough and other double-furrow ploughs by farmers in the first decade of their adoption to 1880 can be examined in newspaper advertisments for farm displenishing sales, usually held at the end of a lease. As they provide an inventory of stock on a farm for sale, they record whether such ploughs were part of the farm stock, their numbers (though not all adverts give detail on this), as well as the other ploughs on a farm, and thus how the different ploughing technologies related to one another. In a few cases, they also record the names of their manufacturers.

A survey of 64 such adverts in the *Aberdeen Journal* and *The Scotsman* between 1871 and 1880 show that double-furrow ploughs were widely distributed throughout the main circulation areas of these newspapers, with the first having an Aberdeenshire focus and the second a Lothians and south-east Scotland one. They provide evidence for the home-area of the plough (Aberdeenshire) (through some 30 adverts) as well as a leading agricultural district (the Lothians and south-east).

In the two areas, the double-furrow ploughs were found on a wide range of farms. In the north-east they ranged from one with six-horse teams (that is, having six single-furrow ploughs) to others with a one-horse team. The six horse-plough farm at Tipperty, Logie-Buchan, Aberdeenshire,[159] was the only one of this size in the north-east that had these ploughs. All others were smaller. They included four horse-team farms such as Nether Angustown, Peterculter.[160] Three horse-team farms were more frequent and included Balquharn, Tullynessie.[161] There were a large number of two horse-team farms, such as Selby, Keith Hall, Boghead of Orrock, and Milltimber, Culter.[162] The only one horse-team farm was Mill of Brogans, Slains, whose advert dated from 1880.[163]

The farms in the Lothians were historically larger in size than those in the north-east. The farms that had double-furrow ploughs were generally larger than those in the north-east. Castleton, North Berwick, East Lothian, which had double-furrow ploughs had seven single-furrow ploughs, as did Temple and Braidwood, Midlothian, and Lingerwood, Midlothian.[164] Dalhousie Chesters, Midlothian, had six single-furrow ploughs.[165] Three- and four-horse team farms were more frequently recorded, including those of Gilchriston, Townhead, near

[156] *AJ*, 20 Dec. 1871.
[157] Macdonald (ed.) *Stephens' Book of the Farm*, I, p. 372.
[158] *AJ*, 20 Dec. 1871.
[159] *AJ*, 7 May 1880.
[160] *AJ*, 23 Apr. 1880.
[161] *AJ*, 10 May 1871.
[162] AJ, 17 May 1871, 13 May 1874, 5 May 1875.
[163] *AJ*, 7 May 1880.
[164] *The Scotsman*, 6 Nov. 1873, 16 May 1874, 3 May 1876.
[165] *The Scotsman*, 29 Sept. 1877.

Gifford, Athelstaneford Mains, Prora, West Barns, all in East Lothian, and Hundleshope, Peebleshire.[166] There were, nevertheless, a few that had two single-furrow ploughs, including Hopepringle at Gala Water, and Begbie.[167] There was one farm that had only one single-furrow plough, St Catherine's.[168] By the early 1880s, the farms in the Lothians that had double-furrow ploughs at their displenishing sales provide a roll call of the most significant and leading ones: Bonnington (North Berwick), West Barns, Ferrygate, Nether Hailes, West Fortune, Dolphingston, Samuelston East Mains, Smeaton, and Borrowstoun Mains.[169]

On 63 of the 64 farms the double-furrow plough was used alongside the single-furrow ploughs. Coalston Mains, Haddington, East Lothian, was the only farm that only used double-furrow ploughs.[170] Most of the farms had only one double-furrow plough, though some sixteen had two, their numbers being nearly equal in the two areas of this survey.[171] Only two farms had three ploughs. Only one farm, Coalston Mains, had four double-furrow ploughs, in 1880.[172]

The evidence from these adverts shows that the double-furrow plough was an implement that could be widely used on farms from the largest to the smaller ones. It was an implement that could meet the needs of a wide range of farmers who had a wide range of ploughing and cropping needs. It could also easily be incorporated within existing ploughing systems and used alongside them.

X

Pirie's double-furrow plough, patented in 1867, created a revolution in ploughs and ploughing in Scotland, and quickly became known more widely, the patent also being used under licence by John Fowler & Co., Leeds, the largest manufacturer of steam ploughs in Britain, and the major English plough makers such as Ransomes, Sims & Head, and J. & F. Howard. Its manufacture by other makers in Scotland and other parts of Britain was rapid, as was its adoption by farmers. From an innovation to an implement that was manufactured by major manufacturers took less than two years from July 1867 to the summer of 1869. By 1870 all the major plough makers throughout Scotland were making double-furrow ploughs. They were seen to be the innovators of modern double-furrow ploughing. One observer writing in *The Glasgow Herald* noted that 'our Scotch agriculturists have been the first to lead the way in the double ploughing of modern times'.[173] English makers, especially the largest ones, explored the Scottish market from an early stage but they did not fully enter it until the Scottish makers had a well-established and tested market for the plough. In its first decade it came to be used on a wide variety of farms, from the smallest to the largest, and working on a range of soils.

[166] *The Scotsman*, 26 Apr., 10 May 1873, 6 Nov. 1874, 2 May 1877, 1 May 1878, 3 May 1880.

[167] *The Scotsman*, 24 Apr. 1874, 2 May 1877.

[168] *The Scotsman*, 19 Aug. 1873.

[169] *The Scotsman*, 18 May, 24 Sept., 26 Oct., 5 Nov. 1881, 10 May, 21 Oct. 1882, 10 May 1884, 31 Oct. 1885, 9 Nov. 1887.

[170] *The Scotsman*, 28 Jan. 1880.

[171] *AJ*, 6 May 1874, 4 Aug. 1875, 1 May, 9 May, 11 May, 16 May 1879, *The Scotsman*, 25 Sept. 1872, 6 Nov. 1873, 16 May, 6 Nov. 1874, 3 May 1876, 2 May 1877, 5 Nov. 1879, 21 Aug. 1880.

[172] *The Scotsman*, 17 Oct. 1874, 22 May 1875, 28 Jan. 1880.

[173] *GH*, 14 Feb. 1871.

Why was this local innovation so successful? It was immediately recognized as an important innovation and was supported by the institutional framework in Scottish agriculture: the national and regional agricultural societies, as well as smaller clubs and ploughing societies, and the agricultural press, in the *North British Agriculturist*, which gave it significant attention and support. They offered the plough – as did Pirie – a framework in which to test out and examine the plough and its work.

The double-furrow plough had a number of 'advantages' over existing ploughing technologies such as the steam plough, and competed well alongside them. The advantages were primarily economical and technical, but also offered greater flexibility in farm management. But it was also an innovation that could be easily adopted and used alongside existing ploughing technologies. It was an innovation that came when there was a clear need for it and farmers quickly recognized its advantages.

The Cinderella of the cattle industry: the state and settler commercial dairy farming in Southern Rhodesia, *c*.1908 to 1937*

by Godfrey Hove and Sandra Swart

Abstract

Anxious to diversify the economy towards white agriculture and to market the young colony as an attractive destination for prospective white immigrants, the British South Africa Company-run government presented Southern Rhodesia as a cattle-man's country. Dairy farming, it announced, would form an important adjunct to the colonial economy and play a vital role in its larger imperial ambitions. This article explores the development of commercial dairying in Southern Rhodesia from the announcement of the White Agricultural Policy in 1908 to the passage of the Dairy Act in 1937. Despite state propaganda, we demonstrate that the dairy industry did not develop along professional lines during this period due to a suite of environmental, financial and technical factors. Instead, it grew mainly as an *ad hoc* industry resorted to out of desperation. Although Southern Rhodesia had begun to participate actively in the external butter markets by the mid-1920s, we argue that this should not be construed to mean the dairy industry had come of age, but was merely a reflection of developments in the beef industry and the limited market for dairy products locally.

In 1911, Dr Eric Nobbs, the Southern Rhodesian Director of Agriculture asserted that the colony was most suited to a livestock-based economy, and that the cattle industry would drive the fledgling colonial economy.[1] As late as 1928, Thomas Hamilton, the state-appointed Dairy Expert, declared that dairy farming was of great national importance not only in ensuring food self-sufficiency but that its success would be 'key' to the success of the white immigration and land settlement policy of the young colony.[2] Within the context of such bold pronouncements, this article examines the development of dairy farming in Southern Rhodesia during the interwar period. It explores colonial state efforts to lay the foundation of a dairy industry. It traces the environmental, financial and technical challenges that rendered such efforts futile by the 1930s. Despite the colonial state rhetoric, we demonstrate that dairy farming was the orphaned step-child of the livestock industry, growing only as a side-line activity to beef production.

* The country once called 'Southern Rhodesia' was renamed 'Zimbabwe' upon the attainment of majority rule in 1980. However, the authors have chosen to adopt contemporary usage in this paper.

[1] *Report of the Director of Agriculture, 1911*, p. 4.

[2] National Archives of Zimbabwe (hereafter NAZ), S1193, D1/2, Chief Dairy Officer, T. Hamilton to McDonald (designation not given), 19 July 1928.

As both the colonial administration and early settlers were initially preoccupied with gold mining, settler agriculture did not receive significant attention until the mid-1900s. We begin by briefly outlining the factors that led to the abandonment of the 'Second Rand' dream and the drive towards agriculture, which was encapsulated in the adoption of the White Agricultural Policy (WAP) in 1908. Noting the marginal position African dairy farming occupied in the colonial market owing to a policy that was designed to hinder indigenous enterprise, we demonstrate that settler dairy farming did not develop as the state had envisaged. This was because the industry was initially spurned by cattle owners who found it more profitable and less demanding to invest in beef than milk. Although, as evinced in this article, dairy production increased exponentially from the mid-1920s onwards, so much so that Southern Rhodesia developed an export market, we argue that this was not an indication that the industry had come of age, but was a mere consequence of problems in the beef industry and the small domestic market for dairy products.

This study draws from related colonial contexts in British settler colonies, the British metropole itself and relevant African case studies. It compares and contrasts developments with Marjorie Gilmore's study on the causes and effects of government policy on the initial development and establishment of agricultural industries, particularly the dairying, maize and tobacco sectors, in a similar colonial context in Australia.[3] David Taylor's longitudinal studies of the evolution of the English dairy industry between 1860 and 1930 provide a detailed exposition of the structural changes that occurred in the home industry. In his first article, written in 1974, Taylor looked at the productivity and profit levels of dairy producers in the country, arguing that dairying was the 'laggard industry sector of English agriculture'.[4] In a subsequent work, Taylor focused on the structural change from butter and cheese during the 1860s to the liquid milk trade that had begun to dominate the industry by the 1930s.[5] This, he argued, was a result of the falling profitability of non-liquid dairy products. These works offer useful contextual comparisons to Zimbabwe's case, especially when one considers that the country was a latecomer to the industry.

Within the sub-regional context, Lilian Mafela's study on the development of dairy farming in colonial Botswana offers interesting comparisons. She demonstrates the manner in which the dairy industry was only considered as an important option after difficulties arose in the beef industry during the 1930s.[6] Although the history of dairy farming in colonial Zimbabwe has yet to receive adequate attention, Jeft Ngadze's work on the development of commercial dairying during the first 60 years of colonialism offers a truncated, but nevertheless useful platform with which to begin an analysis of local production dynamics.[7] Whereas the scope

[3] M. A. Gilmore, 'Kill, cure or strangle: The history of government intervention in three key agricultural industries on the Atherton Tablelands, 1895–2005' (PhD Thesis, James Cook University, North Queensland, 2005).

[4] D. Taylor, 'The English dairy industry, 1860–1930: The need for reassessment', *AgHR* 22 (1974), p. 158.

[5] Id., 'Growth and Structural change in the English dairy industry, 1860–1930', *AgHR* 35, (1987), pp. 47–64. Also see D. Taylor, 'The English dairy industry, 1860–1930', *EcHR* 29 (1976), pp. 585–601.

[6] L Mafela, 'Colonial initiatives and African response in the establishment of the dairy industry in the Bechuanaland Protectorate, 1930–1966', *Botswana J. African Studies*, 13 (1999), pp. 77–91.

[7] J. Ngadze, 'The development of commercial dairying from an international perspective: a case of a latecomer' (Honours dissertation, University of Zimbabwe, 1985).

of his work is limited to local and international marketing dynamics, and the impact of state intervention and legislation, the focus of this article is on the socio-economic and environmental imperatives that shaped the establishment of settler dairy farming in Southern Rhodesia. Drawing on primary sources (official annual reports and archival evidence) and secondary sources, this article seeks to fill a gaping lacuna in Southern Rhodesian agricultural historiography, which to date has evinced a bias towards the beef industry. Indeed, as we demonstrate in this article, the two industries shared a symbiotic, sympatric, but highly asymmetrical relationship, with the fortunes of one inevitably affecting the other.

I

When orchestrating the occupation of Southern Rhodesia in 1890, the BSAC, under the leadership of Cecil John Rhodes, was driven by the hopes of finding rich mineral deposits, especially gold, of the same magnitude as those found in South Africa. As Richard Hodder-Williams has shown, white settlement in Southern Rhodesia was originally fired not by any sense of imperial mission, but by the prospect of a 'Second Rand' developing out of the mineral concessions Rhodes had negotiated with Lobengula, the Paramount Chief of the Ndebele.[8] The fabled 'Second Rand' would in turn generate new funds to finance further development. Rochford Maguire, one of the Company's directors, pithily captured the situation in 1891 thus: 'when cattle and gold were in competition, nobody thought of cattle'.[9]

Although considerable tracts of land were pegged and alienated by the British South Africa Company and sold to many companies and individual settlers at concessional rates, much of the land was retained for speculative purposes; buyers were only holding onto the land in the hope of selling it off when its value had gone up. There were very few settlers on the land, and, for many, farming 'meant only cutting down trees and selling the wood, or cultivating a small patch of mealies [maize]'.[10] Thus, much of the land taken up for settler occupation in the first five years remained untilled. Indeed, this group of settlers have been described as merely 'storekeepers or small time prospectors' who, preoccupied with mining and speculative dealings, could not develop their land for commercial agricultural production.[11]

By the turn of the century, however, questions had begun to arise concerning the materiality of the dream of the 'Second Rand'. Apart from overestimation of the colony's mineral wealth, the disturbances caused by the Ndebele uprising of 1893 and the ensuing war of dispossession diverted the BSAC'S attention from mining and agricultural development towards safeguarding its grip and control of the territory.[12] Exacerbating the situation was the Jameson Raid of 29 December 1895 to 2 January 1896 – a military onslaught on Paul Kruger's Transvaal Republic in

[8] The British South Africa Company's obsession with the hopes of finding huge mineral wealth in Southern Rhodesia has been documented by many historians. For instance, see, R. Hodder-Williams, *White farmers in Rhodesia, 1890–1965* (1983), p. 13. G. Arrighi, *The political economy of Rhodesia* (1967), p. 35.

[9] Rochford Maguire, quoted in R. Palmer, *Land and racial domination in Rhodesia* (1977), p. 26.

[10] I. Phimister, *An economic and social history of Zimbabwe. Capital accumulation and class struggle* (1988), p. 58.

[11] Hodder-Williams, *White farmers*, pp. 24, 25.

[12] S. J. Ndlovu-Gatsheni, 'Rethinking the colonial encounter in Zimbabwe in the early twentieth century', *J. Southern African Studies* 33 (2007), p. 177.

South Africa led by Leander Starr Jameson, the Company administrator – which presented the Shona and Ndebele with an opportunity to launch their own rebellion against the BSAC at a time when Company troops were committed to fighting the Transvaal Republic.[13] The net impact of the raid and the risings, which ended in October 1897, was that the colony's infant mining industry was left on the verge of collapse. The impact was felt on the London Stock exchange where share values of 22 Rhodesian mining companies plummeted between 1895 and 1898.[14]

These crises eroded the embryonic profitability of Rhodesian mining enterprises. Another collapse of the London market for the colony's mining shares in 1903 prompted the Company government not only to restructure the mining industry,[15] but also to begin to look to settler agriculture as an economic alternative. The Company's Directors turned to the land which, it was widely believed, the Company could dispose of as it wished.[16] From this period onwards, the BSAC began put more emphasis on promoting settler agriculture. Immigrants with money and skills were sought to develop the land and thus enhance the value of unsold land owned by the Company.

A Land Settlement Committee was established in London in 1905 and Charles D. Wise was appointed Director of Land Settlement in Southern Rhodesia. Already an experienced British agriculturalist, Wise arrived in Southern Rhodesia in October 1905, with instructions from the board 'to report upon current and future prospects of the agricultural industry, the opportunities for new settlers, and the methods by which cultivating owners could best been established upon the soil'. The following year, Wise wrote a glowing report describing the country's agricultural potential, particularly in cattle raising, maize and tobacco production. He recommended that it should be the aim of the BSAC to dispose of its land at low rates in order to encourage settler immigration, and should be prepared to 'assist these men as far as possible within reason, without spoon-feeding and make them successful as their success will mean the success of land settlement and the development of the country'.[17]

A commission of Directors of the BSAC visited the country in 1907, and confirmed Wise's recommendations. The commission insisted that the aim of the Company was to 'stimulate in every possible way the opening up and steady development of the mineral and agricultural resources of the country'.[18] The new emphasis on promoting settler agriculture found its strongest expression through the reorganization of the Agricultural Department in 1908 under the directorship of Dr Eric Nobbs, an agricultural scientist who had been an agricultural assistant in the Cape Department of Agriculture.[19] His efforts revolutionized the Department, as agriculture began to take a leading role in the development of Rhodesia's fledgling economy.

The BSAC recognized that a number of specialists in various scientific disciplines were required to give advice to incoming settlers and 'to conduct research on all the problems which

[13] G. Blainey, 'Lost causes of the Jameson Raid', *EcHR* 18 (1965), pp. 350–66. For a wider discussion of the Jameson Raid, see T. O. Ranger, *Revolt in Southern Rhodesia, 1896–97: a study in African Resistance* (1967), p. 5.

[14] I. Phimister, 'The reconstruction of the Southern Rhodesian gold mining industry', *EcHR* 29 (1976), p. 466.

[15] Ibid, pp. 465–8.

[16] Hodder-Williams, *White Farmers*, p. 120.

[17] Charles D. Wise, *British South Africa Company Report on Land Settlement* (1906).

[18] Ibid.,

[19] E. A. Nobbs, 'The native cattle of Southern Rhodesia,' *South African J. Science* 24 (1927), p. 1.

had to be solved to put agriculture in a new country and environment on a sound basis'.[20] To this end various appointments were made, including an entomologist, a tobacco expert and the Chief of the Animals Branch, under which dairy farming fell.[21] The first Dairy Expert, J. B. Fisher, was appointed in 1918 and was replaced by Thomas Hamilton the following year. State annual expenditure on agriculture in general increased from £8729 in 1904 to £41,168 by 1923.[22] The staff of the Agricultural Department were mandated to conduct experiments and disseminate information to farmers. They regularly visited farms to give on-the-spot advice to settler farmers. These visits, according to Nobbs, were effective in the provision of support and guidance to farmers in a country 'with a population so largely composed of newcomers, many of them without any agricultural experience'.[23]

II

Besides the provision of technical and financial assistance to white farmers, the success of settler agriculture also depended on the availability of cheap African labour. Yet, as Robin Palmer and Ian Phimister have demonstrated, African agriculture had generally been prosperous during the first two decades as a result of the settler fixation with mining, and the emergence of new markets on mining and emerging urban settlements.[24] Indeed, for as long as African agriculturalists continued to prosper, they naturally remained reluctant to become wage labour on settler farms. The post-1908 period thus witnessed a systematic and intentional crushing of African agricultural enterprise. With regards to dairy farming, and the cattle industry in general, the decades following the adoption of WAP were followed by further weakening of African capacity to produce surplus milk and other dairy products for the market.

Although the African herd continued to increase, doubling from just under 200,000 in 1908 to over 400,000 by 1914, the position of African cattle owners became increasingly perilous from 1908 onwards.[25] As competition for grazing land between white-owned cattle and those belonging to Africans resident on European land increased, settlers brought pressure to bear on the colonial administration to revise the patterns of land ownership and utilization. This led to the passage of the Private Locations Ordinance in 1908, which, by discouraging white land-owners from leasing part of their land to Africans, was really an attempt to 'deny Africans the use of white owned land, except in the capacity as labourers'.[26] Although the Ordinance was not entirely successful in curbing land tenancy, it resulted in the movement of

[20] H. Weinmann, *Agricultural research and development in Southern Rhodesia under the rule of the British South Africa Company, 1890–1923* (1972), p. 3.

[21] Ibid., p. 112.

[22] *Official Year Book of the Colony of Southern Rhodesia, 1924,* p. 4.

[23] *Report of the Director of Agriculture*, *1921,* p. 6.

[24] For a detailed discussion of African agricultural prosperity prior to 1908, see R. Palmer, 'The agricultural history of Rhodesia', in R. Palmer and N. Parsons (eds), *The roots of rural poverty in central and southern Africa* (1977), p. 250; Palmer, *Land and racial domination in Rhodesia*, p. 71; and I. Phimister, 'Peasant production and underdevelopment in Southern Rhodesia, 1890–1914', *African Affairs*, 73 (1974), pp. 217–28.

[25] *Report of the Director of Agriculture,* 1914, p. 2.

[26] J. Rennie, 'White farmers, black tenants, and landlord legislation: Southern Rhodesia, 1890–1930', *J. Southern African Studies*, 5 (1978), p. 46. For a more detailed discussion of the Private Locations Ordinance, also see C. Youé, 'Black squatters on white farms: segregation and agrarian change in Kenya, South Africa, and Rhodesia, 1902–1963', *International Hist. Rev.* 24 (2002), pp. 558–602.

many Africans with their cattle onto reserves. Palmer states that most Africans in districts like Belingwe, Bubi, Bulawayo, Matobo and Umzingwane were moved from their land after 1908, and that between 50 and 100 per cent more people left European land between 1910 and 1911 than the official numbers show.[27]

The imposition of rents on all Africans occupying unalienated land (land which remained under the control of the Company) was yet another step towards stifling African agrarian prosperity. It was another reason for the movement of many Africans off this land and into reserves. For instance, the Native Commissioner for Fort Victoria reported in 1910 that nearly all of Chief Bere's people had moved into reserves, totally depopulating the community under his jurisdiction.[28] The Chief Native Commissioner for Matabeleland reported that numerous Africans were complaining about having to pay so many fees and taxes, noting that he expected no less than 7400 people, together with some 11,000 head of cattle, to migrate into Belingwe, Gwaai, Lower Gwelo, Que Que, and Shangani reserves.[29]

Although no laws were pronounced which specifically discriminated against Africans in the dairy market, there can be little doubt that the displacement of Africans and their livestock had a devastating effect on their capacity to produce and market dairy products. The reserves became notorious for their arid climate, poor soils and debilitating bovine diseases; most reserves were inhospitable for both humans and livestock.[30] If that were not enough, marketing of products on the official markets was made nearly impossible by the fact that when reconfiguring the reserves' boundaries after 1915, the Estates Department ensured that few reserves were located near the major railways and roads. Because milk is a highly perishable commodity which needs to be transported to the market almost immediately after production, few Africans were able to send milk to existing dairies. While official figures showing milk production and marketing figures in the reserves are scarce, an official of the Dairy Division remarked that very little milk was received from reserves during the 1930s. He added that as Africans and their stock were still attempting to adjust to life in the reserves, it was 'predictable that the primary concern of many would be to produce enough for family consumption, with whatever surplus left circulating within the community'.[31]

It should be noted, however, that a few Africans outside the reserves managed to participate in the official dairy market. Some, mostly of South African and Batswana origin, took advantage of the existence of a clause in the 1898 Southern Rhodesia Orders in Council which gave Africans the right 'to purchase land on the same conditions as whites'.[32] The Basotho, who had settled in Victoria district, embarked on successful commercial dairy farming. Jacob Molebaleng and three others purchased Erichsthal Farm[33] in the Victoria District from the Posselt Family for £1000 in 1907 and immediately established thriving dairy enterprises.[34] Led

[27] Palmer, *Land and racial domination in Rhodesia*, p. 96.

[28] NAZ, L2/2/117/46, Native Commissioner, Victoria, to the Chief Native Commissioner, Mashonaland, 10 Dec. 1908.

[29] NAZ, LO 4/1/16, Report of the Chief Native Commissioner, Matabeleland for the year 1914.

[30] J. Alexander, J. McGregor and T. O. Ranger, *Violence and memory: One hundred years in the 'Dark Forests' of Matabeleland* (2000), p. 23.

[31] NAZ, Oral 217, John Richmond Cory, p. 8.

[32] R. Blake, *A history of Rhodesia* (1977), p. 153.

[33] The farm was located between Shagashe and Mutirikwi Rivers in the Ndanga District.

[34] NAZ, AT1/2/1/10, 'Land owned by Natives in 1925'.

by Ephraim Morudu, another group of nine Basotho men bought Niekerk's Rust Farm, near the Harawe area in 1909, and administered it like a small cooperative dairy society, into which many other people subsequently joined.[35] As Joseph Mujere has shown, the Basotho on the two farms used their links to the Dutch Reformed Church missionaries to access education and resources which enabled them to produce milk and cream for the dairies and creameries in nearby Victoria and Gwelo.[36] What distinguished this group was that, unlike the majority of indigenous Africans, they had acquired considerable capital and education from their connections with the missionaries and evangelists of the Dutch Reformed Church.

The only report of indigenous Africans who also acquired land and built dairy infrastructure came from Rugby farm, which was owned by 21 Karanga men who had trained as teachers at the Dutch Reformed Church Mission at Morgenster. One of the part owners of the farm had accumulated a huge herd of cattle, and by 1920 had managed to purchase a cream separator, among other dairy utensils. By 1925, Rugby farm had become one of the key suppliers of milk and cream to the dairies in Victoria and Gwelo. With unambiguous racial bias, the Native Commissioner for Victoria in 1925 reported that, together with producers at Erichsthal and Niekerk farms, Rugby farm represented a breed of 'progressive' and 'intelligent natives' who, because of their level of education, ownership of property were supplying milk and cream to the Victoria Depot.[37] Overall though, only a handful of largely foreign-born Africans participated in the colonial dairy market during the 1920s and 1930s.

III

The Company's new focus on commercial agriculture was followed by concerted efforts aimed at injecting life into settler dairy farming, and the cattle industry more generally. Indeed, state propaganda from the late 1900s suggested that livestock production would be the lynchpin of settler agriculture. Nobbs maintained in 1909 that 'Essentially, Rhodesia is a stock country. It would be hard to over-emphasize the pre-eminent importance of the cattle industry as a branch of agriculture'.[38] In 1911 he asserted that:

> Arable farming must rank below stock-farming in importance, profitable and useful as it is. Cattle raising requires more capital and a longer time before profits accrue, but ultimately yields a higher return, whilst crop growing yields a more regular and an earlier return – a more vital consideration to the newcomer and the man of limited means. Ranching, or at least cattle-farming on extensive lines, is a growing feature of the times, so far with a very promising measure of success, the one general want as yet being numbers.[39]

The notion that Southern Rhodesia, particularly the south-western region of the country, was generally better suited to a pastoral economy than arable farming was derived from the belief that the country's topography, soils and climate were generally not suited to intensive arable

[35] J. Mujere, 'Autochthons, strangers, modernising educationists, and progressive farmers: Basotho struggles for belonging in Zimbabwe, 1930s–2008' (PhD Thesis, University of Edinburgh, 2012), p. 51.

[36] Ibid., p. 51.

[37] NAZ, N9/1/17, Report of the Native Commissioner, Victoria District, 1924.

[38] *Report of the Director of Agriculture, 1909.*

[39] *Report of the Director of Agriculture, 1911.*

farming. With only about 40 per cent receiving an average annual rainfall of more than 28 inches, which is considered to be the minimum annual rainfall required for most of the staple grains, arable farming was a risky venture in most parts of the country.[40] Only the eastern parts of the country could sustain intensive crop production.[41]

Building on the country's perceived suitability for a cattle-based agricultural sector, colonial agricultural authorities sought to encourage white commercial dairying among incoming settlers for 'strategic' reasons. Indeed, dairy farming was earmarked to play a pivotal role in the larger colonial development scheme. As the Dairy Expert in the Agricultural Department, Thomas Hamilton (later the Chief Dairy Officer), wrote in 1928:

> The dairy industry is of great national importance and … on its success the success of land settlement in this colony largely depends. It is essentially a key industry … [and] any scheme, therefore, which can be put forward to improve the status of the dairy industry should necessarily receive the support of the government.[42]

Indeed, as was the case on Australia's Atherton Tablelands, colonial officials viewed dairying as 'key' to their stated goal of creating a white man's country in Southern Rhodesia. Gilmore has argued that the Australian state's active involvement in commercial dairying 'grew out of the necessity to populate the vast continent and to provide necessary infrastructure and services, and to protect the livelihoods of those who pioneered settlement'.[43] Further pushing the cause for the speedy establishment of a strong dairy industry was the amount of money that was expended on importing butter and cheese. R. J. Moore, a British expert, who was invited by the BSAC to give advice on agricultural matters in 1906, intimated that the country was wasting valuable financial resources – amounting to £20,000 yearly – on imported dairy products which could be produced locally.[44]

Yet, despite propaganda by colonial authorities, much of Southern Rhodesia's environment was not suitable for intensive commercial dairying. Stanley Hyatt, a white transport rider during the early 1900s, bemoaning the small quantity of milk available on the milk market, observed that the 'Rhodesian veld does not seem to lend itself to the production of milk'.[45] Indeed, the country's climate did not compare favourably with the major dairy-producing countries in the world. Generally speaking, the minimum natural requirements for successful dairy farming are a fairly cool climate, well-pastured grasslands, and an average rainfall of at least 635mm (24 inches) per annum.[46] Southern Rhodesia had a highly seasonal and erratic rainfall pattern, with the average for over half of the country being less than 635mm per annum. As a result, the natural pasturage was inadequate for the maintenance of milk production for

[40] M. Yudelman, *Africans on the Land. Economic problems of African agricultural development in southern, central, and east Africa, with special reference to Southern Rhodesia* (1964), p. 10.

[41] The eastern parts of Zimbabwe receive a higher average rainfall than the south-western part. Manicaland province in the eastern highlands receives an annual average of above 650mm, the southern provinces receive below 400mm per annum.

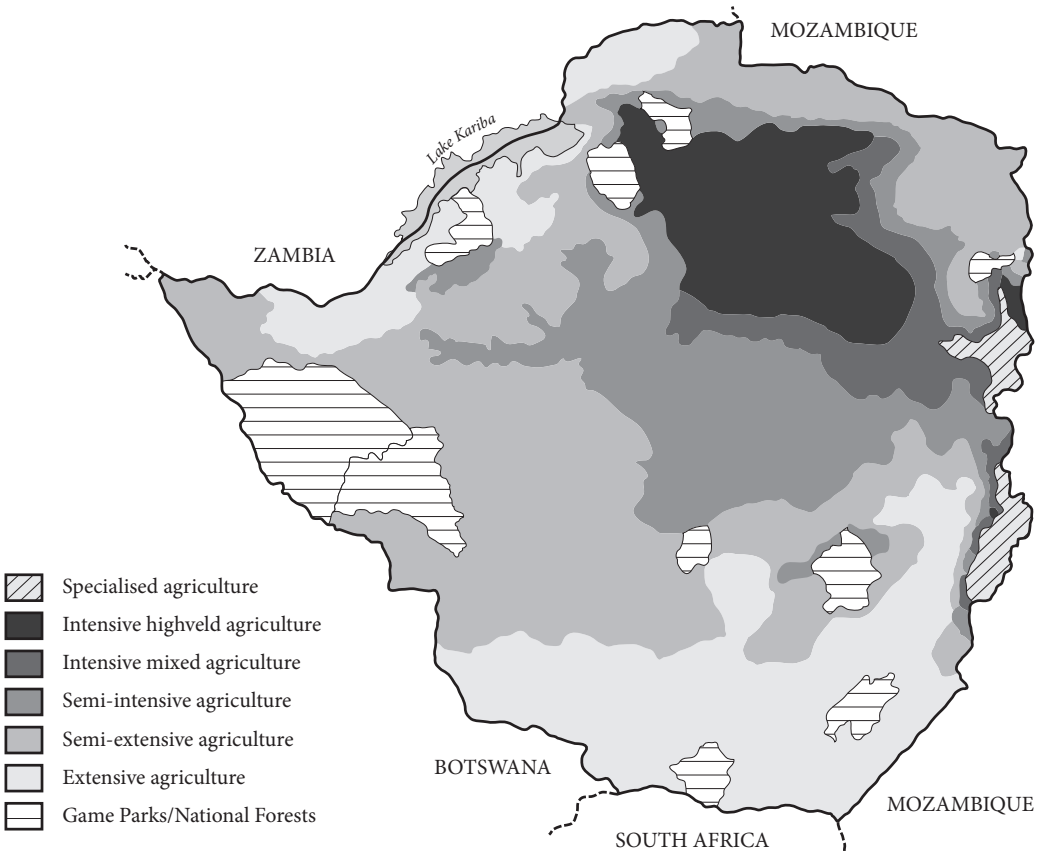
[42] NAZ, S1193, D1/2, Chief Dairy Officer, T. Hamilton, to McDonald (designation not given), 19 July 1928.

[43] Gilmore, 'Kill, cure or strangle', p. 59.

[44] NAZ, G1/5/3, Report on visit to Rhodesia, for the Department of Agriculture, by R. J. Moore, Creamery Expert, to the Secretary for Agriculture, 11 July 1906.

[45] S. P. Hyatt, *The Old Transport Road* (1914).

[46] The Dairy Branch, 'The dairying industry', *Rhodesia Agricultural J.* 11 (1944), p. 79.



MAP 1: The natural farming regions of Southern Rhodesia.

Source: based on M. Yudelman, *Africans on the Land* (1964), p. 32.

more than half the year. Pasturage was available mainly between November and March, when the country received rains.[47] Map 1 which illustrates the country's ecological zones, shows that arable farming was clearly unviable owing to low rainfall (less than 28 inches annually) and poor soils in the south-western parts of the country, these areas could only sustain dairy industry with great difficulty and at considerable cost.

Southern Rhodesia's relatively difficult conditions can be understood by considering the fact that its maximum carrying capacity before 1950 was no more than one cow per two acres of land, while New Zealand's capacity stood at one cow per acre, and in some places reached two cows for three acres.[48] New Zealand, Canada and Denmark had lower average temperatures than Southern Rhodesia. The result of this was that Southern Rhodesian farmers required

[47] For more detailed description of the country's rainfall patterns and general topography in the 1920s, see E. J. Tawse, 'Southern Rhodesia: A white man's country in the tropics', Geographical Rev, 17 (1927), pp. 89–106.

[48] *Report of the committee of enquiry into the economic development of the colony (Southern Rhodesia), 1939*, p. 29.

supplementary feed for cattle during the dry months of the year, at a considerably higher cost, when their counterparts in other Commonwealth countries depended on natural pasturage for longer periods of the year.

In spite of these climatic challenges, the colonial government was determined to make the cattle industry in general, and dairy farming in particular, an important pillar of the colonial agrarian economy. Prior to the adoption of the WAP, only a handful of privately run creameries existed in the country, with the majority of cream and milk producers having opted to make butter on their own farms.[49] The first state-owned creamery was established in Gwelo in 1912. Given the central geographical location of Gwelo and its relative accessibility by farmers from nearly every district in the country, the creamery received milk cream from producers from both Matabeleland and Mashonaland provinces for the manufacture of butter and cheese. Payment to producers was based on the quality of the butter fat received, and the creamery employed a qualified man to undertake the grading. The butter fat was graded into four classes, each with its own price: first class, second class, third class and ungraded. Occasionally, the Dairy Expert would visit the creamery to test the cream and butter fat sent by farmers, as well as the quality of the butter and cheese manufactured at the creamery. The Rhodesia Stock Owners Association (Bulawayo) lauded the development as a major step forward in the development of an organized marketing system. Unlike the old system, the association noted that the system gave stock owners an opportunity of conducting the business on modern lines, producing the milk at distant points, separating on the farm and despatching the cream to a central factory, where it would be paid for on the basis of actual butter fat supplied.[50]

The first official attempt to stimulate some interest in dairy farming among farmers in Southern Rhodesia took place in the 1910 when the BSAC arranged for Miss E. A. Maidment, a Dairy Instructress at Dushaw County Dairy School, in Yorkshire, to visit Rhodesia for a few months and to give a series of lectures and demonstrations at various centres, on milk production methods, milk testing, the manufacture of cheese and butter and so forth.[51] In addition to individual farms, she visited 17 centres throughout the country and lectured and gave demonstrations to more than 570 farmers. Maidment observed that, while environmental limitations could be surmounted, as had happened in other countries like Argentina and Australia which had developed successful dairying industries in spite of adverse climatic conditions, the major hindrance to successful commercial dairying was that relatively more capital, infrastructure and expertise was required in the industry in comparison to other agricultural enterprises. Comparing dairy farming to beef production and the differences in the development of the two industries, Maidment explained:

> The reason probably that up to the present dairying has not been more largely developed is that when people were settling, there was very little railway accommodation and also the knowledge of how to prepare milk for distribution in a sub-tropical climate was very little

[49] Among the privately run creameries were Devonshire and Café Creamery, Lal Bal Dairy and the Model Dairy in Bulawayo, the Gazaland Dairy in Chipinga and three others in Salisbury.

[50] NAZ, G1/5/3, Chairman of the Rhodesian Landowners and Farmers Association (Bulawayo), to Eric A. Nobbs, Director of Agriculture, 13 Feb. 1913.

[51] NAZ, S/ZIM 018; E. A. Maidment, 'Report of a tour in Rhodesia, 1910', *Rhodesia Agricultural J.* 8, (Mar. 1911), pp. 423–34.

understood. Further, dairying involves rather more capital, organisation, care and attention than the farmer is prepared for in the early days (the country is even still very young), and has to be content with cattle raising for beef and transport, maize growing, poultry keeping, and perhaps later, tobacco growing.[52]

Maidment's statement that dairy farming requires more capital and organization is quite instructive. As milk is highly perishable, it poses serious handling challenges. First, as an excellent medium for bacterial growth, it should be cooled immediately after the milking process to temperatures below which bacteria can survive (below 10 degrees Celsius). Second, milk requires high-cost transportation, ideally daily, to markets or processing plants before it loses its keeping qualities. Third, and as a consequence of the first two factors, the handling and processing of milk requires trained and hygiene-conscious workers and relatively more sophisticated apparatus such as coolers, cans, and buckets.[53] Around the same time as Maidment was undertaking her tour, J. C. Coore, a dairy specialist in the Agricultural Department, noted that dairy farmers needed to erect more sophisticated and costly infrastructure in the way of milking sheds on their premises, purchase cooling machines and feed their stock during the dry winter months. He added that more expertise was required in the care and feeding of both the cow and the calf, the milking process and the handling of a highly perishable product.[54]

Against this, it is important to remember that the majority of settlers during the 1910s and 1920s possessed neither the capital nor the expertise to embark successfully on capitalist agriculture in general, and much less in a highly specialized industry such as dairy farming. Machingaidze has demonstrated that despite the colonial government's earnest efforts to develop settler agriculture, lack of capital was one of the chief hindrances to its success.[55] With direct reference to the cattle industry, Samasuwo contended that 'the process of economic expansion in the cattle sector itself was hampered by severe under capitalisation on the part of most white ranchers'.[56] Although loans were available to prospective farmers through the Land and Agricultural Bank, itself a creation of the Responsible Government in 1924 after the dissolution of the Land Bank, the funds made available were often inadequate for the purchase of many bulls and cows. Reporting in 1930, Hamilton complained that most settlers lacked both capital and expertise. He added that most of the producers 'who are at present sending cream to the creameries were in such a straitened financial position' that they could not afford to purchase dairy stock or erect the necessary buildings.[57] Thus, it is not surprising

[52] NAZ S/ZIM 018; E. A. Maidment, 'Report of a tour in Rhodesia, 1910', p. 424.

[53] H. Schelhaus, 'The dairy industry in a changing world', *Smallholder dairying in the tropics* (1999), pp. 1–2.

[54] J. C. Moore, 'Hints to dairy farmers', *Rhodesia Agricultural J.*, 9, (1911), p. 24. Among some of the things Moore mentioned was the ration of food containing the constituents necessary for the production of milk, as well as the heat and energy necessary for the production of milk, of which he said a 'great farmer' needed to develop an understanding.

[55] See V. Machingaidze, 'The development of settler capitalist agriculture in Southern Rhodesia with particular reference to the role of the state, 1908–1939' (PhD Thesis, University of London, 1980), p. 3.

[56] N. Samasuwo, '"There is something about cattle": Towards an economic history of the beef industry in colonial Zimbabwe, with special reference to the role of the state' (PhD Thesis, University of Cape Town, 2000), p. 20.

[57] NAZ, S1193, D1/2, T. Hamilton to C. K. Brain, Acting Secretary, Department of Agriculture, 7 Feb. 1930.

that, notwithstanding state rhetoric on the national importance of dairy farming, the majority of those who ventured into the cattle industry during the early years of settler occupation chose beef production as their main business, and produced cream, butter and milk only as a side-line activity in which they could not adequately invest. Indeed, although her visit was aimed at stimulating the dairy industry by encouraging settlers to take dairying seriously as a viable agricultural enterprise, Maidment's visit was fated to meet with limited results as long as farmers 'earned more money by engaging themselves in the less exacting branches of agriculture like cattle ranching, maize and tobacco growing'.[58]

Nor did matters improve over time. John Richmond Cory, a man whose involvement in the dairy industry in Southern Rhodesia dated back to 1925, when he was engaged as an Assistant Dairy Expert, recalled how 'the bulk of the cream reaching the butter factories (was) derived from dairy-ranching, a system under which ranch cows – or others of a non-dairy type – were milked for a few months of the year, depending on the nature of the season, the milk separated and the cream sent to the creamery for conversion into butter'.[59] Giving evidence to the Committee into the Economic Position in 1939, Cory expressed the opinion that dairy farming in Southern Rhodesia had grown up out of necessity, with little sign of organized effort:

> Fourteen years ago when I came to the country, I found the dairy industry was really in its infancy and it had been established on quite a wrong foundation. In many cases, particularly in Matabeleland, the creameries were dependent for their supplies on herds which were not originally bought for dairying purposes. They were ranching cattle and owing to the outbreak of various diseases, particularly East Coast Fever, which had locked these up in quarantine for a number of years, the farmers were forced to start milking them because they could not be sold as live cattle.[60]

To the extent that they could obtain an extra monthly cheque, especially when they could not sell their cattle profitably, ranchers found it was a tremendous advantage for them to milk their ranch cows. This scenario, which was still prevalent until the outbreak of the Second World, meant that the dairy industry was dominated by amateurs rather than specialists.

IV

The foundation of commercial dairying as a side-line to beef cattle ranching was also reflected in the paucity of dairy cattle in the country, and the poor management of the few that were available. While undercapitalization, as Samasuwo has demonstrated for the entire livestock industry, led to a paucity of pedigree cattle, the situation was worse in dairy farming where farmers were hesitant to invest in dairy cows. Although good dairy cattle could be imported from South Africa through the Friesland Cattle Breeders' Association (with which the government had established an arrangement),[61] or from England, many of Southern Rhodesian farmers

[58] NAZ, S/ZIM 018, E. A. Maidment, 'Report of a tour in Rhodesia, 1910', p. 425.

[59] NAZ, Oral/217, John Richmond Cory.

[60] NAZ, ZAY 2/2/13, 'Amended oral and written evidence to the committee into the economic position of the colony, chaired By Downie. Dairy Produce', Mr J. R. Cory (witness) 25 Jan. 1939.

[61] Weinmann, *Agricultural research and development,* p. 157.

opted for beef cattle, or dual-purpose breeds which could enable them to produce beef. The availability of small loans to farmers for the purchase of pedigree stock did not improve matters. In 1926 Hamilton lamented that '[dairy] farmers are, however, not supporting the government loan scheme for the purchase of dairy stock to the same extent as was anticipated'.[62] J. S. Brown, a member of the Dairy Industrial Control Board (which had been established in 1931 to regulate the marketing of dairy products), lamented that 'in [the herds] I know of, there are not more than 20 dairy cows'.[63] Although mixed farming was generally encouraged, especially when it applied to maize growing and cattle rearing, the milking of beef cattle was discouraged.[64] As late as 1935, the Committee of Enquiry into the Dairy and Pig Industries complained that:

> The sale of cream from beef herds has increased ... This practice is very much against the interests of both the dairy and beef industries, inasmuch as, while increasing the colony's surplus cream supplies, it retards the growth and injures the constitution of beef calves.[65]

The management of dairy herds was one problem with which those farmers who had gained access to good dairy cattle had to contend. Given the climatic difficulties, particularly in the south-western regions, dairy cattle needed supplementary feeding for most of the dry months in the country, when pastures were low. However, most farmers did not have sufficient funds for this purpose. After a reconnaissance tour of settler dairy farms in 1939, T. Adams, a member of the Dairy Industry Control Board, reported that he had never 'seen a dairy herd in this country that was properly fed all through the year [as] it could not be done'. With most farmers unable to afford supplementary feed, Friesland cattle which had been imported from South Africa tended to deteriorate from the time they arrived in the country due to ill-feeding, especially during the dry winter months. As Adams observed, 'the quality of stock around Salisbury in 1939 is inferior to that of the 1920s'.[66]

As part of efforts to improve the quality and productivity of cows, the state introduced a Milk Recording Scheme in 1928. Based on Australian and South African models, the Dairy Division employed an official recorder, who paid monthly visits to dairy farmers who entered the programme and compiled a record of the milk and butter-fat production capacity of each animal on test, the feed consumption, feed cost and the gross income for each cow.[67] The underlying rationale was to measure – and ultimately improve – the productivity of each cow, and the elimination of unproductive animals from the dairy herds. The programme, which was entirely voluntary, thus facilitated interaction between producers and state experts.

The scheme was poorly supported, however. In 1930, Hamilton reported that only 1333 cows belonging to some 32 farmers had been placed under the programme. This was aggravated by the fact that each participating farmer was charged 6*d*. per cow per month for the first ten

[62] *Annual Report of the Dairy Expert, 1926.*

[63] NAZ, S1215/1366/2, Dairy Control Board Minutes, 11 Oct. 1939.

[64] Growing maize, and other products like beans, and legumes is considered helpful for livestock keepers insofar as the crops provide cheap feed for livestock, while livestock also provide cheap manure for crops. The two are symbiotic. See, for instance, J. Cory, 'The feeding of dairy stock in Southern Rhodesia', *Rhodesia Agricultural J.* 27, (1930), pp. 24–32.

[65] *Report of the Committee of Enquiry into Certain Aspects of the Dairy and Pig Industries* (1935), p. 3.

[66] NAZ, 1215/1366/2, Dairy Control Board Minutes, 7 June 1939.

[67] *Report of the Dairy Expert, 1929*, p. 12.

cows, and 3*d*. for each additional one.[68] More worrying for the Dairy Division was the ever decreasing number of farmers who entered their cows for the test. By 1934, milk recorders were complaining that many farmers who had initially entered their cows for recording were pulling out of the scheme.[69] The following statement by a member of the Eastern Victoria Farmers' Association succinctly reflects the general attitude towards the scheme:

> A few of our members initially registered to participate in the Milk Recording Scheme, [because] it is standard practice in all successful dairying countries. However, because many of our farmers have neither proper dairy stock nor the requisite supplementary feed for dairy cows, most have had to withdraw in order to save themselves from [the] embarrassment the recorders' results brings.[70]

Indeed, as Hamilton observed, genuine dairy cows (which were mostly Friesland) never exceeded a third of all cows that were milked in the country prior to the outbreak of the war. The vast majority of cows were either specialist beef cattle (predominantly Hereford, Sussex, Devon and Africander breeds) or the shorthorn, which was a dual-purpose breed.[71]

Owing to the high number of dabblers and amateurs in the dairy industry, the handling and processing of milk and butter-fat on the farms was often sub-standard throughout the interwar period. Unable to afford fences for the creation of paddocks, many ranchers kraaled their cattle at night and grazed them only during daytime, a system they adopted from indigenous practices. After touring many farms, Maidment complained that cattle were only allowed to graze during the day, and were trapped into unhealthy kraals at night. She complained the kraals 'are no protection as they are simply pieces of ground, with either walls built round or thick bush fences. Sometimes there are posts in the ground inside the kraal to which the cows are secured'.[72] For hygienic purposes, she recommended that milking sheds be constructed at all dairy farms.

Yet, as late as the 1930s, most dairymen – both settler and African – had not erected any milking sheds, and milking in open kraals remained 'too frequent a practice'.[73] Giving evidence to the 1935 Commission of Enquiry, Dan Judson admitted that settler cream producers had not erected milking sheds with the result that milking in the kraals was the norm, rather than the exception.[74] Moreover, most reports by dairy inspectors show that neither African premises nor settler farms were equipped with the requisite infrastructure and implements. With no government financial and technical support, many African producers in the reserves could not afford to construct the required infrastructure such as milking sheds, proper dairies with

[68] *Ibid.,* p. 12.

[69] *Report of the Dairy Expert,* 1934.

[70] NAZ, S482/476/39, 'Farmers' Associations, 1926–42': Woodward (position not given), Eastern Victoria Farmers' Association, to Cory, 21 June, 1929.

[71] *Report of the Chief Dairy Officer, 1934*. The dominance of beef cattle continued beyond the First World War. For instance, according to statistical returns at the end of 1922, the numbers showed that 4684 cattle were imported into the country, and were made up of the following breeds: Shorthorns and Red Lincolns, 1736; Devon, 775; Friesland, 690; Herefords, 673; Aberdeen Angus, 405; Sussex, 215; together with a few South Devons, Ayrshire, Red Polls and Jerseys.

[72] NAZ, S/ZIM 018, Maidment, 'Report of a tour in Rhodesia, 1910', p. 425.

[73] NAZ, S1216/D1/4, 'Dairy Industry: Regulations for and registration of farm dairies: 1930–32'. Memorandum by T. Hamilton, Dairy Expert, 15 May 1930.

[74] NAZ, ZAR 2/1/1, 'Written evidence to the commission of enquiry into certain aspects of the dairy and pig industries. Colonel Dan Judson, 2 Sept. 1934'.

concrete floors, or cooling implements for the cooling and treatment of milk and cream. Aggravating the situation for many of them was the general scarcity of water, itself a deliberate and long-standing characteristic of the reserve areas into which most Africans were thrown from the 1890s, but magnified by the passage of the Land Apportionment Act in 1930.[75] While he noted that water was indispensable for maintaining the health and general cleanliness of the individuals engaged in milking and separating cream, Hamilton reasoned that:

> It is futile to expect the native cream suppliers concerned to observe any great degree of cleanliness in their habits or in their methods of producing milk and cream, and until such time as this matter receives attention, the cream produced by natives in these and similarly situated areas will continue to be of inferior quality.[76]

Conditions of production on the farms were no better among white dairy farmers, however. Indeed, owing to the factors discussed earlier (undercapitalization, and the settlers' inability to invest in dairy farming) most settler dairy farms were not equipped with the requisite machinery, while milk and cream handling procedures were generally unsanitary. In reference to the Midlands and Matabeleland regions, Hamilton bemoaned that 'farmers have of late been compelled to milk owing to sheer necessity, and many possess no dairies, nor facilities for the proper handling of cream and milk'.[77] The 1935 Commission corroborated this, stating that:

> Milking and separating are carried on under unhygienic conditions, resulting in contamination. There is also a great lack of care in the treatment of the milk immediately after milking and of the cream after separating.[78]

Despite the availability of technical assistance through Gwebi College's demonstration farms[79], and considerably greater access to financial assistance, most white-owned dairy farms were still not run along proper dairying lines. The words of F. A. Lammas, the Bulawayo District Dairy Officer, in 1934, help to put the state of affairs into context. Describing a farm owned by a Mr Kirk, who was also involved in running the Gwelo Dairy, Lammas said; 'a more slovenly and dirty farm I imagine would be difficult to find. Mr Kirk by all accounts has had university training, and should be acquainted with the rudiments of dairying'.[80] In this light, and noting the inadequacy of all state interventions thus far, Hamilton recommended that the Dairy Produce Act, which had been passed in 1925 to regulate creamery processes, should be extended to regulate farmers' operations. He suggested that all milk and cream producers needed to be compulsorily registered under the same conditions and regulations that applied to creameries and cream depots.[81] These calls were heeded in 1937, with the passage of the Dairy Act, which brought all farm operations under tight state control.

[75] See B. N. Floyd, 'Land apportionment in Southern Rhodesia', *Geographical Rev.*, 52 (1962), pp. 567–70.

[76] NAZ, S1193/D1/2, Cory to Hamilton, 20 May 1927.

[77] NAZ, S1193/D1/2, Hamilton to the Secretary for Agriculture, 11 Mar. 1927.

[78] *Report of the commission of enquiry into certain aspects of the dairy and pig industries*, p. 8.

[79] Gwebi College, among other demonstration centres in the country, was established to give white farmers instruction in farming and to conduct experiments on livestock and arable farming.

[80] NAZ, 1368/7/48, Monthly Reports, Report of the Bulawayo District Dairy Officer for Mar. 1934.

[81] NAZ, S1193/D1/2, Hamilton to the Secretary for Agriculture, 11 Mar. 1933.

V

For much of the pre-1920 period, milk and butter production figures remained low, with the country increasingly relying on imports to supplement local production. While Southern Rhodesia imported 239,498 lbs of butter valued at £12,947 in 1907, 349,384 lbs, valued at £24,056, were imported in 1915. Similarly, while cheese imports in 1907 amounted to 17,095 lbs, valued at £12,947, the figure had reached 20,078 lbs, valued at £18,585 in 1916.[82] Commenting on this state of affairs in 1920, Hamilton lamented how a 'considerable amount of money is passing out of the country which might be well retained here'.[83] As discussed in the previous section, the major reasons behind the low production of butter and cheese included adverse climatic conditions, undercapitalization, and lack of expertise. These factors, as already demonstrated and further delineated below, manifested themselves in the dominance of non-specialists in the dairy industry as beef production became the prime objective for farmers.

Indeed, an examination of the butter production patterns during the tenure of the BSAC will show that the development of commercial dairy farming was heavily reliant on the fortunes of the beef industry. As in England during the late nineteenth century, when, as Taylor has demonstrated, dairy farming lagged behind other sectors because of its low potential for profitability,[84] the Southern Rhodesian dairy industry initially straggled far behind other livestock industries, with production heavily relying on the fortunes of the beef industry. A similar situation also prevailed in Bechuanaland where dairy production was only stimulated during the 1930s owing to the decline of beef production, which itself was caused by South Africa's restriction of cattle imports.[85]

As shown on Figure 1, butter production in Southern Rhodesia, which had been quite low for much of the period before 1914, received a boost when the outbreak of the First World War led to the disruption of trade with overseas markets. With cattle exports initially disturbed by the outbreak of war, most ranchers began to look to milk and butter production for the local market as a remedy. Consequently, butter production, which stood at 151,916 lbs in 1914, soared to 294,568 lbs the following year. However, as cattle, maize and tobacco exports began to increase due to increased demand from overseas from 1916 until the end of the war, butter production fell to 209,439 lbs in 1918.[86] Ngadze has stated that the decline in butter production after 1915 must have been due largely to war-time demand for cattle, resulting in many dairy ranchers stopping milking their cows.[87] This demand, which had helped cattle owners build up an export trade, gave way to a depression in prices by 1921–22. Inevitably, the 1921–22 depression in cattle and maize prices saw many ranch owners begin to turn to milk and butter production. In 1921 Nobbs reported that the dairy industry has received a 'considerable stimulus not only from the gradual opening of overseas markets, but also from the low prices of maize and the difficulties foreseen in the way of finding markets for beef cattle'.[88]

[82] Ngadze, 'Development of commercial dairying', p. 5.

[83] NAZ, SRG 3/AGR 5, 'Report of the Chief Dairy Officer, 1923'.

[84] Taylor, 'English dairy industry, 1860–1930', p. 158.

[85] Mafela, 'Colonial Initiatives', p. 77.

[86] Ngadze, 'Development of commercial dairying', p. 5.

[87] Ibid., 6.

[88] NAZ, SRG 3/AGR 5, 'Report of the Director of Agriculture, 1921'.

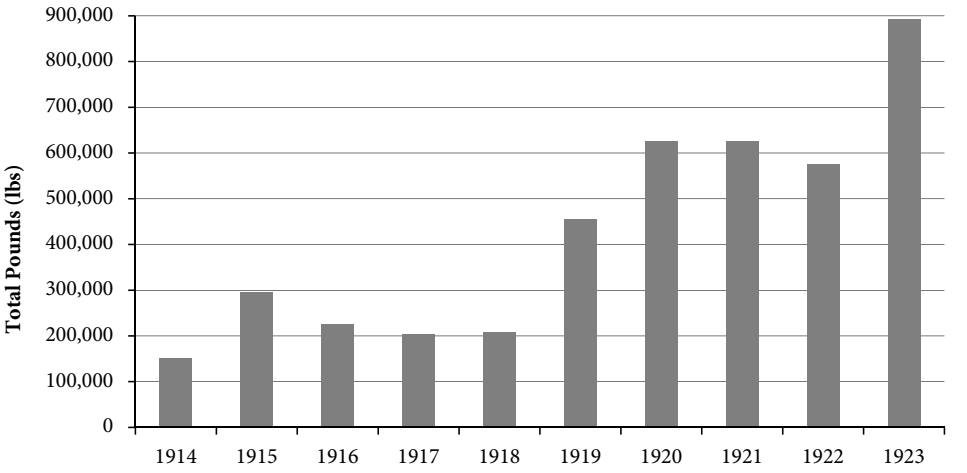


FIGURE 1: Butter production levels between 1914 and 1923 in Southern Rhodesia.

Source: Report of the committee of enquiry into certain aspects of the dairy and pig industries, p. 34.

Not unexpectedly, butter production figures, which had fallen from 1916 onwards, bounced back from 1922, and record levels were achieved successively in 1923 and 1924 when 338,343 lbs and 425,018 lbs respectively were manufactured on farms.[89] Figure 1 illustrates the butter production levels between 1914 and 1923.

The inverse relationship between the beef and dairy industries indicates that the cattle that were used for beef production were, indeed, the same that were used for the production of dairy products. Most ranchers who initially neglected dairy farming and established themselves as beef producers turned to butter and milk production in the early 1920s when beef prices had fallen. Indeed, in 1923 Nobbs reported that 'as a direct result of the difficulties in the way of selling slaughter cattle, attention is being forced towards dairying. This, in the case of the smaller man, is a most desirable development'.[90]

As a result of increasing output of cream and milk from the farms, a number of creameries were established. By 1923, four cooperative creameries were operating in the territory, *viz*, the Gwelo Creamery; the Farmers' Co-operative Creamery Depot, Salisbury; the Rhodesia Co-operative Creamery, Bulawayo; and the Model Dairy in Bulawayo.[91] In addition, no fewer than 24 cheese factories were in operation, and, as in the case of creameries, most of them were established between 1921 and 1923. With the increase in the number of creameries, the amount of farm-made butter made began to decrease, while creamery butter recorded substantial increases. The output of creamery butter was 554,206 lbs in 1923, as against 282,550 lbs in 1922; while that of farm butter fell from 391,058 lbs to 338,343 lbs during the same period.[92] While increased output in milk, cheese and butter might point to industrial expansion, and thus

[89] Ngadze, 'Development of commercial dairying', p. 6.

[90] *Report of the Director of Agriculture, 1923.*

[91] Three previously privately owned butter factories were bought by farmers in Salisbury, and amalgamated to form the Farmers' Co-operative Industries in 1921.

[92] Weinmann, *Agricultural Research and development,* p. 123.

paint a glowing picture of the industry's development, it hides the fact that this growth was premised, as Corry observed, on a fundamentally flawed foundation. As shown in the next section, this was cruelly exposed from the mid-1920s onwards, when Southern Rhodesian butter failed to compete on the export markets effectively.

VI

The circumstances in the beef industry, which had been largely responsible for the dairying 'boom', persisted throughout the 1920s, hence contributing to the continued expansion of butter, milk and cheese production, and the colony's entrance onto the export scene. We contend that increasing butter production beyond local demand forced the country to enter the highly competitive export market at a time when the local industry was not in a position to compete with the major producing countries of the world. The post-1921 decade period was characterized by an unprecedented growth in both farm butter (butter made on the farm by the cattle owner) and creamery butter. As the Figure 2 shows, output trebled between 1922 and 1927.

A significant feature in the distribution of the increase in butter production was the geographical imbalance that had begun to emerge by the early 1920s. Although the Matabeleland region had, over time, become perceived to be more suited to a cattle economy, its output of butter was generally lower than that of Mashonaland, which had begun to contribute the 'great bulk' of the country's butter and cheese.[93] In his 1928 report, Hamilton stated that 'Mashonaland farmers continue to make the great bulk of our locally produced butter and cheese'.[94] Thus, although topographically Matabeleland was better suited to cattle ranching, its considerably more arid climate was less suitable for milk production when compared to Mashonaland.

An important consequence of the increase in dairy production was that the country had to enter the export market by 1924. Even during the years when droughts produced a decrease in production, the output of butter still exceeded local demand. This development, therefore, was not so much indicative of the growth and maturation of dairy farming industry as it was a result of oversupply of the domestic market. Indeed, the relatively small settler population in the country during this time ensured that there would always be more butter than the internal market could consume. Despite the policy to attract as many settler immigrants into the country as possible, the settler community constituted a very small proportion of Southern Rhodesia's total population at any time in the country's history. As Figure 3 shows, the white population constituted about 4.4 per cent of the total population in 1921, and had risen to a mere 4.7 per cent by 1941.

The African population, which comprised the country's majority, was not an outlet for butter. Predominantly rural, the vast majority of Africans did not consider butter, cheese and market milk to be an important part of their diet. Africans had their own 'traditional' methods of processing and preparing milk products which persisted in parallel to the colonial market systems. Timothy Burke's study of the dynamics shaping the consumption of commodities in Southern Rhodesia reveals that although the 'tastes' and 'needs' of Africans were slowly

[93] *Report of the Dairy Expert, 1928.*

[94] Ibid.



FIGURE 2: Dairy Production, white farmers, 1922–27.

Source: Annual Reports of the Dairy Expert, 1923 and 1927.

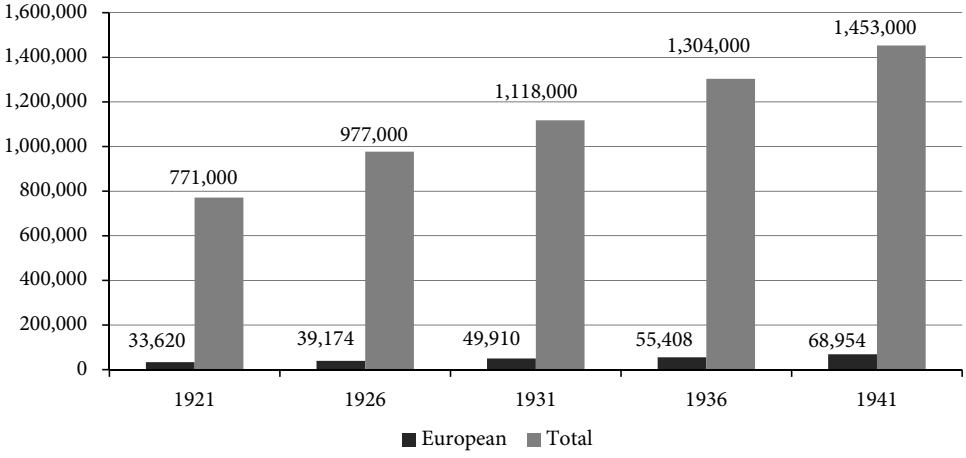


FIGURE 3: Settler and total population in Southern Rhodesia, 1921–*f*41.

Source: Adapted from B. M. Shutz, 'European population patterns, cultural persistence and political change in Rhodesia', *Canadian J. African Studies*, 7 (1973), p. 10.

changing as they became more integrated into the cash economy through proletarianization, their response to the consumption of market butter and cheese was slow.[95] In any case, their position on the periphery of the colonial socio-economic system meant that creamery butter, milk and cheese were beyond the reach of most rural Africans. Cory acknowledged that the industry would have to depend on the export market for the disposal of surplus butter, not because the country was producing huge stocks of butter in comparison with other countries, but because of the low domestic consumption levels at the time.[96]

[95] T. Burke, *Lifebuoy men, Lux women. Commodification, consumption and cleanliness in Modern Zimbabwe* (1996), pp. 63–77.

[96] NAZ Oral/217, John Richmond Cory, p. 4.

Thus, Southern Rhodesia began to look beyond its borders to dispose of its butter, and to a lesser extent, cheese. The major regional consumers of Southern Rhodesian butter were South Africa, Northern Rhodesia, Portuguese East Africa and Nyasaland, while Britain constituted the chief overseas market. Although fresh milk production was also soaring during the period under review, the rate of increase was relatively lower as most farmers chose to produce cream for the manufacture of butter. Considering its keeping qualities and the limited contemporary technology available, the movement of milk within the country, let alone outside the borders for export, was restricted. A surplus of butter was available for export each year between 1924 and the late 1930s. In 1926, for instance, 774,961 lbs, valued at £55,537, was exported to the Union of South Africa, Congo and Northern Rhodesia.[97]

Yet, the country's successful participation on the international market hinged on its ability to produce commodities of a reasonably high quality, which would enable it to compete with other better established butter exporters. The issue of the quality had not been given much attention prior to 1924, but the low quality of Southern Rhodesian butter was dramatically exposed when the state began to look to regional and international markets for the disposal of its product. A government-authored pamphlet describing the general state of agriculture in 1924 succinctly captured the state of affairs in the dairy industry at the time:

> The old days in Rhodesia when there was a local market for all that a farmer could produce have passed away … as late comers into these (foreign) markets, it may be difficult to dispose of Rhodesian dairy products unless it can be proved that they are as good in quality as those produced by our competitors.[98]

In the same pamphlet, the government conceded that nearly all the butter that was made on the farms was unsuitable for export on account of the 'unacceptably bad conditions under which it was made'.[99] But creamery butter too was not uniformly of export quality either. Reflecting on the 1924 season, Hamilton, the Dairy Expert, lamented that the 'proportion of low grade butter coming out of the creameries' churns is quite high'.[100] This state of affairs, as shall be explained later in this section, derived from a miscellany of factors, ranging from lack of dairy cows, inadequate infrastructure on the farms, unhygienic practices and the manufacturing procedures.

Creamery and farmers' representatives acknowledged the need for a concerted effort if Southern Rhodesia's dairy industry were to participate competitively on the international stage against long-established players like Canada, New Zealand and Denmark. A representative of the Rhodesia Creameries of Bulawayo lamented that the small local demand for butter was forcing creameries to look to 'enter the highly competitive regional and international markets at a time when the industry was still dominated by low grade butter

[97] *Report of the Dairy Expert, 1926.*

[98] NAZ, S1193/D1/2, 'Dairy Industry Correspondence': Secretary (name not given), Bulawayo Creameries, to Cory, 1 Feb. 1925.

[99] *The dairy industry in Southern Rhodesia* (Pamphlet prepared for the Wembley British Empire Exhibition, 1924).

[100] NAZ, S1193/D1/2, 'Dairy Industry Correspondence': T. Hamilton to the Secretary for Agriculture, 29 Dec. 1924.

[101] NAZ, S1193/D1/2, 'Dairy Industry Correspondence': Secretary (name not given), Bulawayo Creameries, to Cory, 1 Feb. 1925.

and cheese'.[101] In the same vein, the chairman of the Umtali District Farmers' Association submitted in 1925 that his association 'considers that something should be done to improve the grade of butter that is produced in this country, [the] quality of the article is very bad'.[102] The Assistant Dairy Expert, Cory, admitted in 1924 that 'not less than half of the country's butter was either second or third grade, particularly in the Matabeleland province where temperatures [are] higher and rainfall erratic'.[103] State attempts to improve circumstances in the industry through the passage of the Dairy Produce Act of 1925 were largely futile since the legislation focused more on the creamery processes than on farm operations. By providing for the compulsory registration and inspection of butter and cheese manufacturing processes and compulsory registration of all creameries, cream depots and cheese factories, and only providing for the periodic visits to farms by dairy officers, the legislation missed an opportunity to control dairy farm methods.[104]

Consequently, the country continued to market low-grade butter throughout the 1930s, often with disastrous financial consequences for both farmers and creameries. The general outlook was succinctly captured by the Senior Officer in Animal Husbandry in 1930. While acknowledging that 'considerable improvements in plant and organisation have been made at creameries', he added that:

> Little improvement is evident as far as the general quality of cream supplies is concerned. Large quantities of second and third grade cream, which become increasingly difficult to market each year, continue to be produced. Much of this low grade cream is produced by dairy farmers … who, in many cases, would be wiser in the long run to confine themselves to beef production.[105]

Indeed, a member of the Rhodesia Butter Agencies only identified as Straith, stated in 1935 that, whilst Southern Rhodesia produced the highest amount of butter in Southern Africa after South Africa, 'there is a dearth in first grade butter in this country'.[106] The veracity of Straith's comments may be corroborated by the fact that, at a time when the country was exporting surplus second- and third-grade butter in the region as well as to Britain, Southern Rhodesia was also importing first-grade butter to supplement faltering local production throughout the late 1920s and 1930s.[107] The way in which Southern Rhodesia struggled in international butter markets may be reflected by the fact that its exports were often conducted at a loss. In

[102] NAZ, S1193/D1/2, Dairy Industry Correspondence: A. Howat, Umtali District Association, to Downie, Minister of Agriculture and Lands, 8 Feb. 1925.

[103] NAZ, ZAY 2/2/13, Amended oral and written evidence (Dairy Produce) to the commission of enquiry into the economic position of the Colony 25 Jan. 1939.

[104] Under the Dairy Produce Act, dairy officers were employed within the Dairy Division to regularly monitor and inspect registered premises, to ensure that minimum hygienic and quality standards were followed. As a quality control measure, the chemical composition of butter was regulated, with a stipulation that all creamery butter should contain no less than 80% milk fat, no more than 16% water and a maximum of 4% salt.

[105] *Report of the Senior Officer in Animal Husbandry, 1930.*

[106] NAZ, ZAR 2/1/1 Oral and written evidence to the commission to enquire into certain aspects of the dairy and pig industries, 3 Sept. 1935.

[107] This point is mentioned many times in correspondence between the Ministry of Agriculture officials and the Dairy Expert. For example, see NAZ, S1193/D1/2, Hamilton to the Secretary, Department of Agriculture, 18 Feb. 1929.

1929, for instance, 15,000 lbs of second- and third-grade butter were exported to the Union of South Africa alone at a loss of 4*d*. per lb.[108] The Great Depression affected virtually the entire agricultural sector between the late 1920s and mid-1930s, but circumstances in the dairy industry were exacerbated by long-term problems associated with marketing low grade products.

VII

This article has delineated the development of dairy farming in Southern Rhodesia from 1908, when the White Agricultural Policy was adopted, until the passage of the Dairy Act in 1937, which aimed at revolutionizing the entire production and marketing structure of the industry. Although the state saw the development of the dairy industry as vital for the success of its larger plans to grow the white population through the encouragement of settler immigration (as was the case in Australia), we have demonstrated how, by the mid-1930s, the industry was standing on shaky foundations. Despite concerted state efforts to encourage its development, the sub-optimal natural conditions which existed in the country had a debilitating impact on dairy farming. Moreover, the fact that dairy farming is a sensitive undertaking, requiring a relatively large outlay of capital, expertise and special care discouraged many cattle-owners from investing in dairy production on a long-term basis.

This is what happened in Bechuanaland, where dairy farming only began to be taken seriously in the 1930s, when South Africa imposed restrictions on the import of beef cattle. Dairy farming initially developed as a side-line activity to beef production, with the result that most of the butter was produced by farmers whose main interest lay in beef production. Indeed, an analysis of the production trends throughout the period under review shows that butter and milk production only expanded in response to difficulties in the marketing of meat. Although the expansion in output that was experienced from the 1920s might paint a rosy picture of the state of affairs in the industry, we have argued that much of the milk and cream that was produced locally was derived from beef cattle ranchers who merely dabbled in dairying when beef prices dropped. Moreover, Southern Rhodesia's entrance into the world market from 1923 onwards, itself necessitated by the small local market for butter and milk, was premature, and for that reason, the dairy farmers and creameries struggled to participate in external markets profitably. Thus, notwithstanding state rhetoric on the potential of dairy farming in Southern Rhodesia, the industry was merely suckling on the udders of the beef industry throughout the interwar years.

[108] NAZ, S1193/D1/2, Hamilton to the Secretary, Department of Agriculture, 28 Nov. 1929.

Annual list of publications on agrarian history, 2014*

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Book Reviews

GERRY BARNES and TOM WILLIAMSON, *Rethinking ancient woodland: the archaeology and history of woods in Norfolk* (University of Hertfordshire Press, 2015). 288 pp., 73 illus. £35.

Any book with the term 'ancient woodland' in the title must expect comparison with the iconic works of Oliver Rackham. The latest contribution to University of Hertfordshire's *Studies in Regional and Local History* series by Barnes and Williamson stands up well in that company. The approach taken by this book is to consider ancient woodlands as an integral part of a wider rural landscape, rather than places set aside and protected from the changes going on around them. It is therefore a book with much to offer readers of *Agricultural History Review*. The writers emphasize their historical and archaeological perspective, but this work is also grounded securely and effectively in the geography of the landscape, considering the relative roles of geology, soil and topography, and uses palaeo-ecological and neoecological arguments as deftly as human perspectives.

The authors don't fall into the common trap of setting up a straw man and then knocking it down, preferring to use their case studies as tools to help them explore and develop the ancient woodland concept in a constructive and thought-provoking way. The first chapter concisely and effectively reviews how the concept of ancient woodland arose, and how it has developed within different disciplines and landscapes. This review leads Barnes and Williamson to suggest that the popular conception of ancient woodland as a relatively stable landscape element (that is, surviving largely unchanged over multiple centuries) not only isolates woodland from the wider landscape but in turn leads to a chronological imbalance in many accounts focused on woodland, which tend to skip over the last few centuries, perhaps influenced by the implied stability of the definition of ancient woodland in England as land which has been wooded since 1600. The three predominantly historical chapters of the book redress this balance somewhat by considering the origins of enclosed, coppiced woodlands in the medieval period as part of a process of population increase, agricultural intensification and enclosure spanning the last millennium (Chapter 3), then focusing on the relatively neglected recent past in chapters titled 'Ancient woodland in the eighteenth and nineteenth centuries' (Chapter 6) and 'The recent history of ancient woodland' (Chapter 7).

The landscape approach allows the authors to expand and nuance the ancient woodland concept, as well as to explore the extent to which human actions and social changes have affected woodlands to create the remnants seen today. They argue that the apparent dominance of enclosed, coppice-with-standards ancient woods is a product of post-medieval landscape evolution, showing that before the Middle Ages both coppice products and pasturage would have come from more extensive, less intensely managed expanses of woodland. They suggest that some Anglo-Saxon 'wood names' actually refer to what landscape historians would now call wood pasture, and that 'assarting' may refer to either the grubbing out of closed canopy woodland or the removal of pollards and shrubby stands from grazed common lands to convert them to agricultural fields. Their exploration of the geography of surviving ancient woodlands and their association with former wastes and commons in the context of changing agricultural practices and developing settlement patterns shows how the use and survival of the two landscape elements diverged in Norfolk, and allows the authors to argue convincingly for the survival of wood pasturage in some locations until formal enclosure in the eighteenth and nineteenth centuries.

Norfolk is an apt study region since it has a marked variety of landscapes and landscape histories, reflecting the considerable diversity of geology, soils and topography, including areas with the characters of both 'ancient' and 'planned' countryside (in the sense used by Oliver Rackham). The Ancient Woodland Inventory (AWI) provides the starting point for site selection (and for the useful 91-page appendix containing summary case studies and maps of 50 woods visited and researched by the authors), and although the final chapters identify flaws in the Inventory, they are presented as an inevitable consequence of the limited

resources and large-scale mission of the AWI. The authors propose the useful corrective of introducing a new category of 'pseudo-ancient woodland'; in their case studies, almost a fifth of sites fall into this category. They are also careful to spell out the ways in which Norfolk cannot be taken as representative of the rest of the English lowlands and it is to be hoped that this will spur others on to investigate how their ideas and findings hold up in other counties.

Whilst some problems can always be found in any work, those noted here are minor: maps would sometimes benefit from better keys and the researcher 'Day' cited on page 154 is not male but female. Overall this is a fresh and readable study, of considerable value both as a regional landscape history and as a contribution to wider debates about the role and story of trees in the landscape. Its relatively short, focused approach makes it accessible to the lay naturalist or non-specialist historian, but the critique of the ancient woodland concept will be useful and thought-provoking for more specialist students of the woodland and landscapes of England over the last 1000 years. This book is thus both a useful contribution to regional landscape history studies in the UK and of wider value to anyone interested in the history of trees and woodland in the rural landscape.

M. JANE BUNTING
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PETER FODEN and NORTON COMMUNITY ARCHAEOLOGY GROUP, *Records of the Manor of Norton in the Liberty of St Albans, 1244–1539* (Hertfordshire Record Society, 2014). 360 pp., 12 illus. £22.00.

Well-produced editions of primary sources in translation are always welcome and this present volume is no exception. The editors have produced a valuable collection of various sources pertaining to the St Albans manor of Norton. These include the translation of the court books of the manor dating from the first extant and very short halmote court held in April 1244, to the final court book entry dating from April 1460. In addition the editors have included surviving court rolls of the later fifteenth and early sixteenth centuries, amongst them some view of frankpledge courts, plus an eleventh-century charter and an account dating from 1488–89. There is a comprehensive and useful introduction explaining the sources at hand while also exploring aspects of the archaeology of the manor. A number of useful maps and illustrations alongside subject, name and place indices have also been included, which undoubtedly add value to the volume. Of particular value, especially perhaps to those less familiar with the obscure terminology of court rolls, is the inclusion of a glossary.

A. E. Levett's *Studies in manorial history* (1939) first drew attention to the value and importance of the court books of the various manors belonging to the abbey of St Albans. These were, in effect, edited versions of the manorial court rolls, containing only the types of entries which were of direct significance to the lord. As such, the St Albans court books contain a wealth of information on land transfers (including upon the deaths of tenants), marriage licences and information on various manorial customs and villein dues. The abbey was a notoriously conservative landlord, forever in conflict with its various tenants and famously causing affront to the townspeople of St Albans not only by treating them like villein tenants, but also by insisting on calling them thus. In this respect, then, the existence of the court books can almost be seen as a reflection of the mentality of the lords of St Albans, creating simple short-hand reference guides to all matters pertaining to unfreedom in their manors by extracting the relevant information from the original court rolls. The latter, by their very nature, included a great deal of business concerning relations between the tenants themselves, such as brawls, accusations of debt, petty thefts and broken contracts. Such cases generated revenue for the abbots, but were not of any longer term consequence. Instead it is in land transfers, the rendering of labour services, marriage licences and other cases detailing other villein dues, such as having to use the mill of the lord to grind one's grain, that tests for unfreedom and the status of individual plots of land can be ascertained. These served as precedents and the compilations were a handy reference to the personal status of individual families and the land they held. Therefore the court books of the St Albans manors, the present example of Norton included, are excellent sources for anybody interested in the long-term development of villeinage and the often conflictual relationships between lord and tenant, including landholding patterns and peasant land markets.

That said, this present edition does include some interesting gems illustrating daily life at medieval Norton and the lord's attempts to regulate these to safeguard what he considered to be his assets. In May 1338 for example a decree by the lord is included stipulating that none of the unfree tenants were to spend their time at the tavern of Baldock to 'waste there their goods and chattels to the grave damage of the lord' (p. 115). This seigniorial decree was not due to moral concerns; instead the lord wanted his tenants to brew for themselves and ordered that they 'shall have a common brewery in Norton' to sell ale regulated under

the assize, which would have generated an additional income for the lord.

Overall this is a wonderful and useful volume, not least because the documents included span a significant chronology and include key periods of stress in later medieval rural life, including the famine years of the early fourteenth century and the arrival of the Black Death. It is likely to be highly valued as a teaching tool for undergraduate and postgraduate students and to be welcomed by anybody interested in researching daily life in later medieval England.

MIRIAM MULLER
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VANDRA COSTELLO, *Irish demesne landscapes, 1660–1740* (Four Courts Press, 2015). 256 pp., 73 illus. €50.

'For the house of the planter / Is known by the trees' are lines from *The planter's daughter*, a poem by Austin Clarke (1896–1974). The image is easily understood in an Irish context, for within a landscape denuded of trees the Irish demesne, with its dense plantations, stood out. Despite the visibility of demesnes – often delineated by high walls as well as trees – these places have been comparatively under-researched, unlike the houses which lay at their centre. Pioneering work on Irish gardening and the cult of improvement by Toby Barnard and on idealized and formal landscapes by Finola O'Kane has opened up this ground. *Irish demesne landscapes,* therefore, is a welcome addition to this emerging field.

The book opens with a cursory examination of the political, intellectual and economic background to seventeenth-century Irish estates. The turmoil created by the Civil War of the 1640s and the Commonwealth period of the 1650s, with its land redistributions, had unsettled estates and their owners. With the restoration of the Stuart monarchy in 1660 a more settled period developed, which had the effect of transforming the landscape in England. The same process was witnessed in Ireland and is expertly detailed in this book. (Surprisingly, Costello does not engage with Barnard's *Improving Ireland? Projectors, profits and profiteers, 1641–1786*, which covers some of her case studies.)

The imperatives of bringing civility and making the land productive were motivating factors for landowners, their agents and gardeners. Costello rejects the notion that landscapes were politicized in Ireland, as they had been in some English places, and instead argues that taste, fashion and certain continuities from the past determined the look of Irish demesnes and gardens. Nevertheless, these were idealized landscapes, designed to complement houses and to exude prosperity, usefulness and fecundity. Likewise, the book argues that to delineate gardens as Dutch, French, or Italianate is to mislead. Instead styles were mixed according to taste and fashion, and by the pooling of ideas between landowner, architects, agents, jobbing gardeners and tradesmen. Nevertheless, the constant communication with equivalents in England ensured that the Irish demesne closely mirrored developments there.

Several printed books, mostly published in England, acted as guides to the aspiring landowner. Yet while there was an appetite for these books, Costello acknowledges that much of the advice they contained was not well suited to Irish conditions. The first Irish book, Richard Lawrence's *Interest of Ireland* (1682), sought to remedy this by providing practical suggestions on improving stock and land. For many, Irish demesnes were evidence of 'improvement', that often intangible concept that motivated several landowners to expend vast sums on their demesnes.

Perhaps the most rewarding part of the book is contained in chapters 4 to 9, which deal with the various elements that made up the Irish demesne: the pleasure garden, horticultural land, plants and shrubs, the use and control of water, and recreation within the landscape. Through careful archival research in the surviving papers for estates such as Breckdenston in county Dublin, Burton and Castlemartyr in Cork, Kilkenny Castle, and Kilruddery in Wicklow, Costello dissects the landscape into its various constituent parts. While some of this ground has been examined previously, Costello's approach is different and rewarding. She introduces the reader to the limited range of ornamental and fruit plants that were available and where they were sourced, as well as the experiments in growing vines, melons, and mulberry trees. Demesne greenhouses, which became common in Ireland from the seventeenth century, made some of these experiments possible. Irish landowners and gardeners were as eager as their English counterparts to source exotic varieties, using both private contacts as well as nurserymen in the major cities to do so. For example, the gardens created by Arthur Rawdon at Moira had several Jamaican trees and plants, sometimes obtained from his friend Hans Sloane in London, but also through his own contacts in the Caribbean.

A chapter on trees and woodlands details the exacting rules for the layout of plantations, as well as the avenues and walks which dissected them. Another on canals, lakes and other water features demonstrate how ambitious some landowners were in creating their idealized landscape. In some cases, older fishponds were converted into canals and lakes, while still providing fish for the table. Fountains, jets and water

houses became *de rigueur* for those who wished to enjoy the spectacle and impress visitors. A final chapter investigates the deer park, rabbit warren and duck decoy. These elements appealed to those who wished to have a productive and useful landscape, although the high costs of building and maintenance ensured that few would survive into the nineteenth century. Indeed the desire for a more naturalistic landscape by the end of the eighteenth century ensured that many demesnes were transformed, obliterating much of the formality of earlier times.

Overall this is a well-researched and pioneering book, which capably dissects demesne landscapes in Ireland at a crucial period of their development. It will reward those who are interested in how the landscape was designed and laid out, and may prompt others to further investigate questions about the cost and continuing development and maintenance of gardens, woodlands, and other features in the same period and beyond. Some unfortunate typographical errors managed to escape the editing process. The footnotes in chapter 1 are out of sequence and the last footnote is missing. Nevertheless this is a book that will remain required reading for those interested in the study of Irish demesnes.

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ALAN FOX (ed.), *Parish government in a Leicestershire village: The Buckminster Town Book, 1655–1767 and Constable's Book, 1755–1813* (Leicestershire Archaeological and History Society, 2015). 228 pp., 5 illus. £15.

The parish of Buckminster with Sewstern is situated in north-western Leicestershire on the county boundary with Lincolnshire. This fine edition of two volumes of parochial records provides a useful source for insights into village-level governance, which touched on issues ranging from poverty and taxes to common fields and vermin. The editor, Alan Fox, provides a short but helpful introduction to the sources, in which he notes the growing responsibilities of parishes in this period, as has been shown at a broader level by historians such as Joan Kent, Steve Hindle, Barry Reay, Keith Snell and Henry French. He concisely summarizes the principal contents of each volume and glosses some of the more obscure terms one encounters in the transcriptions. The introduction also includes references to numerous other printed editions of vestry books and parochial accounts.

The Town Book (1655–1767) is essentially a stripped-down version of the sort of vestry minutes one is likely to encounter elsewhere. It consists almost entirely of the annual appointment of the four chief parish officers – churchwarden, overseer of the poor, constable and surveyor of the highways – and the yearly balancing of their accounts. It should be noted that the latter does not include figures for the total amount spent or received, or itemized disbursements. It does, however, also include occasional references to setting rates, binding pauper apprentices, repairing the church and letting church land. This source will be useful mostly to genealogists, but the long lists of officers could also be used as a foundation for an attempt to reconstruct a prosopography of the parish elite, as Henry French has done for an earlier period.

The account book (1755–1813) of the constables and surveyors of the highways has much more detail thanks to its itemized disbursements and receipts. Many intriguing items are mentioned, if only very briefly, such as payments for conveying prisoners, examinations of paupers, attending 'statties' (hiring fairs), repairing roads, maintaining watercourses, and much else besides. Historians of agriculture may also find useful the fact that these accounts mention sub-officers, including a 'neatherd' (common cattle herdsman), a pinder (who impounded stray livestock) and a mole-catcher, as well as scores of individual bounty payments for catching foxes (1*s*. each), crows (2*d*. each) and sparrows (2*d*. per half dozen). The other type of payment that occurs extremely frequently relates to beggars, vagrants and other poor travellers. These can be found on almost every page. Occasionally the accounts offer a bit of detail such as the terrible case of May Wright in November 1807. She was 'a woman found almost sta[r]ved in Grantham Lane', whom the constable attempted to revive with 'gin and ale' and accommodated for five days. Her condition was so terrible that the blanket he gave her 'was obliged to be burnt and her other things washing and cleaning' (p. 184). Mentions of other poor travellers are much less detailed, but there are a remarkable number of payments to poor men, women, children, soldiers, sailors and even 'turkey slaves'. It would be possible to follow the example of David Hitchcock's work on Grandborough in Warwickshire in *Rural History* 23 (2012) and quantify the large numbers of mobile poor people who received help from the Buckminster constables in this period.

Taken as a whole, this edition presents a wealth of material that might be useful to historians interested in local social and economic life. The earlier Town Book is more limited in its potential uses, but the volume of accounts covering the later eighteenth century is rich in detail. It will be especially valuable because, as Fox notes in the introduction, the work of constables and

surveyors of the highways is under-researched when compared to overseers of the poor and churchwardens.

BRODIE WADDELL
Birkbeck, University of London

MADGE DRESSER and ANDREW HANN (eds), *Slavery and the British country house* (Historic England, 2013). 196 pp. £50.

> South Carolina indigo planter Peter Gaillard saw his fortunes revive thanks to the cotton boom … a crop so profitable that … in 1803 [he] constructed a new mansion on this property … Fortified by their wealth, confident of their slave-aided ability to squeeze ever more cotton from the land, American cotton planters came to dominate British markets by 1802.

This passage comes not from *Slavery and the British country house* but from Sven Beckert's *Empire of cotton* (2014). This probably appears a strange way to begin a review about British country houses, but being an American I unavoidably see the world from an American perspective. Please indulge me a little.

My work examines plantation museums in the United States, and during my fieldwork in South Carolina I was struck by planters' attempts to recreate Britain in the American South. Photographs of their homes could be placed in *Slavery and the British country house* without anyone being the wiser. On deeper thought this makes sense: these planters were Englishmen and the sons and grandsons of Englishmen who came to the Americas seeking their fortune. And as Beckert's passage alludes, there were Englishmen on the other side of the Atlantic making their fortune from raw materials from the Americas, materials gotten through enslaved Black labour.

Slavery and the British country house deals with material culture, here in the form of mansions on the British side of the Atlantic. The editors of this volume state that it seeks to trace and interrogate the links 'between the wealth derived from slavery and the British country house' and the 'implications such links have for the way … [these] properties are represented to the public today'. The volume largely succeeds. Traces of the enslaved are made visible through the use of the Slave Compensation database (Nicholas Draper), spatial analysis (Madge Dresser), personal histories (Jane Longmore), archaeology (Roger H. Leech), archives (Simon D. Smith), forensic accounting (Nuala Zahedieh), and landscape aesthetics (Victoria Perry).

I found the chapters enlightening. Of particular interest was Sheryllynne Haggerty and Susanne Seymour's chapter on 'Property, Power and Authority', in which they describe how property, power, and authority were lost on Grenada during Fedon's slave rebellion (1795–96). The rebellion resulted in the burning of a hundred plantations, the death of approximately one quarter of the island's enslaved population and the execution of 41 white British subjects by the insurgents. Slave rebellions were common in the Americas, but, with the exception of the Haitian Rebellion they tend to be underexamined.

I also found intriguing, for a completely different reason, Laurence Brown's chapter on Marble Hill and Northington Grange. It is principally the story of the owner of Marble Hill, George II's mistress Henrietta Howard. While a fine piece of academic research, it reads a bit like a soap opera or telenovela. I do not say this to belittle: I would have liked to have learned more about the personal lives of the owners of these estates.

One chapter that does offer a more personal view is Natalie Zacek's. Her chapter addresses Dodington House, but I would argue that the chapter concerns someone who rarely resided there: Christopher Codrington. Codrington was an American in the continental sense: he was born in Barbados in 1668, the son of the captain-general who at the time was one of the wealthiest sugar cane plantation owners on the island. He attended Oxford and was elected a fellow of All Souls College, and was described by his peers as being a scholar and a gentleman 'worthy of the highest respect', a description today not usually associated with slave owners.

Two of the best chapters are Caroline Bressey's on Kenwood House and Osborne House and Cliff Pereira's on the London Borough of Bexley. What I enjoyed most about Bressey's chapter was the depth she went into reanimating – that is, bringing back into existence – the people of colour who resided at Kenwood and Osborne. Here we learn about Dido Elizabeth Bell, Abdul Karim, Maharajah Duleep Singh, and Victoria Randle, who were not enslaved people but rather, in varying senses, dark-skinned English aristocrats. Their early presence in Britain, along with that of many other unnamed people of colour, calls into question the very whiteness of the nation. Pereira's chapter is the one in the book most concerned with how these 'properties are represented to the public today'. His chapter examines how Bexley's communities – particularly its minority communities – engage with heritage sites in the borough, tracing how places that were perceived as 'white only' spaces have been transformed into spaces for everyone.

I was intrigued and edified by this volume. If I have a criticism, it is that I would have liked to have learned more about the people, especially the people of colour, who both resided in and made these homes possible.

PERRY CARTER
Texas Tech University

LUCINDA LAMBTON, *Palaces for pigs: Animal architecture and other beastly buildings* (English Heritage, 2011). 256 pp, 150+ illus. £25.

The charmingly titled *Palaces for pigs* is a revised and expanded version of Lambton's earlier *Beastly buildings* (1985), a book that somehow escaped review in this journal. This updated edition of the earlier National Trust-published volume aims to bring Lambton's lively accounts of a diverse range of beastly buildings to a new readership. This is in many ways very timely: interest in animal histories and animal geographies is burgeoning, as the growing number of volumes in Reaktion's *Animal* series and recent books by Hannah Velton (*Beastly London*), Peter Atkins (*Animal cities*) and Arthur MacGregor (*Animal encounters*) all attest.

As Lambton argues in the opening pages, the British population's enthusiasm for and love of animals over more than seven centuries has resulted in the construction of 'an array of animal buildings which are second to none in the world' (p. 12). Over the course of the book, we encounter not only stables, cow houses, pigsties and hunting lodges, but also fishing temples, a monkey pagoda, a gothic duck house, a castle for goats and elaborate memorials dedicated to horses, a ship's cat and lots of dogs (including Lambton's own). Given the respective publishers of the two editions the book necessarily focuses for the most part on buildings in the care of national heritage organizations including the National Trust and English Heritage. Hence the beastly buildings featured are mostly in England, predominately rural in setting and many of them were originally part of the country estates of the landed classes, though they are none the less fascinating for that.

While the introductory chapter briefly sets the scene, the remaining chapters cover four major themes: stables and sporting buildings; animals for the plate; menageries; and animal memorials. Each consists of a fairly brief overview of each type of animal architecture, followed by animated vignettes of extant examples, many of them open to the public for at least some of each year. Much of the book is thus effectively a gazetteer. Amongst the more intriguing examples to feature are the third duke of Marlborough's fishing temple at Bray, decorated with Andien de Clermont's paintings of monkeys angling, shooting and riding in boats and Elizabeth, duchess of Rutland's kennels at Belvoir Castle.

As one would expect from an English Heritage/Historic England volume, the book is lavishly illustrated with full and half page colour plates of the various buildings discussed. There is much here to engage rural and agricultural historians and country house visitors alike, even if for the academic reader there are necessarily also points of expansion and clarification which one feels might have profited the book. Thus, for example, Lambton tells an uncomplicated story of growing 'enlightenment' about animal cruelty which would have benefited from a more nuanced telling. Greater thought too could have been directed to the question of why these buildings were built as they were: Lambton assumes it was for the love of the animals housed there, and doesn't seem to recognize that the buildings were caught up in improving ideologies and thereby intended to articulate politics and power, taste and intellect, not just to provide fitting homes for various animal 'friends'. Careful editing of the text to remove some of the quirkier and sometimes repetitive turns of phrases and the surprisingly large number of exclamation marks would also have been beneficial. Both undoubtedly stem from Lambton's obvious love of animals and her great passion for architecture, the 'two whoppingly powerful forces' (p. 12) which animate this quirky book. While it lacks the nuance and theoretical underpinnings of much recent work on the theme of more-than-human histories, this is still much to enjoy in this volume. Even the most experienced heritage tourists or historians of the aristocracy will surely find something new to explore here! And I for one will be adding a handful of these buildings to my country house bucket list! (Unnecessary, tongue-in-cheek exclamation marks entirely intended.)

BRIONY MCDONAGH
University of Hull

MARK JOHNSTON, *Trees in towns and cities: A history of British urban arboriculture* (Windgather Press, 2015). 256 pp., £39.95.

This book was conceived originally to help students of arboriculture and urban forestry to understand more about the history of British urban trees. It provides an enthusiastic and entertaining history of the subject by one of the leading modern British and international urban arboriculturists arguing persuasively that tree professionals and communities must understand more about the role of trees in the formation of urban landscapes to understand the reasons for their characteristics and make informed decisions concerning future planning and management. The book is organized around a series of thematic chapters which broadly follow a chronological pattern and utilize material drawn from across more than a thousand years of history. The relationship between forestry and urban arboriculture, and between town and countryside, is well delineated whilst examples draw as much from the activities of 'working people' as from the gardens and

estates of the rich and powerful. Of course, it greatly helps that the author has had a distinguished career as an arboriculturist, practitioner of urban forestry and tutor, was the first British individual to be honoured with the Award of Merit by the International Society of Arboriculture, and has therefore helped to make the history that he has written about. Having worked as a local government tree officer, a consultant and a government adviser, and helped to create and teach the first British Master's qualification in urban forestry at Myerscough College in Lancashire, Johnston is able to supply insights concerning the history of the subject unavailable to most others. An entertaining and talented public speaker, something of the excitement of Johnston's lectures and conversation is captured by the book too.

Trees in towns and cities investigates the history of British urban trees from Roman antiquity to the present although most of the book concentrates on the early modern period to the present. The first chapter examines the rise of professional forestry including arboricultural education and training, exploring the development of arboriculture as a profession and emphasizing the interface between European, North American and British practices. This section introduces some of the major developments in urban forestry, particularly over the past three centuries, such as the creation and impact of formal arboricultural qualifications and the publication of the first textbooks on the subject. It is followed by an analysis of the governance of urban trees which explains how local government and national government bodies came to assume direction and control over urban forestry, including the provision of legislation to protect trees.

Various kinds of threats to urban trees loom large in the third chapter including the impact of smoke, the provision of utilities, building and construction, urban density, pests and diseases such as deadly fungal and insect infestations. The ways in which public parks and other green spaces helped to introduce so many urban trees between the eighteenth and early twenty-first centuries is explained in the fourth chapter, including the great Victorian public parks and more specialist public urban arboretums with their significant, and sometimes systematic, labelled tree collections. Private gardens are also rightly seen as having been major repositories and nurturers of urban trees from the great wooded green spaces of large villas and mansions to smaller suburban gardens. Other significant tree-laden urban green spaces also receive some treatment in the book including cemeteries, botanical gardens and golf courses, whilst twentieth-century developments such as the roof garden are noted.

One of the most fascinating chapters covers the subject of street trees which tended to be frowned upon at first but brought rich greenery to everyday mundanity and were systematically planted from the later Victorian and Edwardian periods onwards as municipal authorities and parks departments assumed control of the process. Beginning tentatively, the planters of street trees had to face difficulties including dust pollution, constrained space, traffic and the provision of utilities, as well as their poor knowledge. However, a range of techniques were developed to counter these problems, such as adapting the methods of forestry, selecting the most hardy types, developing the use of equipment such as tree guards, and using municipal nurseries to promote large-scale trees production and inculcation of knowledge. A final chapter on visions of urban green considers the role of trees in specially planned industrial towns and villages, resort centres, and the garden cities and new towns of the twentieth century. As Johnston demonstrates, although he did not write much about them, trees were central to Ebenezer Howard's vision and also to Barry Parker and Raymond Unwin's plans for garden cities and suburbs such as Letchworth and Wythenshawe with their provision of green spaces, avenues and US-style planted parkways whose attractions have increased as their trees have matured. As Johnston ably shows, these innovations were hastened and supported by the development of urban arboriculture as a profession with its own training and qualifications, forms of equipment and the growing protection provided by national legislation and local government regulations.

The book is illustrated with some shrewdly selected illustrations which take advantage of the author's professional knowledge and experience. The picture of litter and tin cans carelessly crammed into a wire tree guard beside a tender street sapling from the 1970s (p. 83), bricked up tree cavity (p. 95), fungi-sprouting abandoned tree stump (p. 58) or the protruding shafts of savagely pruned roadside planes in Hampstead each say more than a thousand words could. With decades of experience and an immersion in the history of the subject, Johnston has provided much more than a history of urban arboriculture. *Trees in town and cities* is a general history of urban forestry and arboriculture in which these are not considered in isolation but placed into their social, political and economic contexts. The book provides a fascinating tour of an apparently specialized subject yet one that touches upon the lives of every urban citizen or visitor who enjoys the plantations of gardens, cemeteries or golf courses, takes grateful shelter under the cool shade of a majestic street plane on a hot day or finds solace in

a sea of summer green within a great Victorian park. This thought-provoking study by an enthusiastic and experienced urban forester will long remain an authoritative introduction to a fascinating subject.

PAUL ELLIOTT
University of Derby

SEÁN BEATTIE, *Donegal in transition: the impact of the Congested Districts Board* (Irish Academic Press, 2013). 298 pp., 15 illus. €21.95.

Donegal in transition is a study of the Congested Districts Board's activities in the county of Donegal in the north west of Ireland. The book comprises ten chapters, each of which gives some context and a description of CDB policies and activities in relation to industry, fisheries, agriculture and parish committees. Beattie's main argument is that historians heretofore have underestimated the impact of the CDB on Irish life, in particular life in Donegal. This study presents the extent of CDB's activities and details the minutiae of various schemes and start-ups promoted by the board.

For those unfamiliar with Irish governmental bodies, the CDB was a regional development board active over the period 1891 to 1923. From 1891 to 1909 it had a very specific frame of reference: it would deal with 'congested districts', defined as counties or parts of counties where more than 20 per cent of the population of the county lived in electoral divisions where the total rateable valuation per capita was less than £1 10s (*First CDB report*). The geographic scope and scale of the CDB was expanded in 1909 so that the area under the board's remit increased from 3.5 million acres to 4 million acres, the population increased from 0.5 million to 0.6 million and the rateable valuation of lands under the CDB remit rose from £0.5m to £1.79m (*Nineteenth CDB report*).

Curiously, for a book solely about the CDB in Donegal, a sizeable share of the county was not under the remit of the CDB from 1891 to 1909: it was only after 1909 that the entire county was included within the CDB's remit (p. 3). This disparity is never addressed, nor has the comparison of districts in and out of the CDB remit been contemplated. Another clear omission is the lack of engagement with the definition of 'congestion' and its specific application to Donegal: other areas of the island had similar levels of congestion in terms of having per capita valuations below the £1 10s threshold but were excluded from the remit of the CDB. The conventional criticism of the CDB is that it was too underfunded to have any meaningful effect: essentially, it subsidized uneconomic industries and when the subsidies were removed these industries floundered. This book does little to counter these arguments, but instead highlights the grants that were provided by the CDB, equating this to success. Throughout the book the reader is repeatedly reminded of how Lee's *Modernisation of Ireland* (1989), Ferriter's *The transformation of Ireland* (2005) and Breathnach's *The Congested Districts Board of Ireland* (2005) argue that the CDB had limited impact, and we are simply told that the author disagrees with this interpretation with little subsequent argument or disputing of the facts provided.

This study could have been much improved by adopting a more comparative approach to the topic. An obvious issue that is never addressed is why Donegal was chosen as a location of study. Was this where the CDB was most successful and had its greatest impact? A second, related point is that the CDB operated in regions of several western counties of Ireland. What was the experience like in the different counties? Did the CDB adopt a uniform one-size-fits-all approach or were policies tailored towards specific contexts? Allusions are made to other counties but these are never pursued to their logical conclusion, nor is there much in the way of comparison with wider experiences in the rest of Ireland or indeed with the British Isles more generally. Finally, the study needed a clearer way to assess how the CDB made an 'impact' and to more clearly disassociate this from other factors. For example, some of the important investments discussed in this work (drainage and light railways) occurred before the CDB was formed (p. 22), so it would be difficult to disentangle the effects of both the capital improvements and CDB policies.

A concluding, but no less crucial, point is that this study confuses national and local perspectives throughout. We are told that Ireland was poor (p. 23: 'the high level of economic growth in Scotland, however, stood in stark contrast to the decline in the strength of the Irish economy at the end of the nineteenth century, thanks to the presence of coal and ore in the former and over-taxation in the latter'), but this perspective ignores the industrialization of the north of the island and is illustrative of a lack of engagement with the wider literature. Recent advances in the understanding of Irish economic growth suggest that Ireland (as a whole) experienced convergence on British income levels over the second half of the nineteenth century (see, for example, Geary and Stark's 2002 contribution in the *Economic Journal*), and that this convergence was not confined to the north (on which see Kennedy, Giblin and McHugh, *Economic development of Ireland*). Another example of this lack of clarity appears on p. 119, where we are told that Donegal had the largest

number of holdings under a £4 valuation in Ulster and that the ratio of 'farm workers to 100 farmers' fell from 111 to 104 between 1901 and 1911. In the subsequent paragraph we are told that farm output continued to increase, from £27m in 1850 to £50 by 1914. The latter figures, which are derived from Turner's *After the famine*, refer to the island of Ireland and not to Donegal; this is a deceptive error and overall more care needed to be taken when switching between local and national contexts.

Beattie's work certainly has merits in terms of the level of detail presented on local events, but overall it is an unfocused study, at times plagued with repetition and irrelevant material. One obvious example comes from chapter 5, where the reader is informed about fish curing in Donegal in 'ancient times' (this phrase is used frequently), and in the next sentence the discussion inexplicably moves to mackerel curing in Japan, then back to Donegal without expanding on this Japanese comparison (p. 58). This is but one example of scattered narrative in the book, which was, unfortunately, overly distracting. Thus while this book presents occasional snippets of thoughtful analysis, overall it is a lost opportunity. If the author had been more attentive to both the finer details and the broader context, the book would surely have made a more valuable contribution.

EOIN MCLAUGHLIN
University of St Andrews

SUSANNA WADE MARTINS, *The conservation movement in Norfolk: A history* (Boydell Press, 2015). 187 pp., 55 illus. £19.99.

Susanna Wade Martins' study offers a valuable account of a county conservation movement. Conservation in Norfolk, as elsewhere, responded to wider social and environmental changes, but the county was notable for institutional innovations such as the establishment of the first county nature trust, the Norfolk Naturalists Trust, founded in 1926. Wade Martins documents the key organizations and individuals fostering a conservationist outlook, whether in terms of nature, amenity, archaeology or the built environment, setting the county story within a broader narrative of changing social attitudes and policy priorities. It is good to have a work covering conservation in the county as a whole, to set alongside accounts concentrating on specific regions such as the Broads, as in Tom Williamson's *The Norfolk Broads* (1997) or my own *In the nature of landscape: cultural geography on the Norfolk Broads* (2014), where many of the key figures in Wade Martins' story also appear. The fine illustrations throughout make *The conservation movement in Norfolk* an attractive book for a general and academic readership.

Five chapters of varied length tell a largely chronological story. The first chapter shows the conservation movement emerging in the nineteenth century through bodies such as the Norfolk and Norwich Archaeological Society (established 1846) and the Norfolk and Norwich Naturalists' Society (1869). Botany, ornithology and antiquarianism shape new forms of county appreciation, with middle-class interest prompted in part by touristic encounters with county environments in key areas such as the coast and Broads. The second chapter traces the relationship between organizations working at county level and the beginnings of national legislation on nature protection and historic monuments, Wade Martins moving her account between the local and national scales. Chapter 3 considers the interwar period, where Norfolk was notable for the emergence of conservation bodies set up to purchase and manage land, the Norfolk Naturalists Trust and the Norfolk Archaeological Trust (established 1923) working alongside the existing county scientific societies, with some overlap of personnel, for example in the key figure of naturalist Sydney Long. The Norfolk operations of national organizations such as the National Trust, the Council for the Preservation of Rural England and the state's Office of Works are also traced. The fourth chapter gives a briefer account of the immediate post-war years, with the expansion of conservation landholdings and the implementation of national planning legislation concerning nature and historic buildings. Wade Martins presents the post-war decades as marking a shift from a concern for the preservation of specific sites to the conservation of the wider environment, and her final chapter follows this through to the present day. Here agriculture becomes a key theme, with stories of conflict and compromise over newly diagnosed effects of intensive farming on county nature and archaeology. Wade Martins includes a detailed discussion of the key 1980s battle over the prospective deep drainage of the Halvergate Marshes, which produced the compromise of Environmentally Sensitive Area schemes.

With the exception of some discussion of the conservation of the built environment in urban centres such as King's Lynn and Norwich, this is a predominantly rural story in terms of the objects given conservation value. However it is also an urban story in that the institutions shaping conservation often had a city base, with urban residents as key activists. Norwich is the key centre here, with the city museum playing an important role from its early nineteenth-century incarnations through its establishment as the Castle Museum in the 1890s, still a popular and significant county institution. The museum has served as meeting

point, intellectual hub and site of display, notably in the Norfolk Room, where dioramas of county habitats have been shown since the 1930s. Wade Martins might perhaps have developed further the relationship of city and country in shaping the conservation movement, and indeed reflected on how conservation has itself been important in shaping versions of county identity. County identity can be a highly contested field, and conservation bodies, given their county organizational remit, often find themselves engaged in (and indeed have defined themselves through) such contest.

There are a few minor errors of detail, for example Marion Shoard's *The theft of the countryside* was published in 1980 rather than 1971, Anthony rather than his son John Buxton gave Horsey Mere to the National Trust (but there are a lot of Buxtons in the Norfolk story), the Green Party won 15 per cent of the vote in 1989 at a European rather than a general election, and John Betjeman, while he did write much in praise of Norfolk churches, could only have written from beyond his grave in 2001. This is however a valuable and beautifully illustrated guide to a significant county conservation movement, and deserves a wide readership within and beyond Norfolk.

DAVID MATLESS
University of Nottingham

ANDREW CONNELL, *Appleby Gypsy Horse Fair: Mythology, origin, evolution and evaluation* (Cumberland and Westmorland Antiquarian and Archaeological Society, Extra Series, XLIV, 2015). xii + 103 pp., 21 illus., 1 map, £12.

I am not sure what I expected from this book but, be assured, it came as a surprise. This is not so much history as an excellent example of investigative journalism. Andrew Connell was a teacher of History at Appleby Grammar School but it was subsequent to that, as he became involved in local politics, that he started to look more closely at the Fair and finished up researching its history. It may be said that, the more he looked, the less certain were his findings – but, that is not to say he failed to find a story.

The first five pages are taken up by telling us what we think we know and broadly, the rest of the book dismantles our ideas before handing us a fresh and more nuanced narrative. The chapter describing the fair's early history is followed some general comparisons with the great fairs such as those at Horncastle in Lincolnshire and Stourbridge in Cambridgeshire. Connell then gets into gear to discuss the Fair's evolution since the eighteenth century. Much of this is painstakingly built up from reports in local newspapers dating as far back as they go (*c.*1812) together with excellent use of the records of (the former) Appleby Borough, North Westmorland Rural District and County of Westmorland.

Appleby Horse Fair is in a continuous state of flux and (as historians we know this) the current situation is largely regarded as 'the way it has always been'. In reality, even the date has moved. Traditionally, the Fair started on the second Wednesday in June but, in this century it has migrated so that, in 2013 the fair 'began on the preceding Thursday … and by Monday 10 June, two days before its putative climax, it was effectively over'.

Then there follows a series of chapters which lay out the story in exemplary style as 'Mythology: the Phantom Charter' leads into 'The Origins of Appleby Fair', 'Evolution: the Horse Fair' and 'Evolution: the Gypsy/Traveller Fair'. These short and effective narratives (all either six or eight pages in length) bring us to 1939, after which a number of things changed. Two factors were possibly of most significance in terms of the Fair: the slow replacement of working horses by motorized vehicles and the rapid imposition of limitations on movement triggered by security concerns during wartime.

From 1945 there seems to have been a lot of infighting, with some members of local society finding good reasons to abolish the Fair whilst others found equally good reasons to support its continuance. It is interesting to note that the split was not along simple social lines for there seems to have been a tradition of support by the Lowther family with an earlier earl of Lonsdale attending and buying 'the best dog they had shown him' (though we might note that the Fair was not being held on his land, but on that owned by the descendants of Lady Anne Clifford.). One factor in the Fair's continuance is that people just arrived, and in doing so created practical problems relating to the caravans, the horses or motor vehicles that drew them, the basic needs of people and livestock together with the various kinds of waste they generated.

Chapters 12 and 13 address 'The Late Twentieth-Century Media Fair' and 'Managing the Modern Fair', giving discussions of aspects of contemporary society which are clearly going to have a continuing impact upon who attends the Fair and what their expectations might be. The book finishes with four short (two-page) appendices that present us with an interesting summary of the evidence for 'St Lawrence's Fair' as published from about 1750 together with the voices of three individuals. The first was a child in Appleby in the 1930s and gives insight into the post-1939 changes whilst another gives a gypsy/traveller perspective. The middle narrative in the sequence takes the form of a

poem, written in 1945, and which brought back to the reviewer the charms of the books of her childhood written by 'Romany' (George Bramwell Evens) and 'Nomad' (Norman F. Ellison).

This is a good book and particularly relevant to those with an interest in fairs or livestock trading. It is an exemplar for those who are trying to research and write up a complex topic.

JENNIFER S. HOLT
Haslingden

IAN D. ROTHERHAM, *The rise and fall of countryside management. A historical account* (Routledge: Abingdon, 2015). 352 + xx pp. £85.

In 1970 the land around Elvaston Castle in Derbyshire became the first estate in England to open as a Country Park. Yet, for more than a decade now, its future has been in doubt, as the cash-strapped County Council explores options for its sale to a private buyer, whilst the Friends of Elvaston Castle campaign to keep it open to the public, and search for the funding necessary to restore both house and grounds. The uncertainty surrounding Elvaston's survival as a public amenity illustrates some of the travails identified in Ian Rotherham's book, addressing a neglected topic in the history of the modern countryside.

Country Parks were one element in the new era of 'countryside management' ushered in by the creation of Countryside Commissions for England and Wales and for Scotland in 1968. That very notion of 'countryside management' was a novelty: Rotherham cites an official definition of it as 'the process by which objectives of conservation, recreation and access are secured for public benefit in the management of both public and privately-owned land' (p. 27). It assumed that public funding should support the provision of access to open spaces, often on the urban fringe, and take responsibility for both maintaining and restoring landscapes, cleaning up contaminated and post-industrial land (including dealing with derelict structures left over from the Second World War, which Rotherham notes would now be valued as being of archaeological interest). Countryside rangers engaged in education work and helped the public to take advantage of outdoor activities. With official encouragement, a new profession developed during the 1970s and 1980s – that of countryside manager.

Rotherham's story is about what these professionals achieved, and what he believes is now under threat in an era of cuts and reassessments of the role of public bodies and funding. Between 2004 and 2014 membership of the Countryside Management Association fell by 36 per cent. A large part of the countryside manager's role was always about finding numbers of people to do the work on the ground: recruiting and managing volunteers, and deploying labour from employment schemes like the youth opportunity project. Now the emphasis has swung more firmly towards the voluntary sector, whilst employment opportunities for wardens and rangers are increasingly likely to arise in private tourist attractions and landscapes managed by charities. Rotherham points out that these charities have less obvious accountability to the communities within which they operate and may not address the same range of priorities that featured in management plans developed under council auspices. He also sees young people's fascination with the virtual world and 'passive experience' as a major challenge to any public commitment to maintaining countryside recreation. But he argues that countryside management can continue to make a strong case for its existence, contributing to the control of invasive species, ensuring sustainability, supporting tourism, addressing social problems and enhancing health and well-being.

The book is shaped by the author's active involvement in the processes he describes, while the region in which he is based furnishes many of the practical examples of countryside management in action, drawn from South Yorkshire and the East Midlands, and notably exploring case studies of the country parks and nature reserves around Sheffield. Its central sources are surveys conducted by the author and his students into local authority provision and the management of particular areas of the country. But despite frequent reference to case studies, it is disappointing that so little detail is given to flesh these out, with the emphasis throughout on quantitative rather than qualitative assessments. The result is a rather dry account, establishing the parameters of the topic but without much broader historical contextualization, other than a whistle-stop overview of the history of rural recreation and access. A number of black-and-white photographs are included, but with little direct link to the text. Tables provide data on activities, staffing and regional variation, and set out the stages by which government continued to revise its approach to how the countryside should be managed, as the Countryside Commission morphed into an Agency, later to be repackaged – following Welsh and Scottish devolution – as Natural England. In essence this furnishes the main theme of the book: tracking the mechanisms by which the state has taken responsibility for managing landscapes, and the future for that provision of access and amenity as those arrangements have been revised, outsourced, and placed in the hands of the Big Society.

The book reads rather like a report, with many subheadings, setting out the parameters of the topic and providing extracts from sources, including prospectus descriptions for various degree courses in countryside management. Yet Rotherham seems to have intended a more argumentative intervention: a comment, and a warning, on the impact of austerity in putting a legacy at risk. His book celebrates a profession that has only really existed since the 1970s and never accounted for much in terms of the numbers of people employed, yet which made (he argues) a significant intervention and became 'a beacon' in the field internationally (p. 330). The history of the late twentieth-century countryside of recreation, country parks, nature reserves and the urban fringe, is only now beginning to be written, and the story of the countryside managers clearly deserves further exploration within that research.

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SANDIP HAZAREESINGH and HARRO MAAT (eds.), *Local subversions of colonial cultures: Commodities and anti-commodities in global history* (Palgrave Macmillan, 2016). xi + 213 pp. Hardcover £58, eBook £45.99.

Opening the *Journal of Global History* special issue on Commodities of Empire in 2009, Hazareesingh and Curry-Machado declared, 'Commodities are back in the news' (p. 1). From the 1990s onwards, studies of 'world-changing' commodities, particularly those that are plant-based, have proliferated, their socio-economic and environmental histories often linked to the imperial endeavours of the European nations. The Commodities of Empire research network, of which the editors Hazareesingh and Maat are active members, has built up an impressive online resource (www.commodityhistories.org), illustrated research stories and working papers together emphasizing that, 'Historically, commodities had multiple social lives, partaking both in imperial endeavours and in local resistance to them' (Hazareesingh and Curry-Machado in the *Journal of Global History* 4 (2009), p.2).

Part of the Cambridge Imperial and Post-Colonial Studies series, this edited collection further explores those 'multiple social lives' by documenting local responses to colonial pressure to produce commodities. The concept of the 'anti-commodity' has its origins in a paper by anthropologist Paul Richards and colleagues presented to a workshop of the Commodities of Empire network (subsequently published in that project's already mentioned working paper series and a version of which appears as chapter 1 of this volume). The concept was further explored within the Commodities and Anticommodities collaborative research project (2009–13), and the nine substantive chapters in this book are based on papers delivered at a 2012 project workshop. The 'anti-commodity' is defined, 'as an enduring form of production and action in opposition either to actual commodities and their existing functions, or to wider social processes of commodification, rather than simply a momentary form of protest or reaction' (p. 6). The relationship between 'commodity' and 'anti-commodity' can be and is often complementary and mutually dependent. Chapters thus deal with the familiar and popular plant-based commodities of rice (the subject of three chapters), cotton (two chapters), tobacco and sugar, but in unfamiliar and non-traditional ways, and some in new geographical settings. The plantation crops are joined by contributions on transport infrastructure (David Hyde's chapter on 'East African Railways and Harbours') and organic 'waste' (Lauren Minsky's chapter manure in the Punjab), the collection thus addressing a full commodity lifecycle. At a practical level each chapter has a helpful and comprehensive notes section detailing supporting literature and archival materials for what are inherently complicated histories.

Importantly, as Maat has argued elsewhere, 'Anti-commodity thus refers to production processes in the shadow of commodity production and for those reasons these processes rarely have a prominent place in official records and statistics' (in Francesca Bray *et al*. (eds), *Rice: Global networks and new histories* (2015), p. 337). The book thus outlines what might be done to bring these processes into view, demonstrating how the stories can be told and highlighting the available research materials available. It will appeal particularly to those working on agrarian history in Africa, Asia and the Caribbean but the legacy of much commodity policy as it affected both peoples and environments means that much of the research also has contemporary relevance.

As the editors themselves acknowledge, the chapter authors apply the 'anti-commodity' term in a variety of ways, even when exploring the same crop: Richards sees red and white rice in Sierra Leone as contrasting commodities of the slave trade and emancipation respectively; Maat considers the competing commodities of upland and lowland rice in the Netherlands Indies; and Gilbert deals with the Swahili coast as a place where rice has never been treated as a commodity, and instead is consumed because of its links to identity. Although this approach serves to emphasize the importance of context, the danger is that it leaves the reader without a clear sense of how the term 'anti-commodity' might be most usefully applied.

Research and experiment emerges as an important theme in a number of the chapters that explore government sponsored 'improvement'; the dynamism of seed technology; the complexity of varieties, and genetics and hybrids (something I certainly found difficult to get to grips with in my own work on cinchona). Specifically, Sinha-Kerkhoff provides insight into the tobacco research of the Pusa Institute, Eastern India, where Albert Howard's recognition of the connections between healthy soil and healthy crops, livestock and populations later helped to establish him as a pioneer of the organic farming movement. Hazareesingh's case study of cotton in Dharwar, Western India also emphasizes recognition of indigenous methods of cultivation and climate knowledge. Though all are social histories, environment and ecology also loom large, demonstrating the 'intimate entanglements' that exist 'between the natural and human worlds' (p. 5), with the importance of very particular geographies and local stories highlighted. Given my current research interests in the weather, I particularly enjoyed Hazareesingh's section on unseasonable seasons and 'wind blight'.

Maravanyika's chapter uncovers the role of traditional religion and religious leaders in shaping response to colonial policy on the cultivation of cotton in Gokwe, north-west Zimbabwe, a story again with a legacy that remains evident today. Minsky's exploration of the productive value of organic waste in South Asia is one that makes an important contribution to contemporary studies of sanitation. In Hyde's account of the East African Railways and Harbours, 1945–60, labour power becomes the anti-commodity. There is a link here to Curry-Machado's chapter through the differential rates, and the methods and users of railways and roads in the very particular geography of sugar-cane cultivation in the Remedios region of Cuba.

As 'the success of these ventures still depended on knowledge of, as well as attitudes towards, the encountered local cultural and natural worlds' (p. 2), misunderstandings of both people and environments resulted in histories that are full of constant change, modification, and of ever shifting categories. Binaries and opposites are prominent, but not static, and it is interesting to read about how two (or more) very similar products come to be assigned very different values (not just economic) on the basis of consumer taste, or connections with local identity. For me, colour also popped out as a cross-cutting theme that might be further explored: red and white rice, yellow and black tobacco, red and black soils.

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Conference Report
The Society's Winter Conference, 2015
'Occupations, work and gender in rural Britain, from the fourteenth to the twentieth century'

by Imogene Dudley

The annual Winter Conference was held at the familiar location of the Institute for Historical Research in London. The wide-reaching theme and a strong cast of speakers ensured a healthy turnout of members. The first paper, from Professor Richard Smith of the University of Cambridge, asked the question 'How agricultural was the employment structure of England in 1381?' After establishing that England was primarily agrarian, with only a minority urban population, the focus was on the accuracy of the data gathered for the 1381 poll tax. He reviewed the previous work of Clark (2013), who used the data from 335 vills in addition to Oxford and York, adding up to 26,000 people, and Broadberry *et al* (2015), who utilized information from 22 counties, amounting to 30,000 people in 892 vills. There are three primary issues with these sources, which were recognized by Clark and emphasized by Professor Smith. First, that the labelling of male occupations is problematic, with the term *filius* being especially vague; second, that only an extremely small minority of women were assigned an occupation, being more frequently referred to by their marital status, and third, the physical deterioration of the sources themselves. It was found that both men and women with known occupations worked in the categories of agriculture, industry (including mining) and service. The large urban share in the samples affected the findings considerably. The assignation of 'labourer', found to refer to 15 per cent of Broadberry's sample and 16 per cent of Clark's, is problematic: manual labour, certainly, but pertaining to which of the above categories?

One of Smith's criticisms of Broadberry *et al* was their assumption that women worked only 30 per cent of the available days due to childcare and housewifely duties, an assumption derived from nineteenth-century census data. Professor Smith argued that this does not allow for single women or the economic reality of post-Black Death society. In the poll tax sources, the most common occupation for women was service, but this excludes the valuable economic labour (inside and outside the household) of the wives and daughters of the male taxpayers, work which was hidden by the nature of the data source. It was concluded that both studies failed to be cautious about the nature of the sources used, the poll taxes of 1377, 1379 and 1381. All of these heavily underrepresented women and the hugely unpopular poll tax of 1381 saw significant evasion. The discrepancy is evident when the results of all three poll taxes are reviewed together. The designations of 'servant' and 'labourer' were used interchangeably and, in 1381 especially, there is a marked lack of young men and single women. In the future, these issues should be carefully considered, especially the absence of women and how to treat wives and daughters of farmers whose work was valuable but went unmentioned.

Second on the programme was Professor Jane Whittle of the University of Exeter. She gave a paper entitled 'So what is work exactly? Examining women's and men's work activities in early modern rural England'. It outlined the difficulties of determining a definition of work for the project she is currently undertaking with Dr Mark Hailwood. This is an exploration of women's waged work in early modern England in the rural south-west which is funded by the Leverhulme Trust. Professor Whittle described two main methodological issues which had to be surmounted. The first she

referred to as the 'domestic work' problem. Women's work has often been described as 'domestic'. This refers to the types of tasks typically undertaken by women (housework), the location of female labour (in the household) and the market orientation of women's work (goods produced for household use). The use of the term 'domestic' is unhelpful when related to early modern sources. Even 'domestic servants' cannot be found in pre-1700 records; instead, qualifiers such as 'best' or 'common' servant, or specializations such as 'dairymaid' and 'maltmaid' are used. The second main methodological issue was the 'boundaries of economy' problem. Historians have attempted to separate household work from economic production, where in reality this production boundary was hazy. The household was central to all means of production and not designated as a private and domestic sphere. Men would do unpaid work in the household and women rarely spent more than half their time on housework. There was no contemporary division – all work was done for the survival of the household. In 1923, Margaret Reid argued that if unpaid tasks – such as cooking, cleaning and childcare – could be performed for wages elsewhere, then they should be counted as work.

Professor Whittle then outlined the details of the project itself. It seeks to apply Reid's 'third party criterion' to England for the first time. It will illuminate women's work, more specifically the location, hours and commercial orientation, through examining church court depositions, quarter sessions examinations and coroner inquests. However, the issues faced by the project have been considerable: deciding what to include and exclude, setting up workable databases and widening its scope from incidental evidence to anything work related in the sources. It had been decided to exclude theft and legal related work, as these would be over represented due to the nature of the sources. Another exclusion is instances of people 'ordering', 'asking' or 'willing' someone to do work, unless this specifically involved time or travel, a decision of practicality rather than principle. Professor Whittle then presented preliminary results of the project. These have shown that most categories of work were performed by both sexes, although there was a gender division of labour within these categories. 'Domestic' work, as predicted, has been difficult to classify, as people were paid to do housework and products made in the home were sold elsewhere. Further details and updates on the project can be found on its website, earlymodernwomenswork.wordpress.com.

After a buffet lunch, which afforded the opportunity to mingle and discuss the morning's papers, the conference reconvened for two more talks in the afternoon. Dr Sebastian Keibek and Dr Leigh Shaw-Taylor, of the University of Cambridge, presented a highly empirical paper entitled 'The (male) occupational structure of rural England and Wales, 1381–1911'. This involved data and theories from a project currently being run by the Cambridge Group for the History of Population and Social Structure, which is funded primarily by the Economic and Social Research Council, the Leverhulme Trust, the Isaac Newton Trust and the British Academy. The sources used are the 1377–81 poll taxes, sixteenth-century coroner's inquests, baptisms and censuses. These chart a modest change over the medieval period, with a small decline in agriculture and an increase in secondary and tertiary industries. The period 1650–1750 saw the masculinization of agriculture, with a modest diversification of the secondary sector and then a rapid labour-intensive shift to the secondary sector due to increased consumption. There was a similarity to Professor Smith's paper in the difficulty in attributing the occupational status of 'labourers'. The proportion of labourers working in agriculture declined from 84 per cent in the early nineteenth century to 73 per cent in 1851. This varied from county to county, ranging from 40 per cent to 90 per cent, with the highest in the south east and the lowest in Wales and the north, areas which possessed mainly small, family farms. Data from probate accounts are heavily biased and need to be calibrated with other local data such as parish registers to gain a more accurate picture. Farmers moved to less labour-intensive crops towards the end of the period whilst the tertiary sector grew in the nineteenth century. The paper's conclusions were that a focus was needed on regional patterns, rather than national, in addition to the interplay between regional specialization and British economic success.

The final paper of the conference was given by Dr Nicola Verdon of Sheffield Hallam University, on 'Gender, class and meanings of work in the Great War: the Women's War Agricultural Committees (WWACs).' Due to no contemporary attempt to centralize records, the social composition and work of these committees remain mostly unknown. They were initially formed in February 1916 to encourage young women to perform much needed agricultural labour instead of defecting to better paid industrial work, and there were 63 WWACs country-wide by the summer. However, they faced many challenges. They were sub-committees to the War Agricultural Committees, who could refuse to cooperate with their female counterparts. No official rules were issued, leaving the committees with freedom but also meaning that their success depended on the

efficiency of the women who ran them. Dr Verdon made the Bedfordshire committee her focus due to the extensive surviving records. It was led by well-known members of county society who already had extensive experience of volunteering and sitting on committees. There were many reasons an upper middle class woman would involve herself: not only was it often an extension of duties they already undertook, they also possessed the time, resources, social capital and the self-confidence to make a difference. In some instances both a husband and wife had seats on the relevant War Agricultural Committees. The WWAC divided the county into 15 districts, each with their own representative on the committee, and attempted to increase the numbers of female agricultural workers through demonstrations and recruitment drives. From 1917, the focus was on establishing and promoting the Women's Land Army, which initially had a slow uptake. Problems included finding suitable accommodation, negotiating between the landladies, farmers and workers, and the expense of training and housing the women. The Bedfordshire WWAC saw the welfare of the women as a priority, attempting to oversee conditions and provide wholesome leisure activities. After the war was over, numbers of female agricultural workers decreased, which suggests that the majority did not view the work as transformative, although 60 women were kept on independently in the county. Overall, an exploration of the WWACs highlights the complexity of female agricultural employment on a local level, the difficulties in getting women to register and the practical issues in attempting to train, feed, house and supervise a women's land army.

The day concluded with an expression of thanks towards Dr Paul Warde for organizing the conference, in addition to a reminder that members can now pay online for events and publications. It was also announced that a prize has been established in the name of Joan Thirsk, whom many will remember with affection. This will be awarded annually by the society for the best book in British or Irish rural or agrarian history. Any donations towards the prize fund in Joan's memory are hugely welcomed, either via the website or a cheque to the Treasurer.

THE

AGRICULTURAL HISTORY REVIEW



a journal of agricultural and rural history

Volume 64, Part II
2016

Agricultural History Review
Volume 64 Part II 2016

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Forthcoming conferences

BAHS Spring Conference 2017

The Spring Conference will take place from
Monday 3 April to Wednesday 5 April
at Plumpton College, near Lewes, East Sussex.

Speakers will include Professor Clare Griffiths (Cardiff University), Dr Harvey Osborne (University of Suffolk), Dr Mark Gardiner (Queen's University, Belfast), Professor Louise Curth (University of Winchester), Professor Cherisse Jones-Branch (Arkansas State University), Professor Maggie Andrews (University of Worcester) and Dr Annie Tindley (University of Newcastle).
There will be a new researchers session and a field trip to the Weald and Downland Living Museum. Please join us for a friendly and inspiring conference in a charming rural location.
For more details see the Society's web site, www.bahs.org.uk

Rural History 2017

The forthcoming conference will take place in Leuven (Belgium) from Monday 11 to Thursday 14 September 2017, hosted by ICAG (the Interfaculty Centre for Agrarian History, University of Leuven), in collaboration with the CORN (Comparative Rural History of the North Sea Area) research network.
For more details see the conference web site,
kuleuvencongres.be/ruralhistory2017

Turf wars: conflict and cooperation in the management of Wallingfen (East Yorkshire), 1281–1781*

by David Crouch and Briony McDonagh

Abstract

This paper explores the origins and management of Wallingfen, a large tract of waterlogged marshes and carrs near Howden in the East Riding of Yorkshire. Subject to annual flooding throughout much of its history, the area was utilized by the surrounding parishes and townships throughout the medieval and early modern period, providing a range of important resources to the neighbouring communities including fish, fowl, turves and summer grazing. In this it had much in common with wetland commons elsewhere in England and on the Continent. Yet while the East Anglian fens and the Lancashire mosses were being drained and enclosed in the seventeenth century – as too were the wetlands around the southern shore of the North Sea basin in Denmark, Germany and the Netherlands – Wallingfen remained wet, marshy and entirely unsuitable for arable agriculture long into the eighteenth century. In other ways too, Wallingfen was highly unusual. Not only was a true form of intercommoning practised here until parliamentary enclosure under an act of 1777, but there is also evidence of a cooperative system of wetland management which fell outside the direct authority of the neighbouring manors or any higher form of overlordship.

Marginal, watery landscapes have long been areas of fascination for historical geographers, archaeologists, economic historians and landscape scholars alike. The labour put into mediating the relationship between land and water over many hundreds of years – and more specifically the distinctive landscapes produced by this wresting of productive arable land from the marsh and fen – have been subjects of continued interest from the time of H. C. Darby and W. G. Hoskins onwards.[1] For many, this has been a story about long-term environmental

* We would like express our gratitude to the two anonymous referees for their generous and very helpful comments and to colleagues at the University of Hull – including Malcolm Lillie, Peter Halkon and Greg Bankoff – who kindly read and commented on a draft of the paper. Thanks too to Professors Michael Turner and John Marriott and the staff at the East Riding of Yorkshire Archives Service and Hull History Centre, and to Tim Bettley for help with the map.

[1] H. C. Darby, *The medieval fenland* (1940); W. G. Hoskins, *The making of the English landscape* (1955), pp. 95–100; J. Purseglove, *Taming the flood. A history and natural history of rivers and wetlands* (1988); H. Cook and T. Williamson (eds), *Water management in the English landscape. Field, marsh and meadow* (1999); S. Rippon, *The transformation of coastal wetlands: exploitation and management of marshland landscapes in north west Europe during the Roman and medieval period* (2000).

change, of the progressive reclamation of the land from the sea and the making of the landscape as we see it today. As Hoskins put it, 'the successful attack on fen and marshland [had] begun well back in Saxon times' and continued for more than a thousand years, eventually producing the characteristic pattern of straight roads, drains and field boundaries we now see in the East Anglian fens and elsewhere.[2]

In an English context at least, far less attention has been paid to the functioning of these landscapes in the period before their drainage and enclosure. Scholars are well aware that communities on the marshland or fenland edge utilized the resources of these ecologically rich areas. Yet we know relatively little about how common rights were managed in English wetland environments, despite a growing body of research on the governance of common-pool resources in a northern European context. This new work on the commons and communities of the North Sea littoral has important things to teach us, not least in relation to the 'silent revolution' by which commons governance emerged in the medieval period and about relations between community action and private property interests in flood-prone landscapes. Here we are thinking in particular of the work of Tine de Moor on commons as an example of 'corporate collective action' and of Tim Soens and others on the so-called 'dyke solidarity' which characterized parts of the Danish, German and Dutch Polders, a solidarity which was always negotiated, often contested and sometimes imposed on unwilling communities and individuals.[3] In bringing this work to bear on the origins and ongoing governance of English wetland commons, we go some way towards answering the call – recently voiced by Greg Bankoff – that historians must acknowledge 'the wider history of how the risk of water has shaped both land and society in its enviro-cultural context' across the wider North Sea Basin.[4]

In this paper, we present a case study from the English lowlands on the management of a large, 4500-acre wetland common close to Howden in the East Riding of Yorkshire over a

[2] Hoskins, *Making*, p. 79.

[3] T. Soens, 'Explaining deficiencies of water management in the late medieval Flemish coastal plain, 13th–16th Centuries', *Jaarboek voor Ecologische Geschiedenis* (2005/6), pp. 35–61; M. L. Allemeyer, '"The world according to Harro": Mentalities, politics and social relations in an early modern coastal society', *German Historical Institute Bulletin, Supp.* 3 (2006), pp. 53–77; T. de Moor, 'The silent revolution: A new perspective on the emergence of commons, guilds, and other forms of corporate collective action in Western Europe', *International Rev. of Social Hist.* 53 (2008), Supplement, pp. 179–212; D. R. Curtis, 'Tine De Moor's "Silent Revolution". Reconsidering her theoretical framework for explaining the emergence of institutions for the collective management of resources', *International J. of the Commons* 7 (2013), pp. 209–29; R. van Weeren and T. De Moor, 'Controlling the commoners: Methods to prevent, detect, and punish free-riding on Dutch commons in the early modern period', *AgHR* 62 (2014), pp. 256–77; T. Soens and P. De Graef, 'Polder mania or marsh fever? Risk and risk management in early modern drainage projects: the case of Kallopolder, Flanders, 1649 to 1662', *AgHR* 62 (2014), pp. 231–55; M. Van Tielhof, 'Forced solidarity. Maintenance of coastal defences along the North Sea Coast in the early modern period', *Environment and Hist.* 21 (2015), pp. 319–50; T. de Moor, *The dilemma of the commoners: Understanding the use of common-pool resources in long-term perspective* (2015); D. R. Curtis, 'Danger and displacement in the Dollard: The 1509 flooding of the Dollard Sea (Groningen) and its impact on long-term inequality in the distribution of property', *Environment and Hist.* 22 (2016), pp. 103–35.

[4] G. Bankoff, 'The "English Lowlands" and the North Sea Basin system: A history of shared risk', *Environment and Hist.* 19 (2013), pp. 3–37, see p. 5 for the quote. See too E. Thoen, G. J. Borger, A. M. J. de Kraker, T. Soens, D. Tys, L. Vervaet and H. J. T Weerts, *Landscapes or seascapes? The history of the coastal environment in the North Sea area reconsidered* (2013).

period of several hundred years. In some measure Wallingfen was no different from other marshes and wastes, providing many of the same resources to neighbouring communities including fish, fowl, rushes and turves for fuel. It flooded in winter, but provided grazing to the commoners of neighbouring communities for at least a few months every summer. It was similar in environmental terms to the wetland commons all around the Humber estuary – in the Humberhead Levels, Hatfield Chase, and the Isle of Axholme, for example – and to a greater and lesser extent to those further afield in Lancashire, Somerset and East Anglia.[5] Yet while the East Anglian fens and the Lancashire mosses were being drained and enclosed in the seventeenth century – as too were the wetlands around the southern shore of the North Sea Basin in Denmark, Germany and the Netherlands – Wallingfen remained wet, marshy and entirely unsuitable for arable agriculture long into the eighteenth century. In other ways too, Wallingfen was highly unusual. Not only was a true form of intercommoning practised here until parliamentary enclosure, there is evidence too of a cooperative system of wetland management which fell outside the direct authority of the neighbouring manors or any higher form of overlordship. The survival of an unusual body of late medieval and early modern documents for Wallingfen provides exciting opportunities to delve into the historical geographies of the fen, its resources and their management. This paper explores issues of cooperation and conflict in the management of the common up to its enclosure in 1781.

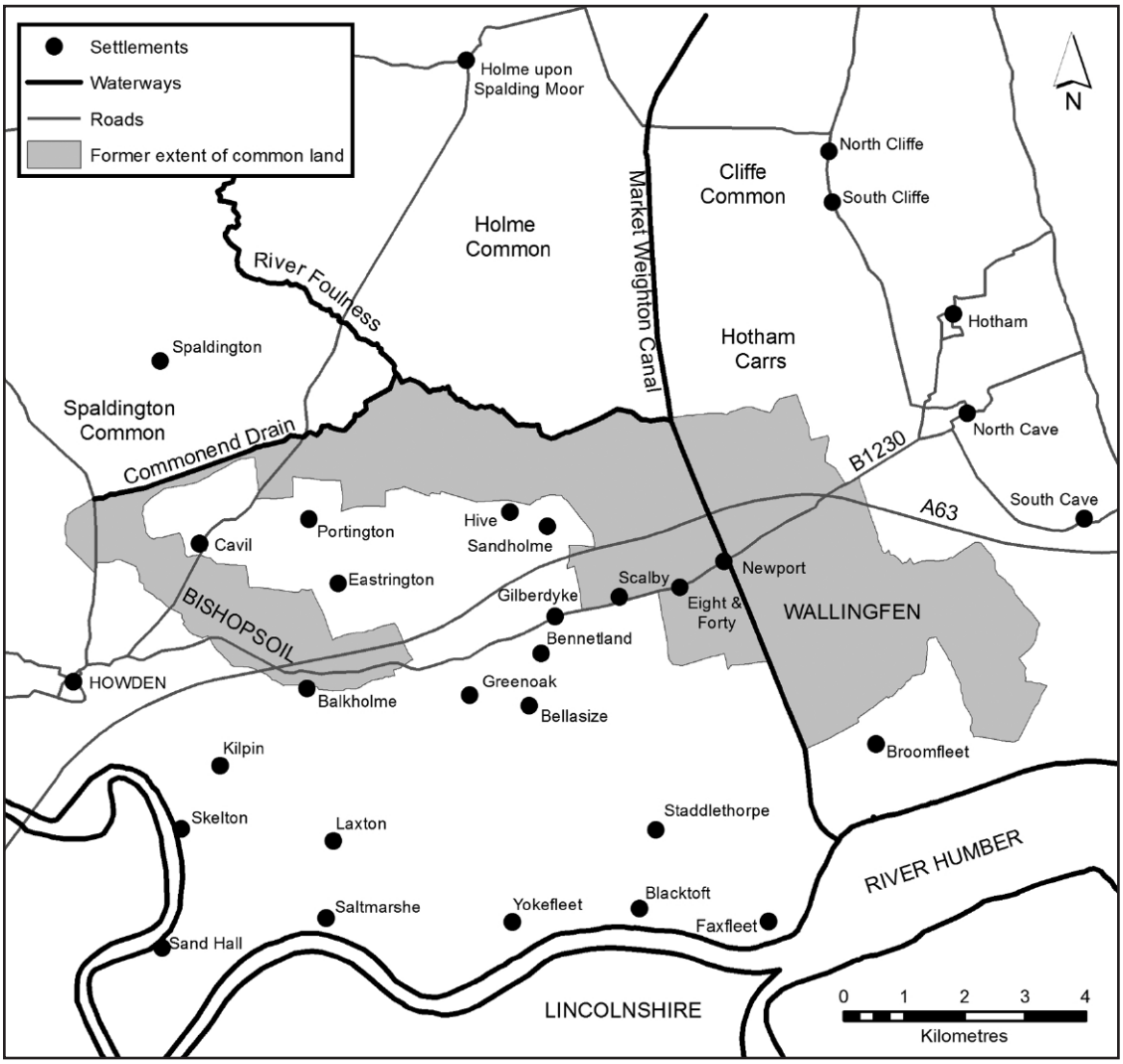
The paper is divided into five main sections. The first offers a brief historical geography of the fen, putting Wallingfen on the map as it were as well as charting its early history and reflecting on the question of the origins of common rights in the wetland. The second focuses on Wallingfen's medieval court and its records, exploring what they reveal about its genesis. The third examines the court's functions as they related to the management of water in the fen and the utilization of wetland resources including grazing rights, fish, fowl and turf. It also explores the court's role in managing conflict and encouraging cooperation. The fourth briefly outlines Wallingfen's later history including the details of its eventual enclosure, while the fifth offers some concluding comments.

I

Described by Arthur Young in 1769 as 'low, flat and disagreeable', Wallingfen ran in a broad arc from Howden in the west to North Cave and South Cave in the east (see Figure 1).[6] It was bounded on the north by the River Foulness or Foulney, which emptied into the Humber estuary at Skelfleet, a tidal creek in Broomfleet township. To the south of the fen lay the settlements and arable lands of Howdenshire – large parts of it reclaimed from the

[5] J. Thirsk, 'The Isle of Axholme before Vermuyden', *AgHR* 1 (1953), pp. 16–28; M. Williams, *The drainage of the Somerset Levels* (1970); K. Lindley, *Fenland riots and the English Revolution* (1982); Purseglove, *Taming the flood*, pp. 49–52; C. Taylor, 'Fenlands', in J. Thirsk (ed.) *The English rural landscape* (2000), pp. 180–81; J. Bowring, 'Between the Corporation and Captain Flood: The Fens and drainage after 1663', in R. W. Hoyle (ed.), *Custom, improvement and the landscape in early modern Britain* (2011), pp. 235–62; W. D. Shannon, 'The survival of true intercommoning in Lancashire in the early-modern period', *Agricultural Hist.* 86 (2012), pp. 169–91.

[6] Cited in J. Crowther, *Descriptions of East Yorkshire: De La Pryme to Head* (East Yorkshire Local History Soc. 45, 1992), p. 25.



MAP 1. Wallingfen and the surrounding district on the eve of enclosure.

Map by T. Bettley and B. McDonagh.

wetland in the twelfth century – and the hamlets of Broomfleet, Faxfleet and Blacktoft on the alluvial levee along the banks of the Ouse. While the surrounding settlements lay on higher, drier land – the Caves on the western dip slope of the Yorkshire Wolds, Holme church on a small hill and Howden on an outcrop of sand – Wallingfen itself was lower-lying and poorly drained.

Palaeo-environmental evidence suggests that the area had once been heavily wooded, but the landscape seems to have oscillated between estuarine and drier conditions since the last Ice Age. The area was subject to marine transgressions in the fifth millennium BC and again sometime between 800 and 500 BC, creating an estuarine inlet of the River Humber fed by

a dendritic creek system.[7] The sea level later receded, yet much of the area was still close to or even below mean sea level and the combination of tidal inundations and the low gradient and general sluggishness of the main watercourse emptying the valley – the Foulness – meant that the area was frequently under water. Its very name indicates how difficult a landscape it had long been. The earliest form (recorded in 1228) is *Walefen*, and the '*Wale-*' element is likely to derive from the Anglian *Wala,* the genitive plural of *Walh* interpreted (as in Wallasey near Liverpool) as 'Britons', or possibly otherwise as 'outsiders' or 'slaves', which suggests the ancient fen was long occupied only by marginal and dispossessed folk.[8] By the time of the Domesday survey – in which not being geldable, the fen received no mention – Wallingfen was an extensive area of waterlogged carrs and marshes, with outcrops of peat and at least two large meres at Oxmardike and Yapley.[9] The only through route across this watery landscape was by a communally maintained causeway – first documented in the fifteenth century, but probably in existence much earlier – which ran from North Cave to Gilberdyke and from there on to Howden, most likely along the route of the present B1230.[10]

Estimated at almost 4500 acres at the time of enclosure in 1781, the marsh and fenlands had once been even larger. To the west, Wallingfen linked up with another large area of common, a mixture of wetland, woodland and pasture, known in the seventeenth century as Bishopsoil, lying in Howden lordship and administered by officers of the bishop of Durham in his capacity as chief lord. To the north of the river Foulness lay the commons of Spaldington, Holme-on-Spalding-Moor, Market Weighton, South Cliffe and Hotham, almost certainly once part of a larger Wallingfen but detached from the area south of the Foulness by at least the mid-fifteenth century.[11] Further south, the settlements between the fen and the Humber had themselves been reclaimed from the marsh in the post-Conquest period when warmer, drier conditions combined with the cutting of drains to allow for an expansion of settlement and cultivation.[12] A series of drains leading from the fen, known as Hansardam, Thornton Dam

[7] P. Halkon, 'The Holme Project', in R. Van de Noort and S. Ellis (eds), *Wetland heritage of the Vale of York* (1999), pp. 133–8; P. Halkon and J. Innes, 'Settlement and economy in a changing prehistoric lowland landscape: An East Yorkshire (UK) case study', *European Journal of Archaeology* 8 (2005), pp. 225–59; P. Halkon, *Archaeology and environment in a changing East Yorkshire landscape: The Foulness Valley,* c. *800 BC to* c. *AD 400* (British Archaeological Reports, 472, 2008); P. Halkon, J. Innes, A. Long, I. Shennan, T. Manby, G. Gaunt, A. Heath, P. Wagner, J. Schofield, D. Schreve and D. Roe, 'Change and continuity within the prehistoric landscape of the Foulness Valley, East Yorkshire' *East Riding Archaeologist* 12 (2009), pp. 1–66.

[8] A. H. Smith, *The Place-Names of the East Riding of Yorkshire and York* (1937), p. 248. The name form shift from 'Wallefen' to 'Wallingfen' is likely by local analogy with adjacent Spalding Moor or Fen.

[9] Oxmardike Mere lay close to where the canal and railway line cross and Yapley Mere or Yapley Marr lay south of Sandholme Landing. A reference of 1492 talks of '*lez pittes aquar(ii)* in the fen' (Hull History Centre [hereafter HHC], U DDBA/10/2, m. 1d).

[10] HHC, U DDBA/10/2 m. 1d.

[11] The 1456 admeasurement is referred to in HHC, U DDHA/4/19; J. Sheppard, *The drainage of the marshlands of South Holderness and the Vale of York* (East Yorkshire Local History Ser. 20, 1966). The Foulness's course of 'Langedike' is described in the fifteenth century as demarcating Howdenshire from Spalding Moor (HHC, U DDHA/17/1).

[12] Warmer, drier climatic conditions from the mid-tenth century onwards – known as the Medieval Warm Period – probably helped to make the area more accessible to drainage, even whilst increased storminess in the thirteenth century may have contributed to heightened flood risks in lowland areas across the North Sea Basin including Wallingfen. See T. Williamson, *Environment, society and landscape in early medieval England. Time and topography* (2013), pp. 42–5

and Temple Dam had been cut before 1180 under the leadership of Bishop Hugh du Puiset of Durham (1153–95) whose dramatic campaign of the 1160s and 1170s drained the wetlands of southern Howdenshire from Wallingfen west as far as Kilpin.[13] As a result, new townships emerged along the banks and dikes at places like Bellasize, Gilberdyke, Gowthorpe, Greenoak and Sandholme, all first recorded in the thirteenth century, settlements whose need for pasture was to shape the future of neighbouring Wallingfen.[14]

Travelling from Hull to Howden *c*.1540, the antiquary John Leland described Wallingfen as follows:

> From North Cave to Scalby three miles, all by low marsh and meadow ground, leaving the arm of the Humber on the left hand in sight. This fen is commonly called *Waullyng Fenne*, and hath many carrs of water in it; and it is so big that fifty-eight villages lie in and abutting on it, whereof the most part be in Howden lordship belonging to the bishop of Durham, and part in Harthill Hundred. The fen is sixteen miles in compass and is all of Howdenshire.[15]

In truth there were actually 48 rather than 58 townships intercommoning the fen – as the surviving medieval and early modern sources demonstrate – but Leland's account does underline both the size of the wetland and the potential complexities of its management. Leland may not have known it, but rather than being divided between the various townships Wallingfen was subject to what William Shannon has recently called 'true intercommoning'.[16] Thus the boundaries between the surrounding parishes and townships ran up to but not across the fen and each community exercised rights across the whole of the fen rather than being restricted to any one part of it. Such an arrangement was distinct from the more usual form of communing *pur cause de vicinage*, a state of affairs where the parish or township boundaries were known – if not demarcated on the ground – but neighbouring manorial lords agreed not to pursue cases of trespass against those whose animals moved across the boundary between townships.[17] The latter arrangement was – according to Shannon – reasonably commonplace in parts of sixteenth-century England, while true intercommoning was considerably rarer. This was especially the case after about 1600, by which time the logic of common law property had seen many intercommoned areas partitioned if not necessarily physically enclosed.

Leland was wrong too about Wallingfen lying within Howdenshire. The townships to the south of it may have been part of the bishop of Durham's post-Conquest lordship of Howden,

Note 12 *continued*
on long-term climatic changes in the medieval period; H. H. Lamb, *Climate, history and the modern world* (1982, sec. edition, 1995), pp. 175–6 on storm risks; but also S. Rippon, 'Human impact on the coastal wetlands of Britain in the medieval period', in Thoen *et al*. (eds), *Landscapes of seascapes?*, pp. 333–51, who argues that the late medieval climatic deterioration had a limited impact on coastal communities, particularly where land was protected by sea walls rather than natural coastal barriers.

[13] Sheppard, *Marshlands*, p. 15; D. Crouch, 'Caville manor and the enterprise of the twelfth-century bishops of Durham,' *Yorkshire Archaeological J.* 86 (2014), pp. 124–37.

[14] K. J. Allison, *The East Riding landscape* (1975), p. 73.

[15] L. Toulmin Smith (ed.), *Leland's Itinerary* (4 vols, 1907–11), I, pt 1, p. 51. Leland used the term 'carr' in its earliest sense to refer to a pool or pond, but it is otherwise used here to refer to wetland supporting willows, alders, sedge or low-growing bushes (c.f. Oxford English Dictionary). The terms 'seave carr' and 'turf carr' also appear in the Wallingfen records.

[16] Shannon, 'Intercommoning', p. 174.

[17] Ibid., p. 173.

but the fen lay outside the bounds both of the neighbouring manorial lordships and of the surrounding ecclesiastical parishes. In this it was highly unusual, an anomaly in the tenurial map of medieval England where notionally all land belonged to the king and under him, to a landlord of some sort.[18] Even intercommoned land was usually vested either in manorial lords or in some kind of overlord, but Wallingfen – at least as far as we know the situation after 1425 – had neither. Quite how such a large area of land came to lie outside the usual system of landholding is unclear, although the fact agriculture was so severely limited by the waterlogged nature of fen and the area subject to many months of seasonal inundation – especially before the thirteenth century – may partially explain this.

In its origins it may be that Wallingfen and the neighbouring areas of common land are relics of a larger Anglian shire or commote common, as Paul Vinogradoff, J. E. A. Jolliffe, Glanville Jones and William Shannon have all argued may be the case for large areas of intercommoned land in other parts of England and Wales.[19] Wallingfen lies at the intersection of three Domesday hundreds – Howden to the west, Weighton to the north and Cave to the east – and it may be that the common rights had been originally vested in the neighbouring multiple estates (themselves the focus of the pre-Danish hundreds) who shared access to the fen and its resources. The only surviving pre-Conquest charter for the area is suggestive in this regard. When the Anglian multiple estate of Howden was granted by King Edgar to the lady Cwen in 959, the estate had as one of its bounds the watercourse of *Fulanea*.[20] The Foulness, of course, was the main watercourse running through Wallingfen and it may be that some or all of the common south of Foulness lay within – or was in some way subject to – the lordship of Howden in the mid-tenth century. The tenth-century state of affairs can still be glimpsed in the fact that the Howdenshire townships of Barmby and Asselby, both of which lay outside the Howden multiple estate in 959, did not subsequently have common rights on Wallingfen nor any share in the enclosure award of 1781. It would seem then that the common rights as they were recorded in the medieval and early modern court records preserved much earlier arrangements, possibly even of pre-Danish date.

Yet if Wallingfen once lay within the Anglian multiple estate, or was in some way attached to it, it had been detached from the lordship of Howden at a relatively early date, certainly before the bishop of Durham acquired Howdenshire from the Conqueror *c*.1080. Thus the 1265 details of the tithing areas of the prebends of the minster of Howden reveal that the ancient church claimed no tithe from outside the bounds of the then lordship of Howden, and its parish did not then or thereafter include any part of Wallingfen. The Hundred Rolls of 1276 – the most comprehensive survey of jurisdiction and lordship undertaken in medieval England – also fail to mention this large area of wetland. The fen lay outside the liberty of Howdenshire in legal matters: Wallingfen does not appear in any Howden halmote roll and the liberty court made no presentments to the sheriff's tourn concerning it at any period between the fourteenth and the eighteenth century.

Although the jurisdiction of the Wallingfen court is described in quite ambitious terms in its own documentation as comprehending a 'liberty' – a word typically used of an honorial

[18] Ibid., pp. 169–71.
[19] Ibid., pp. 178–81.
[20] S. E. Kelly (ed.), *Charters of Peterborough Abbey* (Anglo-Saxon Charters, 14, 2009), pp. 240–7.

jurisdiction such as that of the bishop of Durham at Howden which excluded the sheriff of York – the reality seems to have been less pretentious. The court of Wallingfen only seems to have dealt with the offence of affray or common assault – see for example the pains detailed in a lost ordinance of 1425 with instances mentioned in 1492 and 1532 – as would any halmote or court leet, the oddity here being that the offences being tried were not being heard within a manor but in an extra-judicial area divorced from view of frankpledge. Major criminal pleas of larceny and murder committed on the fen came before the sheriff of York or his bailiffs. Thus, unlike in Howdenshire, the sheriff of York had entry to Wallingfen as is known from two fourteenth-century cases. A jury of Harthill wapentake presented a William son of Geoffrey of Balkholme for the murder of John son of Richard of Sandholme in the *mora de Walnyngfen* in August 1302. William was arrested at the sheriff of York's order and was later to die in gaol.[21] From this it seems that the sheriff exercised by default direct control over presentments to crown pleas on Wallingfen which – unlike Howdenshire – did not come under the intermediate jurisdiction of the bailiff of Howden even though the home township of the alleged murderer and his victim lay within the liberty. The murder took place on the fen in the summer season while the beasts were pastured there and the common was more frequented. Another medieval capital plea relating to Wallingfen is mentioned in February 1340 when the sheriff indicted one Adam Horshird (the horseherder) for the theft of an ox belonging to Hugh of Craston from *Walyngfen*. Adam was subsequently executed by hanging.[22] He must have been subject to a presentment to the sheriff's tourn from the Harthill wapentake court.

In more than one sense, then, Wallingfen forms a void on the map. Not only was there little in the way of settlement or arable cultivation in the fen, but the wetland – as we can glimpse it in the earliest documents and infer from the later medieval court records – was effectively a blank within the local tenurial and parochial structure. If Wallingfen had had an overlord in the pre-Conquest period, it had certainly been long forgotten by the time the court records begin in 1425. Yet the fen was nevertheless an important resource for those residing in the surrounding townships, as the two early fourteenth-century cases mentioned above suggest. The construction of the twelfth-century dams, later followed by efforts to straighten the river Foulness and increase the speed at which the water drained into the Humber – the new canalized stream known as the Langdyke was cut sometime in the thirteenth century – had the effect of reducing the risk of flooding in the fen.

By the thirteenth century, the neighbouring communities were able to use Wallingfen for summer pasture for several weeks a year and this summer grazing season lengthened considerably over the following centuries, a reflection no doubt of continued efforts to reduce waterlogging and flooding in the fen. The fen thus provided summer grazing for cattle, sheep, horses, pigs and geese that were overwintered in the surrounding villages. Access to such a large resource of grazing land – even if only for part of the year – must have allowed the commoners of the five neighbouring parishes to keep far more stock than they might otherwise have been able to support on the grazing grounds within each parish. It was also an important source of fuel for inhabitants of the surrounding communities – specifically turves and perhaps also peat – as well as fish and wildfowl, rushes for basketwork, thatch, and rushlights, and gorse or

[21] TNA, JUST 1/1108, m. 13d.

[22] TNA, JUST 3/78, m. 3.

whins which could be directly grazed by livestock in the summer or collected for winter use as fodder or fuel. It was the need to manage these important natural resources – essential as they were to the economies of the surrounding communities – that led to the production of the documents used here to shed light on the management of the wetland in the later medieval and early modern period.

II

Much of what we know about the nature of Wallingfen's natural resources and their management over a period of several centuries emerges from a small, but important collection of documents in Hull History Centre. These were produced by a body known variously in its records as the court, congregation or commonalty of Wallingfen. It was in existence by 1425 – and certainly earlier in some form – and its specific remit was the 'commonwealth & good government of the said common', that is, the management of the fen and its resources on behalf of the townships within the surrounding five parishes of Howden, Eastrington, Blacktoft, North Cave and South Cave.[23] Of these documents, three are of particular significance. The first is an original roll extracting orders of the court dating between 1425 and 1543, seemingly compiled out of its annual rolls in the mid-sixteenth century by one of the clerks of Wallingfen court. The second is an eighteenth-century copy of another such Tudor book or roll of precedents, also taken from the lost medieval and early modern court rolls. Additional material and variations between this and the sixteenth-century extracts suggest this was an effort independent of the first book. Thirdly, there is a book of selected sixteenth- and seventeenth-century estreats labelled 'Antient Orders and Rules relating to Wallingfen Court' compiled by clerks to the court, probably in the 1750s.[24]

So while the original medieval court rolls have now been lost or destroyed, these later extracts survived because of the ongoing need to manage common rights in the fen up to its eventual enclosure under a parliamentary act of 1777. Indeed the three books are preserved among the papers of Leuyns Boldero Barnard, a successful lawyer who inherited South Cave East Hall in 1748 and was later a key proponent in the enclosure of Wallingfen.[25] While contemporary interests and concerns for precedent no doubt shaped exactly what the eighteenth-century clerk copied from the earlier rolls, the three books of ordinances are nevertheless valuable sources providing important insights into the functioning of the medieval and early modern court, the management of the wetland resources and their exploitation – and eventual enclosure – by the neighbouring communities. It is to the constitution of the court and the evidence of the court books themselves we now turn.

The year 1425 was selected for the beginning of his record by the Tudor clerk who extracted the earliest rolls. This was not a random decision. At that year's June meeting a gathering of local notables – including two knights and ten esquires, one of them also a royal justice – presented to the commonalty an 'ordynaunce and usage' of the fen which was intended to be binding. Not only that, but it claimed that the ordinances it presented were already ancient and

[23] HHC, U DDBA/10/1.

[24] The clerk who copied these entries knew of records going back to 1425, but seemingly not earlier.

[25] *VCH, East Riding,* IV, p. 44.

that it was in fact repeating 'an old record'. The ordinance outlined the rights of the inhabitants of the townships bordering the fen to cut turves and graze their cattle in the fen, while a similar ordinance of May 1430 reiterated these rights and added orders about the cutting of rushes and gathering of wool on the common. We find that the early summer court was the place where the officers of the court were elected. The commonalty or court of Wallingfen had a two-tier structure of governance which survived until the end of the court's existence in the late eighteenth century: the lords of the manors bordering the fen elected 'surveyors' from among their number while the townships elected men to a much larger body known as jurors or governors, some of whom can be identified as drawn from the yeoman class. Five surveyors were mentioned in 1425 and 1430 and in general the number of surveyors seems to have varied between four and five, though it dropped to only three at times in the seventeenth and eighteenth centuries.[26] The surveyors were assisted by 48 governors known as the Forty-Eight Men, a number which was said in later sources to reflect the number of townships with common rights in the fen. The surveyors and governors together formed a legal entity. While the surveyors' role was to be overseers of the common and its court, the Forty-Eight Men had a commitment towards management of the fen, notably in making presentments to the court for any trespasses committed by men of their townships and monitoring the marking, branding or ringing of livestock to be loosed on to the common. There were also five men elected to oversee forfeited goods, seemingly from amongst the Forty-Eight Men, one from each of the five parishes bordering the fen.

The Forty-Eight Men were listed by parish in 1430, when there were 12 from Howden and South Cave and eight each from Eastrington, Blacktoft and North Cave, the number probably a reflection of the parishes' respective populations. By 1467, however, the governors were listed by township rather than parish, a move almost certainly intended to make those elected answerable for constituencies rather smaller than whole parishes and thus improve monitoring.[27] The Forty-Eight Men were responsible for checking the brands and marks of their own particular townships so localizing their election on their home village would have assisted that. The actual executive actions of the court were, however, necessarily taken by bailiffs acting for the commonalty, who seem to have been employed on a retainer rather than being elected officials. The commonalty also employed workmen for particular works and maintenance, apart from the major works of maintenance of the fen's causeway and the dykes, which fell on various townships. There was also a clerk of the court who compiled and kept the records.

There were two annual meetings of the Court or Congregation of Wallingfen from the beginning of the record we have, which met at one of two locations in or close to the fen: 'the hill called Yald [or Yauld] Hill' (unlocated, but possibly in North Cave: dated occurrences in 1425, 1430, 1660 and 1661) and Scalby Chapel (dated occurrences in 1464, possibly 1532, 1584 and 1665).[28] The two court dates respected a summer season of pasturing on the common, for

[26] HHC, U DDBA/10/1 and DDSA/937(f).

[27] HHC, U DDBA/10/2 (Wallingfen Court Roll), m. 1.

[28] HHC, U DDBA/10/3. A place name of *Aldhall Garth* is attested in North Cave in 1310 (Bodl. Ms Top. Yorks, b 14, p. 337) and may indeed be Yald Hill. There seems to have been no correlation between the two meeting places and the two principal courts, for they are used indifferently of the two times of the year. Note too that in November 1471 the court met at Broomfleet (Hull HC, U DDBA/10/2, m. 1d).

which there is evidence as early as 1302. By 1425 the opening of the common was understood to have long taken place on the feast of St Helen, apparently taken on Wallingfen as 21 May, which must be a local use as the Latin Church customarily placed the feast in August. The first annual meeting of the Court preceded the opening of the fen to pasture, and the second followed its closure. In the fifteenth and sixteenth centuries the latter would seem to have been held to coincide with one of the 'drifts', the driving off of livestock from the fen which occurred in mid-June for some beasts and the middle of July for others. The second court of the year was presumably intended to help adjudicate over any rival claims to stock which occurred as the beasts were driven from the common. By the end of Elizabeth's reign the second meeting was not being held until late September or early October, and an ordinance was laid down at some date in the 1590s that the first court should be held on the first Monday in May ('if it not be St Hellens day') and the second court on the second Monday in October. Clearly by then the ecclesiastical date of St Helen's feast had been forgotten. It also suggests that the summer grazing season lengthened considerably between the early fifteenth century (when it was a mere two months) and the late sixteenth century (when it lasted more than five months), although further work is needed to establish how far this was the result of ongoing drainage schemes and embankment works on the Ouse and Humber, climatic variations associated with changes in relative sea levels, rainfall and temperature, or some combination of these factors.

Importantly, the detailed evidence for the governance of the fen as it appears in the early fifteenth century clearly implies that the arrangements it records were older still. Most significant is the extract taken from a roll of 1425 which refers to precedents established at an earlier time 'as well in the tyme of Thomas Davill, John Davill and Roger Davill and others there ancestors'. The reference is to a series of lords of South Cave East Hall manor: Thomas Daiville died in 1401 and John Daiville in 1409, while a Roger Daiville held the manor in the mid-fourteenth century.[29] It would therefore seem likely that the earliest arrangements for the governance of the fen were administered under the presidency of the Daiville family, and that the curious arrangement of gentry surveyors forming a committee with yeoman governors came about as a result of the family's extinction in 1409. This would also account for persistent (if unsuccessful) attempts of South Cave landlords to claim overlordship of Wallingfen in the fifteenth and sixteenth centuries (on which see below).

As another indicator of the time frame in which the governance of Wallingfen emerged, the election of governors of the fen on the basis of the five surrounding ecclesiastical parishes – as was clearly the case in 1425 – can only have been an arrangement formulated after 1269 and the constitution of a parish of Eastrington out of the former larger minster parish of Howden.[30] It seems then that the Wallingfen court probably first came into existence sometime between 1269 and the 1320s. It is tempting therefore to further narrow the date of the first arrangements for the governance of the fen – as we find it in the rolls of 1425 – to the period of local gentry activism against the bishop of Durham in the last two decades of the thirteenth century. In 1281 no less than 11 local manorial lords and a number of other freeholders under the leadership of Master Thomas of Burland, lord of Burland (in Eastrington parish) and archdeacon of

[29] *VCH, East Riding,* IV, p. 43.

[30] F. Barlow (ed.), *Durham annals and documents of the thirteenth century* (Surtees Society, 155, 1945), pp. 1–2, 164–7.

Northumberland, organized a mass trespass against Bishop Robert de Insula, coursing hares with dogs and asserting common rights 'that they and their ancestors had'.[31] The location of the trespass was on the moor or wood of Blackwood and Storkhawe, a part of what was later to be called Bishopsoil Common between Eastrington and Howden. In the ensuing court case at Westminster some of them admitted that the land (*solum*) in question was the bishop's demesne, but they denied his right to close it off as his warren. Intriguingly amongst this group was Alexander of Cave, lord of South Cave West Hall and of North and South Cliffe, though he was not a suitor of the liberty of Howdenshire. The outbreak has to have been a reaction to the bishop's attempt to limit common rights, and perhaps also to intrude on to Wallingfen, for there is no other reason why Alexander of Cave should have been involved.

It can be argued then that the Wallingfen court emerged specifically as a reaction to attempts by the bishop of Durham to assert control over common rights in the fen. The aggression of successive bishops over their jurisdiction, from Robert Stichill (1261–74) to Anthony Bek (1284–1311), is notorious in other spheres. Its emergence was probably also related to the increased exploitation of Wallingfen in the thirteenth century as the fen became drier as a result of the cutting of Langdyke. It was thus a more valuable resource and disputes over its use probably became increasingly frequent. In this sense, both the 1281 mass trespass and the emergence of the court itself can thus be understood as determined attempts by local manorial lords and the commonalty to protect a valuable resource from over-exploitation, and specifically against the intrusion of the bishop of Durham. This may also help to explain why the court initially fell under the auspices of the Daiville family: as one of the most important landed families in the immediate area, they were the natural choice as overseers of the new institution, with the advantage of not being tenants of the bishop. Crucially, however, the court as we see it in 1425 was not a manorial structure: the gentry surveyors did not exercise manorial or proprietorial rights in the fen. Instead they, the local freeholders and the tenant population were all invested with identical common rights, except as far as serving surveyors were rewarded for their office. Thus while there are clear analogies between the Wallingfen court and other wetland courts – including for example the 'Lords of the Level' who oversaw the sea defences in Romney Marsh from as early as 1250 – there are also important distinctions. The East Anglian Fen Code of 1549 was drawn up under the auspices of the Duchy of Lancaster, for example, and the Romney Marsh court reported to local manorial lords. The Wallingfen court was different in that it represented the commonalty rather than acting on behalf of an overlord, an arrangement that potentially much more akin to 'dike solidarity' seen on the other side of the North Sea in the Dutch Polders or even to the common-property regimes which existed in parts of early modern Sweden.[32]

[31] TNA, KB 27/67, m. 12.

[32] On common property in Sweden, see K. Sunberg, 'Nordic common lands and common rights: some interpretation of Swedish cases and debates', in M. De Moor, L. Shaw-Taylor and P. Warde (eds), *The management of common land in north-west Europe 1500–1850* (2002), pp. 173–94; J. Larsson, 'Boundaries and property rights: the transformation of a common-pool resource', *AgHR* 62 (2014), pp. 40–60.

III

While the previous section has dealt with the court's origins and constitution, this one explores its management of the common in the fifteenth and sixteenth centuries, the period for which the surviving documentation tells us most about the court and its remit. The medieval and early modern court's principal functions were two-fold: firstly, the maintenance of the system of drainage ditches and banks which drained the fen and helped mitigate the risks associated with both tidal inundations and terrestrial flood waters; and secondly, controlling access to and use of the wetland by the local communities. Local communities had no doubt exploited the wetland resources of Wallingfen from the Mesolithic period onwards, but the centuries after the Conquest were marked by ongoing modifications to the landscape aimed at increasing the opportunities for exploitation, specifically with regard to pasture for livestock. Stephen Rippon characterizes the historic exploitation of wetland resources as moving through three key stages: exploitation of existing resources; modification of those resources, typically through water management; and the transformation of the environment as a result of the erection of sea walls.[33] We argue here that in Wallingfen the medieval centuries witnessed a movement from the first of these broad stages to the second, though the third was not achieved until the last quarter of the eighteenth century, with the construction of the Market Weighton Canal and parliamentary enclosure.

Medieval drainage projects included the canalization of the river Foulness as Langdyke sometime in the thirteenth century and the cutting of the various other channels mentioned in the court records.[34] Smaller-scale projects were also documented in other early sources and flood management remained necessary throughout the medieval centuries. Indeed, the earliest reference we have that refers to Wallingfen by name comes from a dispute about the management of water in the fen. In 1228 a commission of local justices was appointed to try pleas of novel disseisin at York which William de Daiville and Alexander of Sancton had arraigned against the hospital of St Leonard (in York) 'over a dyke raised in Wallingfen to the harm of Cave'.[35] Sometime before 1154, Daiville's predecessor at South Cave Robert de Mowbray granted land in Broomfleet to the hospital to which he later added another 32 acres in Cave.[36] It was the hospital's activities on this land which seem to have been the problem in 1228, although it is difficult to be certain about exactly what was at stake. It may have been the construction of a dyke (in the sense of a raised bank to hold back the water) in order to power a watermill at Broomfleet, close to the River Humber.[37] This was presumably the Mill Dam mentioned by the *Victoria County History*, which perhaps lay on Skelfleet. Damming one of the main watercourses draining Wallingfen in order to power the mill would have affected the speed with which water was carried away from the wetlands further north thus increasing waterlogging on the grazing lands utilized by the lords of South and North Cave

[33] Rippon, *Coastal Wetlands*, p. 1.

[34] For an early fourteenth-century reference to Langdyke, see Bodl. Ms Top. Yorks, b 14, p. 336.

[35] *Calendar of Patent Rolls, 1225–32*, p. 213.

[36] A. Saltman, *Theobald Archbishop of Canterbury* (London, 1956), no. 285; D. E. Greenway (ed.), *Charters of the Honour of Mowbray, 1107–1191* (1972), no. 308.

[37] A watermill was mentioned at Broomfleet in the twelfth century, but is said by VCH to have soon silted up rendering the mill useless (*VCH, East Riding*, IV, p. 53).

and Sancton, thus prompting their complaint.[38] Alternatively, the issue in 1228 might have been a drainage project the hospital had undertaken on Wallingfen in the vicinity of Broomfleet and Faxfleet which perhaps had the side-effect of drying out lands at Cave and further north as far as Sancton, and so in effect disseising these lords of formerly productive pasture as well as breaking common.

The events of 1228 took place long before the Wallingfen court was established – the court most likely coming into existence in the last two decades of the thirteenth century, as we have argued above – hence Daiville and Sancton were forced to turn to the royal court for resolution, no effective local legal mechanism then being available to them. Thus even this first reference to Wallingfen underlines the Daiville family's interests in the fen as well as the potentially serious implications that even small changes in one part of the catchment might have for the utilization of resources either up or downstream. It may be that the increased complexity of water management practices in the thirteenth century was yet another reason for establishing a court to oversee the fen, its watercourses and banks. Flooding was certainly an issue in 1300, when the men of Broomfleet complained that the diversion of watercourses near Portington and Eastrington into the river Foulness – itself an indication of new initiatives to drain the northern part of Howdenshire – had flooded their lands, restricting cultivation and prevented them from digging turves in Wallingfen or grazing their cattle there.[39]

It is not known who was responsible for the construction of Langdyke, although the fact that 'the men of Eastrington and Portington' were named as the defendants in the Broomfleet case of 1300 perhaps implies that at least some of the drainage works in the region were community initiatives. Yet if we cannot be sure who cut the various drainage channels, we do know that the court of Wallingfen later assumed responsibility for their maintenance. Like both the Howden liberty court and other fenland and marsh courts including the 'Lords of the Level' in Romney Marsh, the Wallingfen court had the power to order the scouring of dykes and the repair of banks.[40] The costs of this were spread equally between the various townships commoning in the fen: thus, for example, when in 1466 part of banks of Langdyke were found not to be adequate, each of the 48 townships was charged 2*d*. for the repairs.[41] The court also had responsibility for the maintenance of the one highway across the fen, the 'Cawsey' between Scalby and 'Mighelines' (presumably in North Cave).[42] Drainage works appear in the record with increasing regularity in the sixteenth century, and in the summer of 1532 the townships had to contribute men, carts, tools and materials (earth and sand) for the reconstruction of the causeway and the scouring and bridging of

[38] There is a hint too of earlier tension between the Daivilles and the hospital when in the early 1180s Roger de Daiville and other local Mowbray tenants were ordered to pay over the thraves they had been withholding from the brothers, though the issue seems to have been arable produce, perhaps tithes, rather than wetland resources (Greenway (ed.), *Charters of the Honour of Mowbray*, no. 315).

[39] *Calendar of Patent Rolls, 1292–1301*, 553.

[40] English common law assumed that the responsibility for banks and dykes to keep the land dry lay with all those who benefited from the defences, rather than simply those on whose land the works were constructed (Bankoff, 'English Lowlands', p. 32; Darby, *Medieval fenland*, pp. 159–60).

[41] HHC, U DDBA/10/2, m. 2 and m. 1d.

[42] In the early sixteenth century there is a mention of the maintenance of the *pons calceti* (elevated causeway) being the responsibility of the governors who hired workmen, and in 1532 the townships were mobilized for extensive improvements, HHC, U DDBA/10/2, mm. 3, 1d.

certain dykes associated with it.[43] This was then said to be an 'olde custom'. At the June 1538 meeting of the court, a pain of 40*s*. was specified for anyone 'that cutt owt eny banke or syke bowndyng off Wallyngfen or other sewers where ther may ensowe great hurt unto Wallyngfen'.[44] The commoners were also ordered to scour Ploughfurres (Ploughfurrow) Dyke and the still extant New Dykes, as well as rebuild the banks of Langdyke. Five years later, several watercourses were still in poor repair – including Skelfleet, Fresdyk, Halpenny Syke and Langdyke – and orders in that year sought both to establish the work needed and the parties responsible for it.[45]

Interestingly, responsibility for the watercourses of Wallingfen appears to have remained with the Wallingfen court even after the Tudor government established Courts of Sewers under a statute of 1532. Medieval Commissions of Sewers were irregular occasions, and the willingness of the Wallingfen commoners to shoulder the burden of drainage in the later middle ages almost certainly stemmed from a realization that if they wanted to avoid flooding and valuable resources being lost, they must manage the sewers themselves. The Tudor court apparently did not engage fully with its responsibility: the Vale of York fell under the River Hull commissioners who do not seem to have been very active west of the Wolds.[46] The Howdenshire Court of Sewers apparently had or claimed no jurisdiction in the fen: its few records show no activity in Wallingfen despite the very high risk of flooding there which would affect its own area of responsibility.[47]

The Wallingfen court's other principal function was concerned with managing the wetland common and its resources. The court's two chief concerns in this respect were the grazing rights in the fen and the right to cut turves, but the court also claimed jurisdiction over a number of other wetland resources including fish, wildfowl, rushes and even the wool shed by sheep grazing on the fen.[48] While the precise origins of the common rights on Wallingfen are obscure, by the time that the fifteenth-century ordinances were issued, 48 townships clearly had rights in the fen. As the 1430 ordinance specified, common rights were restricted to those who 'do continually dwell within the liberties of the same & so long as they be down lying & uprising within the five parishes & not otherwaies & that they dwell upon antient toft & croft or else have no common there'.[49] In other words, this was common 'levant and couchant': those with ancient tofts could put as many animals on to the common in summer as they could support on their holdings over winter. Thus while the court carefully protected the grazing resource from those who were not commoners and specified the months in which commoners could utilize the common for grazing, there was apparently no attempt to limit the number of animals legitimate commoners could turn into the fen.[50] Nor does there seem to have been any attempt to restrict exactly where those animals grazed within the fen. There is no evidence that the grazing rights attached to particular parishes or townships were restricted to certain areas

[43] HHC, U DDBA/10/2, m. 3.

[44] HHC, U DDBA/10/2, m. 4.

[45] HHC, U DDBA/10/2, m. 4. Carter Wath was mentioned in 1594 as in need of repair (HHC, U DDBA/10/3).

[46] P. Saltmarshe, 'Ancient drainage in Howdenshire', *Trans. of the East Riding Antiquarian Soc.* 23 (1920), pp. 16–27.

[47] East Riding Archives, DDTR/421 (a pains file); DDHM/236612 (copy of an eighteenth-century court book and regulations). The court ceased to exist in 1842.

[48] HHC, U DDBA/10/2 and 3.

[49] HHC, U DDBA/10/1, reiterated in 1635 (DDBA/10/3).

[50] HHC, U DDBA/10/3.

of the fen – in other words, there were no physical or notional boundaries in the fen dividing the area utilized by one township from that utilized by their neighbours. Rather it was as much every man's land as no man's land, even whilst rights were clearly restricted to certain holdings as was the usual practice in managing common resources. We are explicitly told by the record that as far as cutting turves was concerned, it was first come, first served.

In the mid-fifteenth century, commoners of the 48 townships could thus place their animals on the common in unrestricted numbers, though the animals were presumably marked or branded. The branding helped to identify animals' owners at the late summer drift – when the stock were driven from the fen and back down the broad greenways that connected it to the southern townships of Howdenshire – as well as to identify cattle, sheep and horses which had no right to graze in the fen. Thus at the mid-June drift of 1466 stray animals were impounded, and individuals who wrongfully put their animals into Wallingfen were amerced.[51] Branding is first explicitly mentioned in the later sixteenth century, when the beasts were to be branded with both a township mark and an owner's mark.[52] In 1588, the branding was to be done before the beast entered the common in May and again at midsummer, presumably in order to ensure that the mark did not fade and become illegible.[53] By 1635, the branding was supervised by the 48 governors who were required to keep an account of the animals they marked and submit it to the court.[54] Forged marks were mentioned in the same year, at a time when the practice of falsely branding animals in order to turn them into the common had seemingly come to the attention of the court.[55] Thus as well as the court houses – assuming that Yauld Hill had one – another structure relating to the management of the fen implied in the record is a pinfold, where stray livestock found on the common and contested beasts were impounded. This was no doubt overseen by the wardens of confiscated stock mentioned as the officers of the commonalty in the fifteenth century.[56]

Turves or peats were another key wetland resource which the court sought to manage carefully. The early fifteenth-century ordinances specified that commoners could cut turves in the common on St Helen's Eve, when each commoner might send one man (and the surveyors, two men) to claim a place in the turf carr from which he would then cut the turves. Turves, unlike grazing, were thus stinted. No one was to cut more than one turf deep or within 40 feet of the highways and cartgates, and no turves were to be cut after midsummer or between sunset and sunrise.[57] The fine for each default was 3*s*. 4*d*. in 1425, a sum which seems still to have been current in 1532.[58] Through issuing orders and fining those who acted against them, the court thus sought to manage this resource and safeguard against its long-term degradation.[59] The ordinances also carefully distinguished between turves (pale-coloured, dry material from near the surface of the ground) and peats (dark, long-decayed matter) specifying that only the former might be cut. Those that dug peats were to be fined a shilling as well as forfeit the peats.[60]

[51] HHC, U DDBA/10/2.
[52] HHC, U DDBA/10/3, reiterated in 1635 (ibid).
[53] HHC, U DDBA/10/3 [1588].
[54] HHC, U DDBA/10/3.
[55] HHC, U DDBA/10/3.
[56] HHC, U DDBA/10/2.
[57] HHC, U DDBA/10/1, 1430 Ordinance and Usage.
[58] HHC, U DDBA/10/2, mm. 1 and 3.
[59] For instances of amercements issued for cutting turves 'against the custom', see HHC, DDBA/10/2, m. 2.
[60] HHC, U DDBA/10/1; DDBA10/2, m. 1. See the *Oxford English Dictionary* for the distinction between turves and peats.

The court also worked to police the boundaries of the fen and exclude those from outside the named townships – and thus without rights – from utilizing the common. It issued orders which specified the fines for 'outen men' who put animals on the common – set at between 4*d*. and 12*d*. in 1425 – and regularly presented and prosecuted those who wrongfully turned their stock into Wallingfen. Thus in 1461 the poor of Ferriby were amerced 14*s*. for pasturing 40 beasts in Wallingfen, as was at least one individual from Hotham in 1466.[61] Presentments were still being made as late as 1730 when several individuals were fined up to £1 19*s*. 11*d*. for turning animals into the common where the court judged they had no right.[62] The question of demarcating and policing the boundaries of the common was made difficult by the fact that Wallingfen bordered at least two other large areas of wasteland or common: Bishopsoil to the west and south and the commons of Spaldington, Holme and several other parishes to the north. At least some, but not all, of those with common rights in Wallingfen also had rights in Bishopsoil – and vice versa – a situation which no doubt complicated matters still further. In 1461, the Wallingfen court issued an order affirming that 'none aboue Potterbrygge shall haue any commons wyth the said commonaltye'.[63] Howden Potterbridge was mentioned in the accounts of the bishop of Durham's receiver in both 1477–78 and 1493–4, and was located on Flatgate on the east side of Howden town.[64] Thus the 1461 order was specifically intended to exclude the inhabitants of Howden (with the exception of those living in the far eastern suburb of Flatgate) from commoning on Wallingfen. Like those living in Barmby and Asselby, the majority of the population of Howden township had no rights in Wallingfen and relied instead on the grazing resources available on Bishopsoil.[65] It is unclear whether there was a physical boundary – a fence, bank or ditch – between Wallingfen and Bishopsoil, but beasts which strayed between the two commons were sometimes a problem, as were occasional attempts by the bishops of Durham to claim waifs and strays found in Wallingfen.[66] In 1466, the court reported that Thomas Parke of Howden Dyke (in Howden township) had taken two waifs from Wallingfen and given them to the bailiff of Bishopsoil. The Forty-Eight Men strongly objected to this attempt by the bishop to claim proprietorial rights, arguing that this being 'never seen afore in great preiudice off the seid common and aganst the ordinaunce and custome', they distrained three of Parke's animals in recompense.[67]

The court also made efforts in the fifteenth century to reaffirm the boundary between the intercommoned wetland and the commons belonging to the parishes of Spaldington, Holme on

[61] HHC, U DDBA/10/2.

[62] East Riding Archives, DDHM 236740.

[63] HHC, U DDBA/10/2.

[64] Durham University Library, Archives and Special Collections, CCB B/93/2. Note too that the township of Howden provided only one forty-eight man, and that only 1466 and 1525. In 1543, he was listed specifically as representing Flatgate, HHC, U DDBA/10/2, m. 4.

[65] This is reiterated in the Wallingfen enclosure act where the only commoners in Howden town to receive land were those living in the township known as 'Flatgate in Howden'.

[66] A fence between Bishopsoil and Wallingfen was mentioned in the Wallingfen enclosure award of 1781, but little is known about the period before the late eighteenth century. That there was an obligation on the bishop's tenants at Eastrington to maintain a fence or hedge with Bishopsoil Common is however known in 1470 (TNA, SC 2/211/61) and there was mention in 1589 to fences between the common and the townships (HHC, U DDBA/10/3 p. 3).

[67] HHC, U DDBA/10/2. The mass trespass of 1281, mentioned above, is another example of action by the commonalty aimed at fending off the bishop of Durham's claim to proprietorial rights in Wallingfen.

Spalding Moor, Market Weighton, South Cliffe (actually a township of North Cave) and Hotham which lay to the north. The area north of the Foulness had probably once been part of a larger waste, but had been separated from Wallingfen by 1425, perhaps much earlier: the ordinance of that year clearly restricted grazing and other common rights in Wallingfen to the 48 townships lying to the south and east of the Foulness, and specifically noted that the owners of any animals straying from the Holme on Spalding Moor, Hotham or Bursea (in Holme parish) into Wallingfen were to pay a penny to the individuals that drove them out.[68] It may be that the cutting of Langdyke in the thirteenth century effectively cut off the northern townships' access to the area south of the dyke and that a decision was taken at that point or soon after to divide the higher, drier common lands north of the Langdyke between the neighbouring townships and parishes, and so split up the original, larger Wallingfen. This would have ended any earlier arrangements for intercommoning that existed in the area north of Langdyke. The common land north of the Foulness had certainly been divided up and portions of it attached to the individual parishes between Spaldington and Hotham by 1456, as an admeasurement of the pastures of Holme Moor taken in that year suggests.[69] Interestingly, the communities at North Cave and South Cave – which lay north or east of the Foulness and were later referred to as 'Highside' or 'Woldside' towns – seem to have chosen not to follow the example of their northern neighbours and instead to remain part of the intercommoned Wallingfen. Exactly why this was the case is unclear, other than because the early Daiville lords of North and South Cave were obviously much invested in the use and management of the fen as their early presidency of the court implies.

External threats to the common came not only from 'outen men' who turned cattle into the fen and thus threatened to overstock it and diminish the value of the resource to the rightful commoners, but also in the form of more fundamental attacks on the authority of the commonalty to manage the fen. Undoubtedly the biggest source of conflict in this respect was a long-running dispute between the commonalty and various lords of South Cave over the latter's rights in the fen. As noted above, the court may have initially operated under the Daiville family's auspices and the Yauld Hill or Hall mentioned as the early meeting place of the court may well have been the family's manorial complex at North Cave. This is not to suggest, however, that the family also had proprietorial rights over the fen or rights other than those conferred on them as commoners and – on occasion – as surveyors. As the court asserted in 1666, Wallingfen had by then operated in excess of 240 years 'without impeachment or controulment of any person or persons whatsoever as by the ancient rowles, books and proceeds at every court will appear'.[70] Yet lords of North and South Cave repeatedly attempted to claim superior jurisdiction and rights in Wallingfen. Thus the later fifteenth and early sixteenth century was marked by at least four attempts to do so, and there were apparently also earlier incidents. Peter d'Eyville's 1310 complaint that men of the neighbouring parishes and townships dug his turves at South Cave almost certainly referred to Wallingfen, and may represent an early attempt by the lords of South Cave to assert a jurisdiction over the marsh.[71]

[68] HHC, U DDBA/10/1.

[69] HHC, U DDHA/4/19. Note, however, that while the boundaries between the various parochial moors and commons had been fixed by 1456, as late as the eighteenth century there were still no fences between Holme and South Cliffe commons (HHC, U DDHA/4/4).

[70] HHC, U DDBA/10/3, p. i.

[71] *Calendar of Patent Rolls, 1307–13*, p. 261.

We hear nothing further until 1464, when Henry Lounde, lord of South Cave West Hall was charged by his fellow gentry and the governors that he had 'presumptuously pretendyd a tytle and clamyd for to have bene the cheyff lord of Wallynfen wher he no ryght hadd'.[72] They alleged a long history of his violent trespass on the common rights, saying that he had driven the common and wrongfully impounded cattle, illegally charged for passage over a bridge over Skelfeet, demanded duty for every unringed swine and claimed the amercements from those who cut turves after midsummer. Lounde was apparently found guilty by the court for he bound himself to it, saying 'that he should never pretend any title to the said Common … [and] did openly there desire all the said commoners to forgive him the offence he had done for he was very sorry for the same & that they would accept him as a commoner & no otherwaies'.[73] This was a very public statement of his wrongs: three men 'in the name off the seid Henry Lounde desyryd and prayd oppenly all the commons to pretende but repent hym off the wrong that he hath done etc'.[74]

Yet it apparently did little to end the attempts by the lords of Cave to claim superior jurisdiction in the fen. In 1497 another Henry Lounde – most likely his grandson – sued 19 individual yeoman of the Wallingfen townships by name and township for digging turves, grazing his pasture and fishing his fisheries, claiming they had done £36-worth of damage. This can only be an example of a local landlord attempting to restrict the activities of the commoners, claiming they were operating within his lands.[75] A few decades later John London, the lord of South Cave East Hall, sued Sir Robert Constable and other surveyors and governors of Wallingfen in Chancery claiming that he and the lords of the manor before him had had strays, fishing, fowling, drift of cattle, tolls and the profits of all trespasses in the fen. He said that the tenants had recently put him out of the same and chosen surveyors and governors to manage the fen. This was clearly untrue – the Wallingfen court having by then existed for at least 100 years, and more likely in excess of two centuries – but represented another attempt by the lord of South Cave to claim superior rights.[76] London was then the new lord of the manor – having acquired it from the Daiville's successors sometime around 1513 – and no doubt saw the opportunity to potentially increase his manorial profits.[77] Unsurprisingly, given the considerable organizational might of the Wallingfen commonalty backed by the court, he was unsuccessful in his claim, but a few years later common rights in Wallingfen were again an issue of dispute between London's lessee – a man named Smetheley who was much hated by the locals – and the commoners of South Cave.[78] Once again, the commonalty was apparently successful in fighting off this threat, organizing a mass ploughing and lodging various equity court cases in their efforts to curb Smetheley's ambitions to enclose and convert arable to pasture.[79]

[72] HHC, U DDBA/10/2, m. 2.

[73] HHC, U DDBA/10/1.

[74] HHC, U DDBA/10/2.

[75] TNA, CP 40/939, m. 259d.

[76] TNA, C 1/535/21. The Chancery bill was filed sometime between 1518 and 1529. See also TNA, STAC 2/30/38 for a Star Chamber suit lodged before 1513 in which London denied being 'an extorcioner and oppressor of his neybors' and that presumably also related to the long-running dispute about rights in Wallingfen.

[77] *VCH, East Riding,* IV, p. 43.

[78] TNA, C 1/845/35-6.

[79] See B. McDonagh, 'Negotiating enclosure in sixteenth-century Yorkshire: the South Cave dispute, 1530–1536', in J. Whittle (ed.), *Landlords and tenants in Britain, 1440–1660* (2013), pp. 52–66 for a fuller discussion of events at South Cave in the 1530s.

IV

While the early ordinances are concerned to restrict common rights to those dwelling on ancient tofts in the named townships – and thus limit the number of commoners and exclude those with from outside the five parishes – there is no suggestion in the records that the common was otherwise stinted or limited, other than in the cutting of turves. But all this changed in the early decades of the seventeenth century. In 1600 it was specified that commoners must be resident in the liberties of Wallingfen – that is, in one of the 48 townships – for 'the space of eight months of the year att the least' with a stiff 39*s*. 11¾*d*. fine for every forfeit, but no specific limits to the number of beasts that might be depastured by each commoner were recorded.[80] Stints were not explicitly mentioned until 1635, when the number of animals each commoner could turn into the fen was recorded for the first time. An order of that year specified that no commoner should have more than 160 sheep gates in the common, one half stocked with sheep and the other with horses and cattle (at seven sheep gates to a horse, and five sheep gates to a cow). Two foals counted for one horse and two calves as one cow, and lambs were not accounted at all until 'Michaelmass next after they be lambd'. This was a determined attempt to restrict the number of animals utilizing the common and, in 1637, the fines were raised to 6*s*. 8*d*. a horse, 5s. a cow and 11*d*. a sheep (between 33 and 50 per cent higher than the fines set just two years earlier). Nor was it only grazing rights to which these stints were applied. 1635 was also the year that the stinting of rushes was mentioned for the first time with each commoner restricted to gathering no more than four loads in the Seave (viz. 'Rush') Carr or elsewhere in Wallingfen. Twelve years later, the court ordered that no commoner could kill wildfowl on the common without order of the court, specifying a fine of almost 40*s*. for each default.[81]

Yet even after the introduction of stints and the ramping up of fines, Wallingfen survived as an intercommoned wetland for close to another 150 years, far later than many of the intercommoned Lancashire mosses recently documented by William Shannon.[82] The court or commonalty continued to function in that time, holding twice-yearly courts, issuing orders and dealing with presentments about encroachments on the common. Thus for example in 1730 the court fined more than 30 individuals for turning unmarked animals into the common (at 1*s*. per animal), for turning in animals where they had no right, or for failing to attend the court.[83] There is little here to suggest that Wallingfen had been over-exploited by the surrounding communities or that it witnessed anything akin to a 'tragedy of the commons'.[84] The dismantling of the centuries-old governance of Wallingfen did not take place until the enclosure process began and the eventual enclosure of the common probably stemmed primarily from the realization that agricultural improvement in Wallingfen was dependent on more effective drainage, itself reliant on the extinguishing of common rights and the partitioning of the fen between the townships. Enclosure took place at the height of the first

[80] HHC, U DDBA/10/3.

[81] HHC, U DDBA/10/3.

[82] Shannon, 'Intercommoning', *passim*.

[83] East Riding Archives, DDHM 236740. See also HHC, U DDBA/10/3 for three mid-eighteenth-century orders.

[84] The classic text on this is G. Hardin, 'The tragedy of the commons', *Science* 162 (issue 3859) (1968), pp. 1243–48. For recent work challenging Hardin's ideas, see E. Ostrom, *Governing the commons: The evolution of institutions for collective action* (1990) and de Moor, *Dilemma of the commoners*.

great wave of parliamentary enclosures in England and the widespread belief, amongst the landowning classes at least, that enclosure was a profitable and morally desirable improvement to the agrarian landscape, no doubt also played a part in the decision to enclose the fen.[85]

The potential for the manorial lords and freeholders associated with Wallingfen to profit from township enclosure was appreciated at least two generations before the enclosure of the fen itself was canvassed. In 1707 Heyrick Athorpe (d. 1745), a lawyer and the principal landowner in Kilpin, south east of Howden, pushed through the enclosure of the township's common fields, with the compliance of his neighbours and tenants. The manor of Duncotes in the same township may have been enclosed as early as the 1670s.[86] Much of the riverside township of Cotness was privately enclosed around 1750 through the initiative of Dr Gideon Wells (d. 1761), the dominant landowner there after 1745. As in much of the rest of champion England, enclosure by parliamentary act really got going from the 1760s onwards.[87] Holme, Market Weighton, Hotham and North Cave were all enclosed in the mid-1760s and 1770s, eventually followed by South Cave under an act of 1785. The immediate context for enclosing Wallingfen, however, must have been the successful parliamentary enclosure of neighbouring Bishopsoil Common achieved under a parliamentary act of 1767. Since this large ancient common had a chief lord in the bishop of Durham, unlike Wallingfen, the process over Bishopsoil was comparatively easy to manage, for all it was technically complex, and it seems that the manorial lords with rights on this common were compliant in it. These included the same gentry landowners who would combine to push through the enclosure of Wallingfen over the next few years.

The complex process by which Wallingfen was eventually enclosed and drained must necessarily be a story for another outing, but it can be briefly summarized here. The same year as the Bishopsoil award was published in 1777 the act for Wallingfen received the royal assent and the commission to divide it up was sworn.[88] Acquiring the necessary act to enclose the common was in part made possible by a legal sleight of hand 50 years earlier: in 1723, the justices of the East Riding Quarter Sessions decided that Wallingfen could be considered a manor, with the surveyors described as its joint lords.[89] Fifty years later, the strategy of Leuyns Boldero Barnard and his colleagues was to follow the logic of their fellow justices of the Quarter Sessions and argue that Wallingfen fell within the several neighbouring manors of which they were the lords. Thus Wallingfen was described in the act's preamble as lying 'within the several parishes of Howden, Eastrington, North Cave and South Cave, and the parish or parochial chapelry of Blacktoft' and the lordship of Howden was described as 'extend[ing] over the said common or stinted pasture, except such parts thereof as lie within the parishes of North Cave and South Cave'. This had certainly not been the case throughout the medieval and

[85] This is not to suggest that the enclosure was uncontested: the parliamentary debate on the bill reveals that the proprietors of 93 of 858 common rights in Wallingfen (that is, 10 per cent) were still resisting the scheme by refusing to sign the bill in 1777.

[86] A process known only from Athorpe's pre-inclosure survey, HHC, U DDKG/1, 264.

[87] W. E. Tate and M. E. Turner, *A domesday of English enclosure acts and awards* (1978); Tom Williamson, *The transformation of rural England: farming and the landscape, 1700–1870* (2002).

[88] For the Bishopsoil Award, East Riding Archives, Deeds Register RDB/1/2, AX, pp. 184–354. For the Wallingfen Award, RDB/1/2, BE, pp. 3–56. The corresponding award map is IA/170.

[89] East Riding Archives, QSV/1/2(A) *notitia*. See also another such reference from the 1750 order book, QSV/1/4(C).



FIGURE 1. Common Farm, North Cave. The names of several of the post-enclosure farmsteads on the former Wallingfen preserve evidence of their origins.

early modern centuries, but the act listed eight lords of the neighbouring manors – crucially, now seen as extending over Wallingfen – as the proprietors of the common. This effectively resolved the jurisdictional anomaly that was Wallingfen and made enclosure possible. When the award was made four years later, the commissioners carefully identified both the township and the manor in which each of plot of newly enclosed land was 'declared and deemed to be situate': the more than 500 individual plots of land were assigned to one of eight main manors and more than 45 different townships and constabularies.[90] Thus the enclosure not only extinguished common rights, but for the first time also divided up the fen between the neighbouring townships that had previously intercommoned it. It also of course dismantled the centuries-old institution of the commonalty or court of Wallingfen, there no longer being any need for community oversight of the now privately owned plots of land.

To medieval eyes, the view from the main road from the Caves to Howden would have been almost unrecognizable by the early years of the nineteenth century. The landscape was by then one of large arable fields scattered with isolated post-enclosure farmsteads, many of which took on names that either signalled their township identities – for example, Laxton Grange and Skelton Grange, both more than 10 kilometres from the township hamlet – or monikers like North America and Nova Scotia which underlined their isolated locations (Figure 1). The new industrial settlement of Newport – initially three groups of houses known as New Gilberdyke,

[90] East Riding Archives, RDB BE/3/2. A small number of plots were also assigned to Osbaldwick manor, North Newbald manor and Husthwaite manor in North Newbald.

Newport and New Village which were later amalgamated – also quickly grew up in the heart of the former fen on the banks of the Market Weighton Canal. Yet while the landscape was rapidly transformed in the post-enclosure period, the earlier medieval arrangements nevertheless had their legacy. The chapel at Scalby in which the medieval court met which later came to be known as the Forty-Eight House – after the congregation of 48 governors which made up the court – eventually gave its name to the surrounding scatter of cottages, so that the name Eight & Forty was used from the late nineteenth century onwards to refer to part of Newport village.[91] Moreover, the complexity of intercommoning arrangements and the sheer number of townships and individuals claiming rights in Wallingfen (and to a lesser extent, Bishopsoil) presented the parliamentary enclosure commissioners with the difficult task of allocating the new plots not only to new owners, but also by parish and township. The result was a fine-grained patchwork of detached portions of townships so complicated and confusing that it had to be rationalized a century later in 1880, when the new civil parishes of Bishopsoil and Wallingfen were created by uniting the previously detached portions of the neighbouring 40 plus townships.

V

The story told here is a complex one spanning more than a thousand years stretching from a time before the Anglo-Scandinavian settlement of East Yorkshire to the creation of the civil township known as Wallingfen in 1880. Yet what we present here is not a simple landscape history of this once-waterlogged corner of the East Riding: rather the paper is concerned specifically with the management and governance of the fen as revealed in the medieval and early modern records of the court or commonalty of Wallingfen. Rather than being a top-down solution to the problem of the fen, the court seems to have derived its existence and authority from the local communities themselves, with the gentry and yeomen acting in concert to offer a cooperative system of wetland management that fell outside the authority of the neighbouring manors or any higher form of overlordship. As we have argued, it governed the fen for several hundred years between 1425 (or possibly even as early as *c.*1281) and the last quarter of the eighteenth century, managing the resources on behalf of the many neighbouring communities who used the wetland for grazing, fuel and foodstuffs. In a context in which the threat of flooding was ever-present, the court maintained the all-important drainage works and organized levies for repairs, and its success here can be measured by the gradual extension of the commoning season from two to five months between the fifteenth and seventeenth century. The court also monitored the use of the fen for grazing and fuel gathering and imposed sanctions on those who overstocked or otherwise encroached on the common, as well as introducing stints in the seventeenth century to reduce the risks of resource degradation in response to rising populations of humans and animals. And it provided a mechanism for cooperation and collective decision making – by the election of the surveyors and governors as representatives of the townships – as well as a forum for conflict resolution, the latter being crucial in an area in which no identifiable overlordship existed.

[91] T. Bulmer, *History, topography and directory of East Yorkshire (with Hull)* (1892); Ordnance Survey 1:50,000, sheet 106 (1974).

That the court existed is not, of course, to suggest that the utilization and management of the fen was always trouble-free nor that the commonalty represented some kind of ideal community. Indeed we have suggested that the court came about specifically as a defence against aggressive measures by thirteenth-century bishops of Durham to appropriate as much wetland pasture into their demesne as they could. As the later records of the court reveal there were other 'turf wars' too, not least those begun by various lords of South Cave on the tenuous grounds of the sometime presidency of the Daiville family over the common. In this long-running dispute, we see how the court might act both as a forum for resistance and as stage for formal and elaborate submission to, and reconciliation with, the commoners. Nor was the court untouched by the politics and power relations which underpinned medieval and early modern society: the surveyors were drawn from the gentry families of the surrounding townships and to be elected one was to affirm one's social place within the local elite. In some cases the office of surveyor passed through as many as eight generations of the same family, as it may well have done in the case of the Saltmarshes and Portingtons. To serve in it was an acknowledgement of local eminence. The court was thus a forum which served to moderate inevitable local tensions. This was not just at the gentry level, for the court worked to discipline and mobilize the yeomen and husbandmen of the townships where they might otherwise compete over a valuable resource. This is at its most surprising where we see the Wallingfen court taking upon itself the powers usually associated with a manorial halmote: hearing presentments from jurors, electing pinders, judging cases of affray and trespass in the fen, and imposing pains. But since the surveyors were themselves mostly manorial lords, it might well have seemed natural that any court they presided over should have the same powers as they had on their own manors.

The court of Wallingfen thus delivered against many of the key attributes of 'stable local common pool resource management' outlined by Elinor Ostrom.[92] Herein lay the secret of its survival. We argue in this paper that effective management of grazing and other resources over a period of many centuries, combined with the legal difficulties posed by the lack of identifiable overlord or 'owner' and the sheer number of commoners exercising rights, together explain why Wallingfen survived so much later as an intercommoned waste than comparable examples in Lancashire and East Anglia, or indeed further afield on the eastern coast of the North Sea. When the end came, however, it was abrupt and the centuries-old institution of the court was quickly dismantled just as the commoners were barred from the common and the landscape drained, hedged and divided up. Thus ended the complex intercommoning arrangements that governed the common for hundreds of years and even at its termination involved more than 850 recognized commoners – and earlier many more – from almost 50 local communities. It is the size of fen and its large body of commoners, the longevity of the court, its anomalous tenurial and jurisdictional history in relation to the surrounding lordships, and the survival of such a valuable body of material relating to its early management that all make Wallingfen such a compelling case study through which to explore important questions about conflict, cooperation and the management of common-pool resources in the period before the enclosure of the commons.

[92] Ostrom, *Governing the commons*.

Beyond the flock. Sheep farming, wool sales and social differentiation in a sixteenth-century peasant society: the Campine in the Low Countries*

by Maïka De Keyzer and Eline Van Onacker

Abstract

In the existing literature late medieval sheep keeping has been perceived as a landlord and tenant-farmer strategy, aimed at international export markets. In this article we want to show that there was another side to those activities. Up until the early modern period, some regions – such as the Campine district in the Low Countries – managed to maintain viable peasant sheep-breeding enterprises. Two things were vital for the survival of peasant sheep breeding in the Campine. First of all the specific social structure and power structure of the region, allowing the peasants to keep control over their common lands and use them for their own (commercial) strategies. And secondly, there were lively local and regional markets, where demand for lower quality textiles was and remained strong.

The late medieval Low Countries were especially renowned as a centre of cloth production. Their original fame came from the luxurious 'Old Draperies' (*gesmoutte draperie*), and later from the cheaper 'New Draperies'. But in the fifteenth and sixteenth centuries, the much cheaper 'light drapery' or 'dry drapery' – of which the Hondschoote *saies* were perhaps most famous – increasingly flooded the markets of Europe and the New World. Historiography on these export-driven industries is extensive,[1] as is research on the production of wool for the old draperies.[2] The literature tends to concentrate on the supply of high-quality wool, imported

* This research was funded by ERC Advanced Grant no. 339647, COORDINATINGforLIFE (Maïka De Keyzer) and FWO Flanders, Grant no. 12N9315N_PO. The authors have contributed equally to the preparation of the article.

[1] See, for example, on the old draperies, P. Chorley, 'The cloth exports of Flanders and northern France during the thirteenth century: A luxury trade?', *EcHR* 40 (1987), pp. 349–79; J. Munro, 'Industrial transformations in the north-west European textile trades, *c.*1290–1340: Economic progress or economic crisis?', in B. M. S. Campbell (ed.), *Before the Black Death. Studies in the crisis of the early fourteenth century* (1991). For the light draperies, E. Coornaert, *Un centre industriel d'autrefois. La draperie-sayetterie d'Hondschoote (xive–xviiie Siècle)* (1930); J. Munro, 'The origins of the English "New Draperies": The resurrection of an old Flemish industry, 1270–1570', in N. B. Harte (ed.), *The New Draperies in the Low Countries and England* (1997); P. Chorley, 'The "Draperies Légères" of Lille, Arras, Tournai, Valenciennes: New materials for new markets?', in M. Boone and W. Prevenier (eds), *La draperie ancienne des Pays-Bas: Débouchés et stratégies de survie (14e–16e Siècles)* (1993).

[2] E. Coornaert, *La draperie-sayetterie d'Hondschoote*; A. Verhulst, 'La laine indigène dans les anciens Pays-Bas entre le xiie et le xviie siècle', *Revue Historique* 96

from England or Wales and, later on, especially for the new draperies, Spanish merino wool.[3] The sheep that produced this wool were bred by wealthy farmers on large estates or employing elaborate transhumance practices. This is a well-known story, but there is more to late medieval wool production than the focus on large-scale sheep breeding aimed at provisioning the export industries of the Low Countries, England and Italy would suggest. In this article we want to describe a much less familiar type of sheep farming, by peasants, which managed to survive and thrive in several European regions, one of which – the Campine in the southern Low Countries – will be at the centre of this article.

Until now, sheep breeding for commercial wool production has been associated with ecclesiastical institutions, manorial lords and urban or rural elites. The first instances of seigneurial and commercial animal husbandry can be found in the high middle ages, with ecclesiastical estates and noble lords as the pioneers. From the tenth and eleventh centuries, abbeys across Europe turned their attention to wool production and commercial sheep breeding. In coastal Flanders, for example, abbeys, usually cooperating with the Count of Flanders, developed the dunes and salt marshes near the North Sea coast into sheep pastures. According to Erik Thoen this commercial production of wool fuelled the rise of cloth industries and simultaneously the rise of cities in the twelfth century.[4] The same pattern can be identified in northern and western Spain, the French Pyrenees and the Alps. After the fourteenth-century crisis, rural and urban elites also started to invest in commercial sheep breeding. Following the depopulation after the Black Death, agricultural wages rose significantly – making grain production less lucrative as it needed more labour input – as did the demand for wool, meat and dairy products. Mixed farming increasingly gave way to a more specialized animal husbandry and the famous transhumance flocks of thousands of sheep started being driven through the French, Spanish and Italian mountains.[5]

The scope and characteristics of these elite endeavours are well known. Esther Pascua has given us a detailed account of the Saragossan herds of sheep, belonging to urban collectives of burghers, roaming on the mountain slopes and river pastures in the fourteenth and fifteenth centuries.[6] We have been introduced to Francesco Sugana, a Treviso clothier, who single-handedly dominated the transhumance trails and set the rules for their use.[7] Our knowledge of how rural elites managed their flocks is becoming fuller as is our knowledge of the elites themselves. The commercial flocks ranged in size between 100 and 1500 sheep, with a few

Note 2 *continued*
(1972); P.-Y. Laffont (ed.), *Transhumance et estivage en Occident. Des origines aux enjeux actuels* (2006).

[3] For example, J. Munro, 'Spanish Merino wools and the Nouvelles Draperies: An industrial transformation in the Late-Medieval Low Countries', *EcHR* 58 (2005), pp. 431–84.

[4] E. Thoen and T. Soens, 'Elévage, prés et paturage dans le Comté de Flandre au Moyen Âge et au début des temps modernes: Les liens avec l'économie rurale régionale', in F. Brumont (ed.), *Prés et* pâtures *en Europe Occidentale* (2008).

[5] Laffont (ed.), *Transhumance et estivage*; N. Carrier, 'L'estivage en Savoie du Nord à la fin du Moyen Âge. Essai de chronologie et de typologie'; E. Pascua, 'Communautés de propriétaires et ressources naturelles à Saragosse lors du passage du Moyen Âge à l'époque moderne'; M. Schermann, 'Un acteur de la transhumance: Le cas d'un drapier Trévisan à la fin du xve Siècle'; X. Soldevila I Temporal, 'L'élevage ovin et la transhumance en Catalogne Nord-Occidentale (xiiie–xive siècles)'; J.-M. Yante, 'Transhumance ovine et porcine En Ardenne-Eifel (xve–xviie siècles)', all in Laffont (ed.), *Transhumance et estivage*.

[6] Pascua, 'Communautés de propriétaires'.

[7] Schermann, 'Un acteur de la transhumance'.

touching 2500 animals, and were in the possession of the upper layers of urban and rural societies.[8] In the case of Northern Spain, Xavier Soldevila I Temporal has demonstrated that – even though peasant families did own some sheep – it was mostly noble lords, urban investors and rural elites who possessed immense numbers of sheep. Those animals were gathered in ever larger flocks and were herded by professional shepherds, in order to provide the famous merino wool.[9] Pascua found a similar situation: 'le panorama économique au début de l'époque moderne, était celui de quelques communautés d'éleveurs, seigneuriales ou urbaines, qui exerçaient un controle corporatif et collectif sur ses territoires'.[10] In England, both Cistercian and Benedictine abbeys can be labelled as the most important wool exporters. At first they held large sheep flocks thanks to direct demesne exploitation, but later on shifted towards leasehold. As Allison stated, in the sixteenth and seventeenth centuries, Norfolk sheep were almost entirely in the hands of manorial landlords and their demesne lessees or gentlemen families. Wool was produced by the Norwich cathedral priory and the L'Estrange, Southwell and Gawdy families, with flocks of up to 15,000 sheep.[11]

Commercialized sheep farming for large-scale wool production by large landowners seems a match made in heaven. But Romeo might have had more than one Juliet. Sheep farming, the ownership of flocks, and commercial activities were not limited to large landowners or their large commercial tenant farmers. Throughout medieval and early modern Europe, a second type of sheep breeding existed, which is less often addressed in the historiography, and is usually not particularly well documented. In the thirteenth-century English Brecklands peasants were the first and most important group within rural society to engage in commercial wool production. While lords had little interest in animal husbandry and focused on grain production, small tenants obtained the right of foldcourse to graze their sheep on the open fields. Philip Slavin has found that, of the taxed households (between 65 or 70 per cent of the total population) mentioned in the 1283 Blackbourn hundred tax assessment, peasant taxpayers owned on average 11.5 sheep each. Breckland peasants had even more sheep, averaging around 25 per owner.[12]

In these areas, peasant sheep-ownership dwindled after the late medieval crisis, as manorial lords started to displace their tenants' sheep with their own and seigneurial wool production came to dominate. The main wool production centres all evolved from a mixed farming system towards a highly specialized and market-dependent animal husbandry, which concentrated on sheep breeding.[13] By the early seventeenth century, only a quarter of households paid tithes on sheep at Great Cressingham, in the Brecklands. They were the

[8] Carrier, 'L'estivage en Savoie'; Pascua, 'Communautés de propriétaires'; Schermann, 'Un acteur de la Transhumance'; Soldevila I Temporal, "L'élevage ovin'; Yante, 'Transhumance ovine'; K. J. Allison, 'The sheep-corn husbandry of Norfolk in the sixteenth and seventeenth centuries', *AgHR* 5 (1957), pp. 12–30; id., 'Flock management in the sixteenth and seventeenth centuries', *EcHR* 11 (1958), pp. 12–30.

[9] Soldevila I Temporal, 'L'élevage ovin'.

[10] Pascua, 'Communautés de propriétaires', p. 150.

[11] J. Bond, *Monastic landscapes* (2004); Allison, 'Flock management', p. 100.

[12] P. Slavin, 'Peasant livestock husbandry in late thirteenth-century Suffolk: Economy, environment and society', in M. Kowaleski *et al.* (eds), *Peasants and lords in the medieval English economy. Essays in honour of Bruce M. S. Campbell* (2015), pp. 8–10.

[13] M. Bailey, 'Sand into gold. The evolution of the fold-course system in West Suffolk, 1200–1600', *AgHR* 38 (1990), pp. 43–55; Allison, 'Sheep-corn husbandry'; Allison, 'Flock management'.

absolute top layer of society, owning by far the most animals.[14] Alexandra Sapoznik presents similar findings for fourteenth-century Oakington in Cambridgeshire, where – according to the court rolls – smallholding peasants only owned a couple of sheep a piece.[15] In the historiography, which is strongly dominated by English cases, it is argued that after the fourteenth century only farmers with a considerable amount of land were capable of maintaining a decent flock of sheep. As Bruce Campbell said of the sixteenth century: 'sheep were now disproportionally a landlord animal'.[16]

Nevertheless, even within the late medieval transhumance herds in Spain, flocks of 30 or 40 animals are found in and amongst flocks of over 1000 sheep, indicating that the peasant sheep keeping never completely died out.[17] Furthermore, in some regions peasant households managed to keep both their flocks of sheep and their communal rights, and were thus able to maintain their mixed farming system, animal breeding and commercial strategies. Examples can be found in a number of regions within the Low Countries, such as 'het Gooi', Drenthe and the Campine.[18] Here flocks of 30 to 45 sheep were grazed on the common heathlands, so as to provide the peasants with an additional income from selling wool, meat, and dairy products to the local urban markets. The details of this peasant model of sheep breeding remain somewhat obscure, as research on this topic is lacking. In this article we want to fill this gap by arguing that sheep breeding did have an important function in a peasant economy.

In order to explain the success of peasant sheep breeding in the Campine in the fifteenth and sixteenth centuries, the internal dynamics of the peasant society, the ecological constraints of the Campine ecosystem as well as the role of urban demand will be taken into account. Here a significant subgroup of peasant society was able to seize the opportunities presented by wool production to diversify their economic activities, but this did not lead to specialization, as mixed farming remained predominant. In a region of extensive, communally managed heathlands, sheep breeding offered interesting opportunities for the diversification of income, which is a major characteristic of peasant agro-systems. On the other hand, demand was secured thanks to the local and regional cloth guilds and sale of second quality textiles back to the rural hinterland and smaller urban centres.[19]

[14] Norfolk RO, PD 131/38, Vicar's book (tithe account), 1622–42.

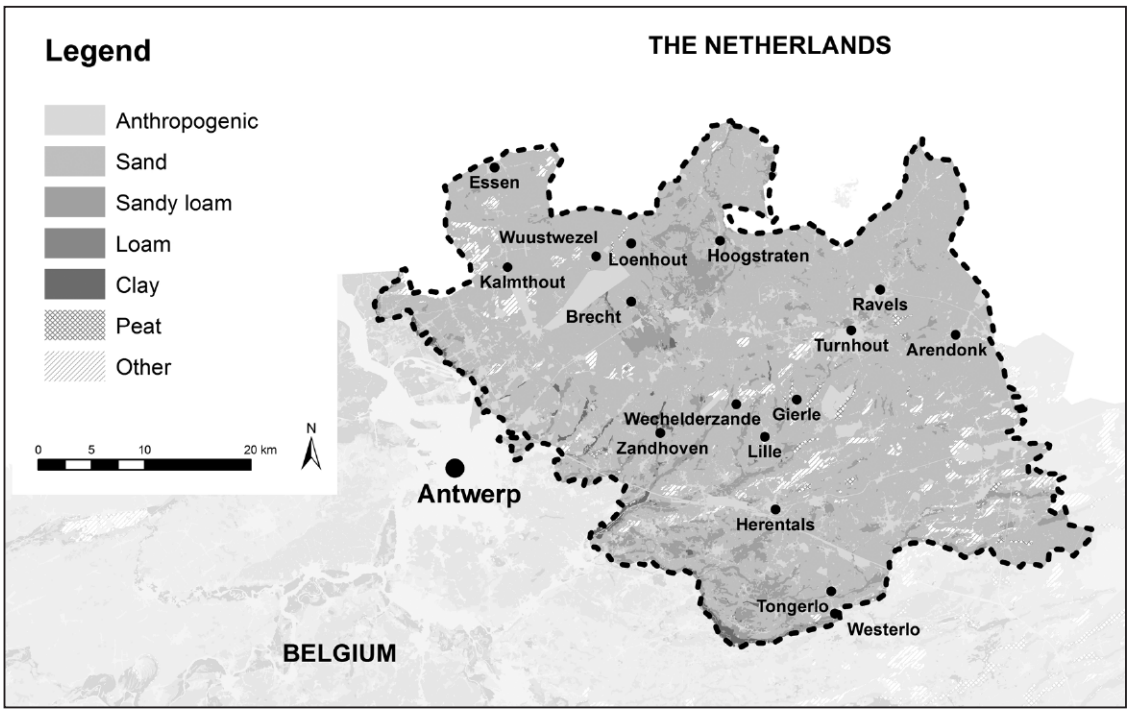
[15] A. Sapoznik, 'Resource allocation and peasant decision making: Oakington, Cambridgeshire, 1360–99', *AgHR* 61 (2013), pp. 187–205.

[16] B. M. S. Campbell and M. Overton, 'A new perspective on medieval and early modern agriculture: Six centuries of Norfolk farming, *c.*1250–*c.*1850', *Past and Present* 141 (1993), pp. 77–8.

[17] Soldevila I Temporal, 'L'élevage ovin'.

[18] A. Kos, *Van meenten tot marken. Een onderzoek naar de oorsprong en ontwikkeling van de Gooise marken en de gebruiksrechten op de gemene gronden van de Gooise markegenoten (1280–1568)* (2010); T. Spek, *Het Drentse esdorpenlandschap. Een historisch-geografische Studie* (2004); E. Van Onacker, 'Leaders of the pack? Village elites and social structures in the fifteenth and sixteenth-century Campine Area' (Ph.D thesis, University of Antwerp, 2014); M. De Keyzer, 'The common denominator. The survival of the commons in the late medieval Campine area' (Ph.D thesis, University of Antwerp, 2014).

[19] C. Dyer, 'L'industrie rurale en Angleterre des années 1200 à 1550: Géographie, sociologie et organisation de la production et des marchés' and A. Barlucci, 'L'industrie de la laine dans le territoire Florentin (xiie–xve Siècles)', both in J.-M. Minovez *et al.* (eds), *Les industries rurales dans l'Europe médievale et moderne* (2013).



MAP 1: The Campine.

By using a wide array of sources – censuses of animals, accounts, rent and tax registers and cloth guild records – from the fifteenth- and especially sixteenth-century Campine, we will address the following questions: what were the characteristics of a society in which peasants held flocks of sheep? Who were the Campine sheep breeders, what was their social position, and what were their strategies and interests? And in which markets was Campine wool sold? In answering these questions, we offer a comprehensive account of an 'alternative' way of sheep breeding: small-scale, dominated by a peasant elite, and focused on supplying domestic markets.

I

The Campine was situated in the Duchy of Brabant, to the north east of the sixteenth-century metropolis of Antwerp (Map 1). It was an area of small towns and innumerable villages.[20] Its soils were mostly sandy, with areas of peat bog. It was also extensively wooded. Due to its infertile and challenging nature, medieval colonization started rather late. During the high middle ages, only a few isolated farmsteads were established in the most accessible and fertile spots. The defining era in the shaping of Campine socio-institutional structures was the thirteenth and fourteenth centuries, especially the period around 1350. The structures created then remained more or less intact until the beginning of the nineteenth century. They arose

[20] Based on De Keyzer, 'Common denominator'; Van Onacker, 'Leaders of the pack'.

TABLE 1: Property distribution in the villages of Gierle (1554) and Alphen (1559)

	Gierle		*Alphen*	
	Relative number per property group (%)	*% of total village surface per property group*	*Relative number per property group (%)*	*% of total village surface per property group*
< 1 ha	31.3	6.2	20.9	3.2
1 – 3 ha	28.3	18.8	27.4	18.4
3 – 5 ha	13.9	18.2	23.7	27.1
5 – 10 ha	12.7	27.3	24.7	44.0
≥ 10 ha	6.6	26.8	2.3	7.3
unknown	7.2	2.7	0.9	0.0
TOTAL	100.0	100.0	100.0	100.0

Source: RAA, OGA Gierle, 344, Taks register, 1554.

out of a power struggle between different types of lords (the duke of Brabant, local lords and ecclesiastical lords) all of whom needed to attract migrants to cultivate the land. As a result this period was characterized by an increase in population, many of whom were migrants from the heavily populated County of Flanders and the south of the Duchy of Brabant. The rising population drastically altered the Campine landscape. The village centres shifted from the fertile higher grounds to the lower river valleys and larger blocks of land were exploited as arable. The total area of enclosed arable and pastures increased 4.5 times between 1210 and 1340 and the woodland was slowly transformed into common heathland.[21] A mixed farming economy emerged, combining arable production and animal breeding.

The feudal structure was and remained divided between rival lords. The Campine village communities were able to profit from the power struggles between them. The lords tried to outdo one another in developing their estates by attracting new inhabitants. They competed for peasants by granting the members of rural communities extensive powers of self-government and usage rights on the common lands. By the fourteenth century village communities had become an important political force in their own right, with elaborate powers to control their resources. Due to this institutional arrangement, lords and communities limited each other's power.

During the same period a particular social structure and power structure came into being within these communities. They were dominated by peasants: smallholders with strong property rights over their plots of land. However, different types of peasants can be distinguished. Farm sizes serve as an excellent tool to illustrate these differences (Table 1). Within Gierle – an archetypical Campine village – several property groups can be discerned. First of all, there is a significant majority of nearly landless inhabitants. A large part of them lived in, or on the verges of, poverty and were dependent on casual wage labour, poor relief and the use of the commons for survival. Furthermore, there was a significant group of cottagers, owning

[21] D. Vangheluwe and T. Spek, 'De laatmiddeleeuwse transitie van landbouw en landschap in de Noord-Brabantse Kempen', *Historisch geografisch tijdschrift* 26 (2008).

TABLE 2: Ratio of private and common land per village during the sixteenth century

Village	*Total surface area in ha*	*Total surface area of private land (ha)*	*Area of common waste land (ha)*	*% common*
Lichtaart	2518.20	325.0	2193.2	87.0
s-Gravenwezel	1498.8	312.0	1186.8	79.2
Gierle	1775.0	400.0	1375.00	77.5
Kalmthout	11586.2	4292.6	7293.7	58.3
Wommelgem	1273.7	474.5	799.2	63.0
Tongerlo	2044.6	498.3	1546.3	75.6

Source: SAA, 5 Condition, 1593; RAA, OGA Gierle, 344, 1554; RAA, OGA, Tongerlo 896, 1569; AAT, Section II, 373–400, Rent register, Kalmthout, 1518. The surface area of the villages is based on the historical database of www.hisgis.be/nl/start_nl.htm.

between one and three hectares, who struggled for subsistence. They probably had to look for additional income to make a living. The group owning over three hectares can be labelled as 'independent peasants'. They were able – more or less – to make a living from the combined use of their own lands and the commons. Those owning over five hectares probably were relatively well off. They were also able to dominate village office holding, as over 80 per cent of village aldermen (the de facto village government), tax officials, poor master, etc. belonged to this category.

Even though Campine villages were relatively egalitarian economically, with GINI indexes generally between 0.50 and 0.56, we can also observe the presence of relatively large tenant farms, measuring 20 to 80 ha, in certain villages. These farmers leased their farms mainly from ecclesiastical lords, such as the abbey of Tongerlo. They were however not able to dominate either their fellow villagers or the village economy as their counterparts were able to do in the traditional sheep-breeding regions. The most intriguing aspect of Campine social stratification is therefore its lack of a true 'one per cent', of an elite that was able to distinguish itself economically, politically, socially and culturally. No social group was powerful enough to remove the privileges of other social groups – as such, the specific power balance of this region resulted in a 'common denominator'. This equilibrium went hand-in-hand with a lot of quarrelling, small frictions and an elaborate array of formal and informal conflict regulation mechanisms, but the essential structure was never shaken.[22]

This can clearly be seen when the village commons are considered. The Campine was characterized by vast stretches of common waste used as common pasture during parts of the year. The scale of the commons is shown in Table 2. At least half, and in some cases three quarters of the land area of villages was used as common in the sixteenth century. Whereas in other regions such as the East Anglian Brecklands or the German Geest region,[23] usage of

[22] De Keyzer, 'Common denominator'.

[23] M. De Keyzer, 'The impact of different distributions of power on access rights to the common waste lands: The Campine, Brecklands and Geest compared', *J. Institutional Economics* 9 (2013), pp. 517–42.

the commons was increasingly limited to richer villagers or the descendants of original users, exclusion processes of this sort were absent in the Campine. Here, all community members – from tenant farmers to poor cottagers – were allowed to use the commons and exercise rights to graze animals and cut peat and turves. However, the Campine commons were not open to all. Outsiders, neighbouring communities as well as new settlers were excluded from using the commons. The privileges were therefore only shared within the peasant community of one particular village or hamlet.[24]

II

The historiographical lacuna concerning peasant sheep breeding stands in stark contrast with the general image of the Campine in the Belgian collective memory, strongly influenced by the depictions of the region by nineteenth-century romantic painters, who portrayed its heather in a silvery light, studded with little white, fluffy dots: the Campine sheep. The late medieval Campine communities placed a similar emphasis on the relevance of sheep farming to their communities, especially in sources drawn up in the wake of the Dutch Revolt, when the Campine peasants were eager to illustrate the havoc the Revolt wreaked upon their villages. The villagers of Olen for example, stated in 1593 that '*elke ingesetene*', every inhabitant, was a sheep owner.[25]

Sheep were, however, not a constant throughout Campine history. While sheep were grazed on mountain ridges, river pastures and sea dikes throughout Europe from the tenth century onwards, the Campine was virtually devoid of sheep in this early period. Specialized or commercial sheep breeding, even animal husbandry in general, was limited before 1300, as the region was sparsely populated and still characterized by woodland. Even though Frans Theuws stated that the Dukes of Brabant introduced commercial sheep breeding onto their demesnes from the thirteenth century onwards, Karel Leenders has convincingly shown that only a few flocks, belonging to ecclesiastical institutions, could be found in the Campine during the thirteenth century.[26] The abbey of Tongerlo and other Premonstratensian abbeys were indeed the first to develop large flocks of sheep on their demesnes from around this time. Ecclesiastical sheep breeding remained a feature of the region. From 1400 onwards the archives of the abbey give us of the numbers of sheep carried by the abbey's tenant farms (Figure 1).

Peasant sheep breeding took off somewhat later, after 1350, when, as we saw, the agricultural system was fundamentally transformed.[27] Vangheluwe and Spek link the appearance of sheep breeding to an intensification of the agricultural system, after the period of colonization had

[24] De Keyzer, 'Common denominator'.

[25] City Archive of Antwerp (SAA), Ancien Regime archives of the city of Antwerp, other governments, Local governments and seigniories, Belgium, Duchy of Brabant, 5, Condition of the villages in the margraviate of Antwerp in 1593.

[26] F. Theuws, 'Middeleeuwse parochiecentra in de Kempen, 1000–1350', in A. Verhoeven and F. Theuws, *Het Kempenproject 3. De middeleeuwen centraal* (1989).

[27] K. A. H. W. Leenders, *Van Turnhoutervoorde tot Strienemonde. Ontginnings- en nederzettingsgeschiedenis van het noordwesten van het Maas–Schelde–Demergebied (400–1350)* (1996).

[28] Vangheluwe and Spek, 'De Laatmiddeleeuwse Transitie'.

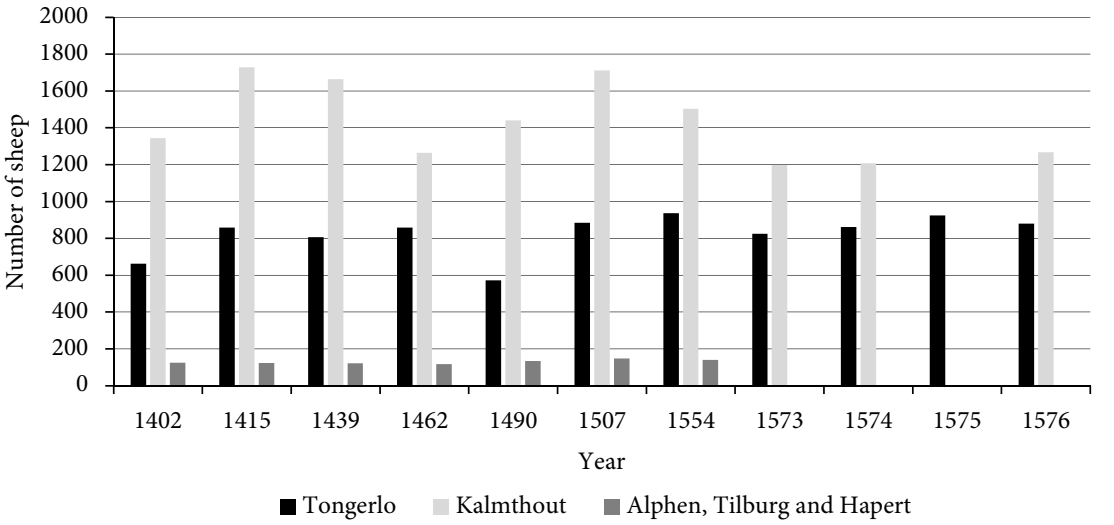


FIGURE 1: The size of the Tongerlo sheep flocks in the three most important *seignieuries* belonging to the abbey.

Source: C. Heerman, 'Het abdijdomein van de abdij van Tongerlo in de 15de–16de eeuw (met speciale aandacht voor de pachthoeves van de abdij)', *Taxandria, Jaarboek van de Koninklijke geschied- en oudheidkundige kring van de Antwerpse Kempen* (2006).

come to an end.[28] The area changed from a rural society predominantly focused on subsistence grain production into a fully mixed, yet still subsistence, economy, combining intensive arable production on small arable fields, cattle breeding on the common meadows and extensive sheep breeding on the vast common waste lands. The introduction of sheep was an immediate success and their numbers rose significantly. The golden age of peasant sheep farming in the Campine can be located in the fifteenth and sixteenth centuries. As in neighbouring peasant-dominated inland Flanders,[29] the late medieval crisis had hardly any impact on the Campine region, so sheep breeding remained a constant factor of importance.

IV

So far, we have established that the rise of peasant farming in the Campine was associated with the appearance of a mixed farming regime. This leads us to ask a number of questions: exactly how large were the peasant flocks grazing the Campine heathlands? How widespread was sheep ownership in Campine peasant communities? And what was the profile of peasants owning flocks of sheep? Until now, research has primarily focused on the flocks of ecclesiastical tenant farmers for whom detailed accounts have been preserved.[30] Sources allowing us

[29] E. Thoen and T. Soens, 'The family or the farm: A Sophie's choice? The late medieval crisis in Flanders', in J. Drendel (ed.), *Crisis in the later Middle Ages: Beyond the Postan–Duby Paradigm* (2015).

[30] Some examples: H. Van Der Wee, *The growth of the Antwerp market and the European economy (14th–16th centuries)* (1963); A. Verhulst, 'De inlandse wol in de textielnijverheid van de Nederlanden van de

TABLE 3: Possession of lambs by quartile, Alphen, 1514 and Essen and Nispen, 1553

	Alphen	*Essen and Nispen*
Minimum	1	1
Quartile 1	7	8
Median	10	11
Quartile 3	14	15
Maximum	34	31
Total lambs	2619	1597

Source: Sources: AAT, II, 688. Lamb tithes in Alphen and the surroundings, 1514 and AAT, II, 806. Lamb tithes, Nispen and Essen, sixteenth and seventeenth century.

to reconstruct peasant sheep ownership are much rarer, since probate inventories, accounts and estate papers are largely missing and those which survive do not provide information on animal ownership. But by combining different types of sources (*enquêtes*, tithe accounts, tax returns) we will attempt to shed light on these questions. These sources mainly stem from the sixteenth century, with some additional early seventeenth-century material.

The most elaborate, but unreliable, source is the '*generale enquête*' of 1593, drawn up to assess the damage done during the Dutch Revolt of the last quarter of the sixteenth century.[31] Here the Campine inhabitants gave an assessment of their pre-revolt sheep numbers. The people from Geel, a small town, claimed that 221 flocks had grazed on their territory. Loenhout, with over 1500 inhabitants, claimed that 3200 sheep had once been grazed there and in Wortel, a tiny village of some 300 people, 877 sheep. The *enquête* is not an entirely trustworthy source, since the Campine inhabitants used it to record the damage done to their property and their economy by the revolt, hoping to be compensated. Other sources confirm the image of a sheep-ridden society in the sixteenth century. In the archives of the abbey of Tongerlo, two accounts of the collection of lamb tithes have been preserved, one for the village of Alphen in 1514 and one for Essen and Nispen from 1556–57 (Table 3). Alphen was located in the north of the Campine, and was, with its extremely sandy soils, excellent for sheep breeding. The account shows that 243 households out of a total of 340 (71.5 per cent) owned up to dozen lambs. The total number of lambs liable to tithe was to 2619.[32] In the villages of Essen and Nispen 133 people made a contribution to the lamb tithes in 1553, for a total of 1597 lambs.[33] The distribution of lamb owning is strikingly similar in both villages in both periods. Their flocks were not as large as those of the Campine tenant farmers, however, they were by no means negligible. Some early seventeenth-century animal censuses – in all likelihood serving taxation

Note 30 *continued*
12e tot de 17e eeuw: Produktie, handel en verwerking', *Bijdragen en mededelingen betreffende de geschiedenis der Nederlanden* 85 (1970), pp. 6–18; C. Heerman, 'Het abdijdomein van de abdij van Tongerlo in de 15de–16de eeuw (met speciale aandacht voor de pachthoeves van de abdij)', *Taxandria, Jaarboek van de Koninklijke geschied- en oudheidkundige kring van de Antwerpse Kempen* (2006).

[31] SAA, 5, Condition, 1593.

[32] AAT, II, 688. Lamb tithes in Alphen and the surroundings, 1514.

[33] AAT, II, 806. Lamb tithes, Nispen and Essen, 16de en 17de centuries.

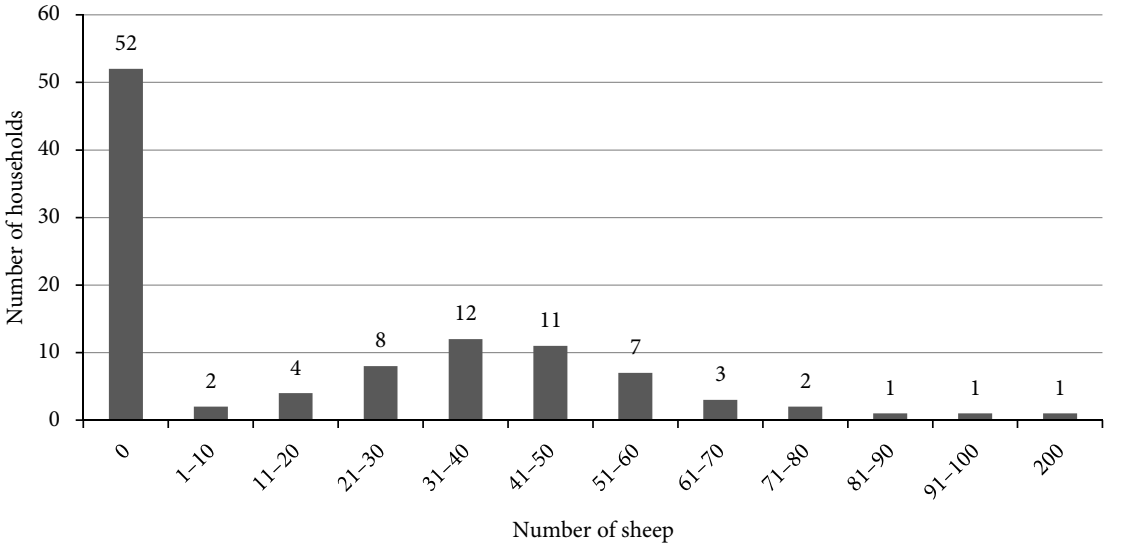


FIGURE 2: Size of the Rijkevorsel sheep flocks in 1608.

Source: RAA, OGA Rijkevorsel, 3141–3149, Animal counts, 1608.

purposes – confirm the sixteenth-century image. In early seventeenth-century Brecht 1573 and 2145 sheep were found in censuses of 1602 and 1605, and 2352 in the village of Rijkevorsel.[34]

Campine peasant flocks were larger than often supposed. Several scholars have stated that pre-industrial peasant households were unable to own significant flocks and that medium-to-large flocks of sheep, bred for commercial wool, meat or leather production, invariably belonged to rural elites, lords or ecclesiastical institutions.[35] As Jean-Marc Moriceau has written: 'Dans les sociétés agraires préindustrielles, on connaît bien la valeur de bétail comme critère de différenciation économique et sociale'. In his opinion, only farms with at least four ploughs were able to maintain a 'true' flock of sheep. Moreover, previous writers have linked the quality of the animals to the size of the farm. Whilst it is agreed that peasants owned cows, pigs or sheep, only the wealthiest peasants were able to produce high-quality milk or beef, or breed sheep with high-quality wool.[36]

We find that Campine peasants, owning no more than ten hectares of land at the most, possessed more than just a couple of sheep. In Rijkevorsel only six of the households that registered sheep possessed fewer than 20, while the large majority of the sheep-owning households held flocks of between 20 and 60 animals (Figure 2). This picture is confirmed by the flock sizes in the village of Brecht where the median is 40 in 1602. (It was only 25 in 1605 however, and the average also fell.) At Rijkevorsel in 1608, the median flock size was

[34] RAA, OGA Rijkevorsel, 3141–49. animal counts, 1608; OGA Brecht, 2540A, animal count, 1605 & 2541, animal count, 1602.

[35] Carrier, 'L'estivage en Savoe di nord', Pascua, 'Communautés de propriétaires'; Schermann, 'Un acteur de la transhumance'; Soldevila I Temporal, "L'élevage ovin'; Allison, 'The sheep-corn husbandry of Norfolk'; id., 'Flock management'; Campbell and Overton, 'New perspective'.

[36] J.-M. Moriceau, *Histoire et géographie de l'élevage Français. Du Moyen Âge à la Révolution* (2005), pp. 19–23.

TABLE 4: Peasant flock sizes in Campine villages, early seventeenth century

	Brecht, 1602	*Brecht, 1605*	*Rijkevorsel, 1608*
Minimum number of sheep	2	5	6
Maximum number of sheep	92	90	200
Average number of sheep	42.1	28.6	45.2
Median number of sheep	40	25	40.5

Source: RAA, OGA Rijkevorsel, 3141–3149, animal counts, 1608; Ancien Regime archives (OGA) Brecht, 2540A, animal counts, 1605.

40.5 and the average 45.3 (Table 4).[37] During the sixteenth century, some rural households were even able to sustain flocks up to 100 or even 200 sheep, approaching even the biggest tenant flocks.[38]

Nevertheless, we can perceive significant social differences in the possession of sheep in the Campine. Even though Campine sheep breeding was by no means limited to the 'one per cent', sheep owners were not found equally in all layers of society. This should perhaps not occasion any surprise: Philip Slavin has suggested that even during the thirteenth century a strong correlation between wealth and the ownership of sheep can be found, a trend that increased towards the pre-modern period.[39] In the 1593 *Enquête* for the village of Wortel, it was noted that those not owning any sheep had one thing in common: they were all cottagers, leasing their houses and possessing almost no land, something which was found throughout pre-modern Europe.[40] Sheep owning thus seems limited to 'true peasants': peasants who 'owned' their land (or at least had it for a customary rent) and were mostly able to guarantee the survival of their family. We can then of course wonder about the socio-economic profile of the peasants who were the true sheep owners. It is extremely difficult to get a clear view of this aspect of sheep ownership. Based on a general cattle unit count in Zandhoven in the mid-sixteenth century, it seems more than probable that only the upper 30 per cent of society were the owners of sheep, possessing the largest flocks. As indicated in Figure 3, 31 per cent of the total population possessed at least one sheep.[41]

[37] Based on the lamb tithes of the Abbey of Tongerlo for the villages of Alphen (1514) and Essen and Nispen (1553). Source: AAT, II, 688, 1514 & AAT, II, 806, 16de en 17de century; Rijksarchief Antwerpen (hereafter RAA), OGA Brecht, 2540A, animal count, 1605.

[38] Van Onacker, 'Leaders of the pack?', p. 192.

[39] Slavin, 'Peasant livestock'; Campbell and Overton, 'New perspective'.

[40] Slavin, 'Peasant livestock'; Sapoznik, 'Resource allocation'.

[41] The curve shows the general distribution of cattle units in Zandhoven, while the horizontal lines indicate the estimated limit of the different types of animals. 65 of the 76 registered households listed at least 0.5 head of cattle. Therefore 85 per cent of the village owned at least one animal. Thanks to the animal counts of different villages, such as Wortel and Rijkevorsel, we know that the large majority of peasant households owning even the tiniest parcel of land possessed at least one cow, but almost never listed a horse or sheep (see light grey line). We therefore estimate that 0.5 cattle units equalled one head of bovine cattle. By looking at the example of Rijkevorsel, we can deduce that households owning sheep possessed 5 times as many sheep as head of livestock. Therefore, five sheep equalled one head of livestock that could either be a horse or bovine cattle. These findings, together with our knowledge of average sheep and horse ownership derived from Wortel and

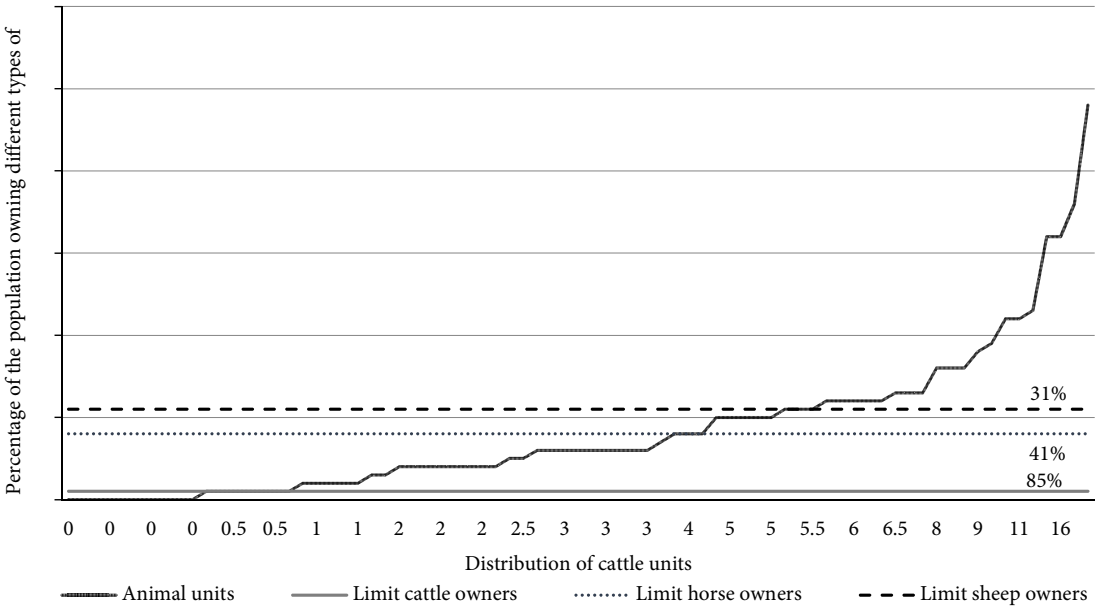


FIGURE 3: Cattle, horse and sheep possession in Zandhoven in 1559.

Source: RAA, OGA, Zandhoven, 148.

A detailed assessment of the profile of sheep owners cannot be made before the beginning of the seventeenth century because it requires the combination of animal counts and tax registers, both of which are very rare for the Campine. Even then we can only attempt to sketch the socio-economic position of sheep owners for two villages, Brecht and Rijkevorsel.[42]

In Brecht, in 1602, 50 per cent of all sheep owners were part of the highest three tax deciles (corresponding to the 30 per cent highest taxed, and wealthiest, individuals),[43] while in 1605 this amounted to 58.3 per cent (see Table 5). In Rijkevorsel, in 1608, as many as 53.6 per cent of all sheep owners belonged to the highest three tax deciles. Not surprisingly the majority of sheep owners possessing flocks larger than the median came from the highest deciles. In 1602 Brecht, this amounted to 57.1 per cent. Three years later, in 1605 this number even rose to 81.8 per cent. In Rijkevorsel, in 1608, 72.2 per cent of owners with flocks larger than the median, came from the highest three deciles. And, strikingly, sheep owners also tended to possess quite substantial numbers of cows (higher than or equal to the median value) (see Table 6). This implies that the Campine sheep owners predominantly came from the social group of the 'independent peasants', those owning above-average farms (3 to 5 hectares) and

Note 41 *continued*
Rijkevorsel, has led us to calculate that the top 41 per cent of Zandhoven's livestock owners who listed four cattle units owned at least one horse (see dotted line) and 31 per cent owned a flock of sheep (see dashed line), which consisted of a minimum of five animals. Sources: RAA, OGA, Zandhoven, 148, 'Heideboek', 1559–1581; SAA, 5 condition, 1593; RAA, OGA Rijkevorsel, 3141–3149, animal counts, 1608.

[42] Based on the following tax registers: RAA, OGA Rijkevorsel, 3262, 1607 and OGA Brecht, 2529. Tax register early seventeenth century.

[43] RAA, OGA Brecht, 2541. Animal count, 1602.

TABLE 5: Stratification of sheep ownership in Brecht and Rijkevorsel, early seventeenth century

	Percentage of sheep owned in		
	Highest 3 deciles	*Middle 3 deciles*	*Lowest four deciles*
Brecht, 1602	50.0	35.7	14.3
Brecht, 1605	58.3	20.8	20.1
Rijkevorsel, 1608	53.6	39.3	7.1

Source: RAA, OGA Rijkevorsel, 3262, Tax register, 1607; OGA Brecht, 2529, Tax register, early seventeenth century.

TABLE 6: Link between sheep and cow ownership

Brecht 1602	100 % own at least 1 cow	78.57 % own ≥ median
Brecht 1605	100 % own at least 1 cow	100 % own ≥ median
Rijkevorsel 1608	96.96 % own at least 1 cow	78.78 % own ≥ median

Source: RAA, OGA Brecht, 2541, animal count, 1602; OGA Brecht, 2540A, animal count, 1605; OGA Rijkevorsel, 3141–3149, animal count, 1608.

able to dominate their communities. Peasants owning less than three hectares, and especially those tilling a farm of less than one hectare, possessed significantly fewer or even no sheep at all. This was in all likelihood linked to the fact that the breeding of sheep required an investment poorer peasants were unable to make. Sheep required winter fodder, something this group was less able to grow or buy. These less well-to-do peasants were more inclined to invest in one or two cows, which could graze on the common hay meadows.[44] As Neeson stated, cows were the most important assets for a peasant household to protect themselves from becoming fully dependent on wage labour.[45] Sheep ownership thus functioned as a social marker, not one separating the one per cent from a large mass of villagers, but one distinguishing a broad peasant elite (consisting of about 25 to 30 per cent of the village community) from their less well-off fellow-villagers. The question then of course remains why these independent Campine peasants were able to engage so firmly in what has often been labelled a landlord or tenant-farmer form of farming. Two factors will be discussed in the following sections: one focusing on the 'supply side', namely the institutional organization of the Campine commons and one on the 'demand side', namely the demand for wool by the Low Countries' cloth industry.

[44] De Keyzer, 'Common Denominator'; Van Onacker, 'Leaders of the pack'.

[45] J. M. Neeson, *Commoners: Common right, enclosure and social change in England, 1700–1820* (1993).

TABLE 7: Features of meadows, Gierle, 1554

	Percentage of holding used as meadow	*Average hay yield (kg per ha)*	*Number of cattle units that could be fed*
< 1 ha	43.9%	486.1	0.8
1–3 ha	27.3%	788.9	1.3
3–5 ha	29.2%	1671.2	2.7
5–10 ha	25.7%	2585.7	4.1
≥ 10 ha	25.5%	4557.8	7.3

Source: RAA, OGA Gierle, 344. Tax register, 1554.
Note: Hay yield (1411 kg per ha): based on Dahlström, 'Pastures, livestock numbers and grazing pressure'. The amount of fodder needed per animal: based on Moriceau, *Histoire et géographie,* p. 209. He claims that one horse needs 2500 kg of hay, a cow needs 625 kg and a sheep 208 kg. Cattle units: 1 horse = 4 cows = 12 sheep.

IV

The independent peasants of the Campine, alongside the tenant farmers of the ecclesiastical estates, were thus the most important sheep breeders of their communities but, as we already mentioned, their farms were only of moderate size and by no means big enough to sustain flocks of about 30 up to 100 animals by themselves. In Alphen in 1559, the average farm size was 3.3 hectares.[46] In Gierle in 1554, farms were even slightly smaller on average, at 2.8 hectares.[47] Sheep farming on the scale we have discovered was only possible because the peasants had access to suitable village waste lands. In the case of the late medieval Campine, all residents were considered to be part of the village community and were allowed to use its commons. Outsiders and neighbouring community members were strictly excluded. Even though some communities did demand a small entrance fee, this sum was low enough not to be a burden on the poorest community members, since during the sixteenth century 98 per cent of all households made some use of the common waste.[48]

This dependence on the common waste lands followed immediately from the peasants' inability to feed their animals on their private land alone. Based on the calculations of Anna Dahlström, we have reconstructed the average amount of fodder peasants of different property groups in the villages of Gierle and Alphen were able to produce on their private meadows around the middle of the sixteenth century (Table 7).[49] It immediately becomes clear that even the peasants with the largest meadows were unable to support flocks of over 30 animals from their private land alone. Flocks of the size we have discovered could only be maintained

[46] AAT, II, 689. Tax register, 1559–78.

[47] RAA, OGA Gierle, 344. Tax register, 1554.

[48] After all, on average a family household had to pay eight *stuiver* for one year, which is less than the average daily wage for this period (fluctuating around 11.5 *stuiver*), either grazing or collecting peat. One cattle unit cost on average 0.6 *stuiver* and one day of cutting peat and mowing hay 1.75 *stuiver*. Source: RAA, OGA Zandhoven, 148.

[49] A. Dahlström, 'Pastures, livestock numbers and grazing pressure, 1620–1850. Ecological aspects of grazing history in south-central Sweden' (Ph.D thesis, Swedish University of Agricultural Sciences, 2006).

TABLE 8: Sheep, lamb and wool ownership in Great Cressingham, first half of the seventeenth century

Year	*Number of lamb owners*	*Number of wool owners*	*Average number of lambs*	*Estimated total population*	*% sheep owners of estimated total population*
1624	8	9	123.8	44	18.2
1625	9	8	125.6	46	19.6
1626	10	7	188.1	46	21.8
1628	9	9	160.8	52	17.3
1634	14	15	91.9	40	35.0
1635	16	18	84.7	40	40.0
1636	11	14	79.3	46	23.9
1640	20	20	63.3	53	37.7
1641	22	13	63.3	49	44.9

Source: Norfolk RO, PD 131/ 38.

because of the extensive commons available to the peasants. The scale of these commons has already been shown in Table 2.

This reliance on a common property regime can be found in all the peasant sheep-breeding societies we identified earlier. Without access to common waste lands, peasant sheep breeding seems unviable. Common-pool institutions similar to those found in the Campine also developed in both Drenthe and het Gooi, and here too peasants had the possibility to grazing flocks of sheep in extensive wastes. Access to the commons was more restricted in Drenthe and het Gooi than in the Campine. Only peasants owning a particular plot of land, farmstead or holding a licence could graze animals on the commons. As a consequence a much smaller proportion of the community, but practically all sheep owners, were granted access.[50] Peasants' reliance on commons becomes clear when we look at areas where access to the commons disappeared because the balance of local power shifted to landlords and their farmers. This brought peasant sheep farming to an end. In the East Anglian Brecklands, peasants were engaged in sheep breeding and wool production from the twelfth century onwards via the foldcourse system, at a time when their lords were mostly interested in grain production. On average 60 per cent of Blackbourn hundred taxpayers and 62 per cent of those in Breckland had sheep in 1283 (Table 8).[51] In addition, Slavin has shown that stocking densities of sheep and cattle were 2.2 times higher on tenant holdings than on demesne land in 1283.[52] The sheep had to be folded in strictly defined grazing tracts marked by temporary fences, which were

[50] J. Bieleman, *Boeren op het Drentse zand 1600–1910: Een nieuwe visie op de 'oude landbouw'* (1987); T. Spek, *Het Drentse Esdorpenlandschap*; Kos, *Van Meenten Tot Marken*; H. Vera, '... Dat men het goed van den ongeboornen niet mag verkoopen. Gemene gronden in De Meierij van Den Bosch, tussen Hertog en hertgang 1000–2000' (Ph.D thesis, Radboud University, Nijmegen, 2011).

[51] E. Powell, *A Suffolk hundred in the year 1283* (1910).

[52] Slavin, 'Peasant livestock'.

regularly moved on the open fields and wastelands of the manor. The manorial lord controlled this system and could determine who could have access to the communal flock and where the sheep should be placed to fertilize the land.[53] After the Black Death, small independent peasants largely disappeared and grain prices plummeted. This enabled lords to monopolize the foldcourse rights and exclude the remaining peasants from the commons. The abolition of the communal rights led to the disappearance of peasant sheep breeding in this particular area from the sixteenth century onwards.[54] In the Breckland village of Great Cressingham only 13 individuals were registered as paying lamb tithes during the second quarter of the seventeenth century, almost half of whom could not be linked to property or land in the village itself. They probably possessed the right of foldcourse in the village without actually residing there.[55] As Allison and Bailey have both noted, sheep breeding had become an activity of specialized, commercial sheep breeders and landlords rather than peasants.

There is therefore an association to be made between peasant sheep farming and the emergence (and survival) of robust peasant rights over commons and wastes. The Campine was not exceptional, but the rights here were remarkably inclusive: all social groups had the use of the commons. The independent peasants, or upper 30 per cent of society, had access as well, as did tenant farmers living within the village communities. So too did smallholders and cottagers. Other pre-industrial communities increasingly tried to limit the grazing pressure on common pastures and wastelands by reducing the number of animals individuals could graze. Densely populated areas would be the first to introduce such restrictions: an unstinted system presupposes a sufficiency of common land.[56] Angus Winchester, who has discussed the regulations introduced by common-pool institutions, has described stinting as a common practice that became increasingly dominant after the middle ages, even though as many as 46 per cent of the communities of England and Wales remained stint-free.[57] This view of stinting as a response to population growth and the over-use of the wastes which it produced has been confirmed time and again for multiple regions.[58] Nevertheless, not one Campine village introduced a quota for any type of animal.[59] Sheep flocks could therefore be as large

[53] Bailey, 'Sand into gold'.

[54] Ibid.

[55] Norfolk RO, PD 131/ 38.

[56] A. J. L. Winchester and E. A. Straughton, 'Stints and sustainability: Managing stock levels on common land in England, *c*.1600–2006', *AgHR* 58 (2010); J. Thirsk, *The agrarian history of England and Wales,* IV, *1500–1640* (1967), pp. 30–48.

[57] Winchester and Straughton, 'Stints and sustainability'; J. R. Birrell, 'Common right in the medieval forest: Disputes and conflicts in the thirteenth century', *Past and Present* 117 (1987).

[58] M. De Moor, L. Shaw-Taylor and P. Warde (eds), *The management of common land in north-west Europe, c.1500–1850* (2002); B. M. S. Campbell, *English seigniorial agriculture, 1250–1450* (2000).

[59] Byelaws (keuren) consulted for this statement: RAA, Oud Gemeente-Archief (OGA) Tielen, 28; OGA Gierle, 44, Byelaw; OGA Herenthout, 3; OGA Hoogstraten 638; OGA Rijkevorsel, 8; AAT, Bundel Tongerlo I: Rules for the village of Tongerlo; AAT, Bundel Byelaws, Veerle and Oevel; G. De Longé, *Coutumes d'Herentals, de Casterlé, de Moll, Balen et Desschel, de Gheel, de Hoogstraten, de Befferen et de Putte et féodales du Pays de Malines* (1878), Th. De Molder, 'Keuren van Oostmalle', *Oudheid en Kunst* 26 (1935); J. Ernalsteen, 'Brecht: De keuren van 1601', *Oudheid en Kunst* 16 (1925); J. Ernalsteen, 'Keuren van Gheel', *Oudheid en Kunst* 26 (1935); A. Gielens, 'Keuren van Ekeren', *Oudheid en Kunst* 30 (1939); I. Helsen, 'Het dorpskeurboek van Retie', *Bijdragen tot de geschiedenis* 1 (1949); M. Koyen, 'Keuren van Ravels', *Oudheid en Kunst* 41 (1958); J. Lauwerys, 'Keuren van Westerloo', *Oudheid en Kunst* 28 (1937); G. Meeusen, 'Keuren van Esschen, Calmpthout en Huybergen', *Oudheid en Kunst* 23 (1932); J. Michielsen, 'Keuren van Brecht', *Oudheid en Kunst* (1907);

as the owners wished. This explains why peasant flocks could be as large as 200 animals, as opposed to the Gooi region where limits of 33 sheep were introduced.[60] Inclusiveness and lack of stinting did not lead to a free-for-all or a 'tragedy of the commons'. The commons were closely monitored and regulations were strict. Over-exploitation was prevented by introducing strict herding practices, strong social control and collective maintenance works, rather than by excluding community members.[61] The absence of stinting and the reliance on other methods of control is closely linked to the specific social constellation of the Campine, the above-mentioned 'common denominator', implying that no social group was able to limit the access rights of others. So, on the production side of the picture, the specific configuration of the Campine common-pool institution was a decisive factor. But let us not forget the role of consumption and demand, which will be dealt with in the next section.

V

For the Low Countries – and especially the duchy of Brabant – the fifteenth and sixteenth centuries were a period of significant economic change. From the fifteenth century onwards, the annual Brabantine fairs in Antwerp and Bergen op Zoom prospered. In the sixteenth century Antwerp became a true commercial metropolis, a vibrant centre of trade and art, buzzing with possibilities; markets flourished. But to what extent was Campine sheep breeding linked to these local and regional markets? Did the independent peasants of the Campine operate within the same commercial circuits as the regional elites and ecclesiastical producers of wool? Was there a role for Campine wool in the famous cloth production centres of the Low Countries?

Although research does indicate that all those living on the countryside used markets – whether large farmers or smallholders, from the Scandinavian peasants living under the sun division[62] to Eastern European peasants confronted with a renewed wave of feudalization[63] –, the exact relationship between peasants and markets has, however, proven to be a distinctly more complicated matter and the subject of intense discussion. In the neo-Marxist and neo-Malthusian theories dominant in the 1970s, peasants and markets belonged to two

Note 59 *continued*
K. C. Peeters, 'De Wuustwezelsche dorpskeuren (xv^{e}–xvii^{e} Eeuw)', *Wesalia, Tijdschrift voor plaatselijke Geschiedenis en Folklore* 8 (1933); K. C. Peeters, 'De Wuustwezelsche Dorpskeuren (xv^{e}– xvii^{e} Eeuw)', *Verslagen en mededelingen van de koninklijke Vlaamsche academie voor taal en letterkunde* (1932); R. Peeters, 'De keuren van Turnhout (1550)', *Taxandria* 29 (1957); id., 'De keuren van Turnhout' *Taxandria* 29; F. Prims, 'Keuren der Vreyheyt van Arendonk', in H. Draye (ed.), *Feestbundel H. J. Van De Wijer, den jubilaris aangeboden ter gelegenheid van zijn vijfentwintigjarig hoogleeraarschap aan de R. K. Universiteit te Leuven 1919–1943* (1944); J. Van Gorp, 'Het keurboek van Casterlee', *Bijdragen tot de geschiedenis* 18 (1927); id., 'De Aartbrief van Terloo', *Bijdragen tot de geschiedenis* 18 (1927); E. H. A. Van Olmen, 'De keuren van Vorselaar', *Taxandria* 7 (1910); F. Verbist, *Costuymen van de hoofdrechtbank Van Zandhoven, Uitgave 1664 . Keuren En Breuken, Uitgave 1665* (2007); J. R. Verellen, 'De keuren van Herentals (1410–1567)', *Taxandria* 16 (1950); P. J. Verhoeven, 'Keuren Van Calmpthout', *Oudheid en Kunst* (1907).

[60] Kos, *Van meenten tot marken*.

[61] M. De Keyzer, 'All we are is dust in the wind. The social causes of a "subculture of coping" in the late medieval Coversand Belt', *J. History of Environment and Society* 1 (2016).

[62] For example J. Myrdal, 'Women and cows: ownership and work in medieval Sweden', *Ethnologia Scandinavica* 38 (2008), pp. 61–80.

[63] P. Guzowski, 'A changing economy: Models of peasant budgets in fifteenth- and sixteenth-century Poland', *Continuity and Change* 20 (2005), pp. 9–25.

different worlds. Neo-Marxist views drew on the godfather of peasant studies, the Russian agronomist Alexander Chayanov who propounded a distinctly negative view of peasants and markets, suggesting that peasants were market-averse and inclined to shun risks.[64] This theory was adopted by Robert Brenner in his influential work on the transition to capitalism on the English countryside.[65] More recently, thinking on this point has become more nuanced. Market activities are increasingly considered as being part of a mixed portfolio of activities, portraying peasants as the ultimate 'anti-specialists'.[66] Recent historians have stressed the importance of subsistence farming, but also point both towards the possibilities and necessity of market participation. Paul Warde, for example, takes a very pragmatic stance, stating that peasants were indeed inclined to meet subsistence needs first, but that this did not imply that they shunned market participation.[67]

Campine peasants were eager participants in the market, but only within the boundaries of a traditional and non-specialized peasant society. Commodities could be marketed to generate a surplus income, but that cash income was not the main source of sustenance for the peasant household. Nor were peasants primarily focused on maximizing profit.[68] Late medieval communities themselves did not object to commercial practices. Even though several scholars have stated that the marketing of products derived from the commons was prohibited, this applies only to exhaustible resources. Almost all Campine by-laws prohibited the selling of peat, loam or heather from the commons. Similar rules did not apply to animal products. Hides from cattle and sheep, wool, milk, cheese, beeswax and meat were products that were directly linked with the common wastelands or meadows, but which could be sold on local and regional markets without any restrictions.[69] As such, there were no objections to marketing the by-products of sheep breeding on an institutional level. Was there also a demand for them?

The urban centres of the Low Countries were of course very well known for cloth production, but did inland wool – and more specifically Campine wool – play a part in this? Adriaan Verhulst claimed that the onset of the Flemish (and later on Brabantine) cloth industries was supported by inland wool, but that, once established, they switched to higher-quality wool, most notably from England.[70] In the centres of the luxurious 'Old Draperies' – the traditional medieval industrial centres such as Bruges, Ghent and Ypres – inland wool was certainly of no importance, as only high-quality English wool was used. The industries of the 'New Draperies', on the other hand, which produced good-quality imitations of the old luxury products, mainly used somewhat cheaper Spanish merino wool. However, the fifteenth- and sixteenth-century novelty of the light drapery (or *sayetterie*), in which cheap fabrics were produced in rural

[64] D. Thurner *et al.*, *A. V. Chayanov on the theory of peasant economy* (1986).

[65] R. Brenner, 'Agrarian class structure and economic development in pre-industrial Europe', *Past and Present* 70 (1976).

[66] See, for example: J. D. Van der Ploeg, *The new peasantries: Struggles for autonomy and sustainability in an era of empire and globalization* (2009).

[67] As formulated in P. Warde, 'Subsistence and sales: The peasant economy of Württemberg in the early seventeenth century', *EcHR* 59 (2006), pp. 289–319.

[68] E. Van Onacker, 'Bedrijvige boeren? Peasants en de land- en kredietmarkt in de vijftiende- en zestiende-eeuwse Kempen', *Tijdschrift voor Sociale en Economische Geschiedenis* 10 (2013).

[69] See n. 59 above.

[70] Verhulst, 'De inlandse wol'.

[71] Munro, 'Origins'.

TABLE 9: Guild regulations of Brabantine cities mentioning Campine wool

City	*Stipulation*
's Hertogenbosch	Anyone who wants to produce broadcloth, must make it from English wool and of good Campine wool
Antwerp	Cloth from Retie and Duffel (two villages in the Campine)
Brussels, Mechelen and Lier	We do not process Zeeuwsche wool, lambswool, Brabantine wool or 'blootwool', but only the finest and most exquisite Campine wool
Leuven	This inland wool came from the immediate surroundings, where some drapers, such as Ard Vinke, possessed flocks, but the best was without doubt the fine Campine wool, which was – for regular cloth – mixed with fine English wool in 1513 and in the fifteenth century was used for this purpose on its own

Sources: N. Van Den Heuvel, *De ambachtsgilden van 's-Hertogenbosch voor 1629. Rechtsbronnen van het bedrijf sleven En Het gildewezen* (Utrecht, 1946), p. 74 (1403 & 1471); F. Prims, 'De statuten van de Antwerpsche lakengilde in het begin der 16de eeuw', *Koninklijke Vlaamsche academie voor taal- en letterkunde,* 1939 (1939), p. 37 (1532); A. Thijs, *Van "Werkwinkel" Tot "Fabriek". De Textielnijverheid Te Antwerpen Van Het Einde DerP Vijftiende Tot Het Begin Der Negentiende Eeuw* (1978), p. 504 (1567); R. Van Uytven, *Stadsfinanciën en stadsekonomie te Leuven* (1967), p. 504.

centres such as Hondschoote, might have had more use for the Campine wool, which was of lesser quality than its English or Spanish alternatives.[71] Furthermore, the importance of even average-quality wool for the domestic market should not be underestimated as these luxury draperies were not omnipresent and were mostly aimed at international markets. The domestic market for non-luxury products was, after all, much larger than that for high-quality cloth. A quick scan of the cloth guild regulations of some Brabantine cities such as Antwerp, Brussels, Leuven, Lier and 's Hertogenbosch shed more light on this enigma (Table 9). Several of these regulations mention the use of Campine wool.

It is likely that the Campine peasants sold wool to traders from urban centres. The records of the steward of Turnhout suggest that Campine sheep breeders conducted business with traders from Herentals, Hoogstraten, as well as Sint Truiden.[72]

Demand for wool remained quite constant for the Campine peasants and tenants. While the traditional cloth centres started to dwindle during the fifteenth century, the Campine peasants were able to shift towards more northern urban centres such as Oisterwijk, 's Hertogenbosch and, later, Tilburg, or to more rural production centres such as Weert.[73] Marlous Craane found that a significant part of the wool produced in the area around 's Hertogenbosch was used in rural textile production and not in the town itself.[74] A detailed reconstruction of proto-industrial textile activities in the Campine countryside is impossible as there are scarcely any probate inventories preserved from before 1650, so we have very limited evidence for the presence of looms and other means of production. Other sources however give no indication of the presence of this type of activity during the sixteenth century. This is obviously an

[72] ARAB, Chambre des Comptes, 5213/1–8, Accounts of the domain of Turnhout, 1550–57.

[73] L. Adriaensen, 'De plaats van Oisterwijk in het Kempense lakenlandschap', *THB* 41 (2001).

[74] M. Craane, 'Spatial patterns; the late-medieval and early-modern economy in 'S Hertogenbosch from an interregional, regional and local spatial perspective' (Ph.D thesis, Tilburg University, 2013), p. 94.

important lacuna when assessing the demand for Campine wool, but the possibility remains that the local wool found an outlet in the villages in which it was produced.

It is only during the seventeenth century that commercial peasant sheep farming began to decline. The Dutch Revolt had led to chaos and ultimately cut the Campine off from northern production centres. Jan Bieleman suggested for the Veluwe, a sandy region in the Netherlands not dissimilar to the Campine, that it was from around then that commercial sheep breeding and wool production ceased to be a profitable business. Due to the growing popularity of linen, woollen textiles became less attractive. The breeding of sheep shifted to more peripheral regions, such as Drenthe.[75] If we look at some eighteenth-century figures, made available by Eric Vanhaute, then we find striking differences with the fifteenth and sixteenth centuries. Whereas in the earlier period a broad layer of society, the 'true' peasants who owned their own farms and were able to live above subsistence level, owned sheep, by the late eighteenth century only 9 per cent of the villagers were still maintaining far smaller flocks.[76] The Campine peasants therefore were able to adapt their commercial strategies to the changes in demand – perhaps turning more towards proto-industrial activities, for which we have evidence during the eighteenth century – as their mixed farming businesses gave them a stable basis for living.[77]

Lastly it remains to show how 'profitable' Campine sheep farming was in the sixteenth century. How much could a peasant gain by selling animal by-products? Sheep produced a wide range of saleable products: wool, dairy products, hides and meat. While wool has received the most attention, the importance of sheep for dairy products, hides and meat in particular was of equal importance to these peasants. Let us start with the possible gains to be made from the sale of lambs (for meat). Antwerp market prices are easily accessible. Scholliers has produced series of fifteenth- and sixteenth-century Antwerp animal prices, predominantly based on the accounts of the Saint Elisabeth Hospital.[78] However, it is important to remember that these prices are probably not entirely representative for the Campine markets, where products were usually somewhat cheaper. The lamb numbers are based on the sixteenth-century lamb tithes accounts for Alphen and Essen-Nispen. Given that the median sheep-owning villager owned around 10 or 11 lambs, they might have a reasonable income from the sale of some of these animals; taking into account that the price of a lamb was around 3.75 (Essen and Nispen) to 4 (Alphen) days' wages of a rural labourer (see Table 10).

Wool did, however, leave more paper trails than the sale of animals. We have information on wool sales from the accounts of a sheep-breeding enterprise set up by Mary of Hungary, governor of the Low Countries, on her demesne in Turnhout. Based on the records of Willem Wils, the manager of this estate, we have been able to assess how much a peasant could potentially earn from the wool of his flock (see Table 11). A household owning a flock of sheep

[75] J. Bieleman, *Boeren in Nederland: Geschiedenis van de landbouw, 1500–2000* (2008), pp. 112–19.

[76] E. Vanhaute, *De invloed van de groei van het industrieel kapitalisme en van de centrale staat op een agrarisch grensgebied: De Noorderkempen in de 19de Eeuw (1750–1910)* (1990) and E. Vanhaute, *Heiboeren. Bevolking, arbeid en inkomen in de 19de–Eeuwse Kempen* (1992).

[77] On how peasants were able to seize market opportunities and adapt their strategies, see also B. Dodds, 'Demesne and tithe: Peasant agriculture in the late Middle Ages', *AgHR* 56 (2008).

[78] E. Scholliers, 'Prijzen en lonen te Antwerpen (15e en 16e eeuw)', in C. Verlinden (ed.), *Dokumenten voor de geschiedenis van prijzen en lonen in Vlaanderen en Brabant* (1959).

TABLE 10: Lamb prices and possible profits in the sixteenth century

	Alphen, 1514			*Essen-Nispen, 1553*		
	Number of animals	*In Brabant pence*	*In working days of unschooled labourer*	*Number of animals*	*In Brabant pence*	*In working days of unschooled labourer*
Price for one lamb		57.8	4.0		90	3.75
Minimum number of lambs	1	57.8	4.0	1	90	3.75
Q1 number of lambs	7	404.6	27.9	8	720	30.0
Median number of lambs (Q2)	10	578.0	39.9	11	990	41.25
Q3 number of lambs	14	809.2	55.8	15	1350	56.25
Maximum number of lambs (Q4)	34	1965.2	135.5	31	2790	116.25
Average number of lambs	10.8	623	43.0	12	1080.7	45.0

Sources: Animal numbers come from AAT, II, 688. Lamb tithes in Alphen, 1514 & AAT, II, 806. Lamb tithes, Nispen and Essen sixteenth and seventeenth century; prices are derived from E. Scholliers, 'Prijzen en lonen te Antwerpen (15e en 16e eeuw)', in C. Verlinden (ed.), Dokumenten voor de geschiedenis van prijzen en lonen in Vlaanderen en Brabant (1959); wages from Van der Wee, *The growth of the Antwerp market* (database Jord Hanus).

TABLE 11: Estimates of wool yields, based on prices and quantities of wool sales in Turnhout by Willem Wils between 1553–56

Wool yields and profits	
Average quantity of wool per sheep in 'steen'	0.16
Price of wool per steen in schelling	33.13
Average flock size	45.0
Wool yields in steen per average flock in schelling	7.2
Cash earnings per average flock in schelling	238.54
Amount of days' wages a skilled mason could receive from the earnings	29.81

Source: Information on flock sizes and number of sheep that were shorn derived from: AAT, II, 206, Lease accounts of the abbey of Tongerlo, 1504–1513. Estimates of the price and quantities based on the accounts of Willem Wils, ARAB, Chambre des Comptes, 5213/1–8, Accounts of the domain of Turnhout, 1550–57.

could potentially earn an income equal to 30 days of wages as a skilled urban mason.[79] We must obviously take into account the fact that these peasants had to re-invest a portion of these earnings in order to purchase animals, fodder and supplies, while probably up to a third of the flock had to be replaced each year.[80] However, the fact that the commons could be used and the

[79] ARAB, Chambre des Comptes, 5213/1–8. Wages based on the series of Robert Allen, derived from Van Der Wee, *Growth of the Antwerp market*.

[80] ARAB, Chambre des Comptes, 5213/1–8. Campbell, *English seigniorial agriculture*.

fact that family labour (often child labour) could be used to shepherd sheep cut costs significantly. The difference between cottagers and smallholders, owning a limited number of sheep, and independent peasants, owning sizeable flocks, seems to be sharply drawn. Independent peasants were in all likelihood much more able to profit from the commercial opportunities of sheep breeding than their less well-off neighbours, whose more limited number of sheep did not allow for such endeavours.

The peasants in particular were therefore able to supplement their household income by engaging in the market. They did not, however, blindly follow the ups and downs of those urban markets. When, during the fifteenth century, imports of English wool were banned, Campine peasants would have been able to transform their farm structure and agricultural strategies to specialize in sheep breeding and wool exporting. After all, this important shift had occurred in the Brecklands in East Anglia during the later medieval period once English wool had gained importance as an export product.[81] Nevertheless, the peasants did not change their agricultural strategies, and maintained similar flock sizes throughout the period, apart from a short downfall of sheep numbers during the late fifteenth-century economic crisis. They supplied the inland wool that was constantly needed to produce second-rate cloth for internal demand without trying to follow the fluctuations of the luxury trade.

VI

Where peasants continued to have access to commons – where common-pool institutions protected their rights – they continued to maintain sizeable sheep flocks. Where the institutions which defended commons were overturned by lords, peasant sheep keeping disappeared. Whilst lords, ecclesiastical institutions and their tenants might have been able to produce better-quality wool, and dominate the high-end market, peasants could almost certainly find an outlet for their wool if only for the production of lower-grade cloth manufactured and sold locally. Peasant wool might therefore find a ready market.

The late medieval Campine is a particularly good example of this. A significant proportion of the Campine villagers owned flocks of sheep, of which the largest were in the hands of the richest 30 per cent, the independent peasants. The larger peasants owned flocks averaging around 45 animals, a few as many as 100 animals. As such some of these peasants could match the flock sizes of the tenant farmers of the abbey of Tongerlo. These sheep owners were however true peasants. They never owned more than 10 hectares of land, including both arable land and pasture. Specialization was absent, and they combined intensive arable production on small plots of land with animal husbandry. Taking full advantage of both their own as well as common land, these households were able to maintain a couple of heads of cattle and run flocks of sheep on the heathlands. These peasant households had therefore diversified to avoid complete market dependency and to outride the shocks and economic fluctuations of the pre-industrial urban markets. Sheep breeding provided an additional income with which to secure self-sufficiency.

[81] Bailey, ‘Sand into gold’.

However, even in a peasant society with commons, significant internal differences could be encountered. The ownership of a large enough farm and a flock of sheep could make the difference between struggling for survival and relatively adequate standard of living. When it came to sheep owning, the Campine's most significant dichotomy was not one between commercial tenants and small peasants, but between those able to keep flocks of sheep of above average size and reap the commercial benefits, and those only able to breed a more limited number of animals, essential for their own survival.

Not all peasant societies were able to opt for commercial sheep breeding. Limited by their tiny plots of private land, smallholders heavily relied on access to common pasture. In the Campine, peasants were only able to feed up to four or five cattle units from their own lands, which was far from sufficient to support their flocks of around 45 animals. It was only when peasants were able to obtain and maintain access to wastelands that sheep breeding became practicable. Thanks to the extensive and inclusive communal rights to the common wastelands, the Campine peasants, and especially the upper layer of independent peasants, were able to develop a diversified economic portfolio. Consequently the Campine peasant flocks not only survived throughout the fifteenth and sixteenth centuries, but reached their peak at that time.

Why was flour of poor quality? The impact of seigneurial laws and price controls on flour in Quebec during the colonial era*

by Vincent Geloso and Alexis Lacombe

Abstract

The literature on Quebec's economic history often portrays its agriculture during the pre-Confederation era as poor. One recurrent problem mentioned in the literature is that the flour produced in the colony was of very poor quality. This judgment was only extended towards flour consumed within the colony and not that exported to foreign markets (where Canadian flour seems to have enjoyed a slightly better reputation even if exports were quite small in terms of volume). This paper tackles the sources of this problem of quality on the domestic market and argues that it arose from a combination of land tenure regulations under the system of seigneurial tenure and of price regulations.

From its settlement in the early seventeenth century to the early days of the Canadian confederation, the predominantly French-speaking province of Quebec was primarily an agricultural society. One recurrent complaint in the colony concerned the quality of locally produced flour, which was held to be of very poor quality. But this concerned only flour found *within* the colony. On foreign markets, the flour produced in Quebec actually had a strong reputation. No papers have addressed the question of why this should have been so despite the importance of this issue to the agricultural economy. The answer that we suggest is of interest to both economists concerned with regulatory issues as well as scholars concerned with early Canadian history.

Micro-economic theory can shed light on the issue. The government of New France, in order to stimulate settlements across the colony, awarded a monopoly over milling to the *seigneurs* of the colony (the landlord who possessed an estate or *seigneurie* granted to him by the crown). In short, only landlords could own mills. Moreover, peasants on a *seigneur*'s estate were not permitted to take their grain to a mill other than the landlord's. Moreover, the colonial administration also enacted important price controls both on the milling tolls and on the price of bread. It is argued here that the regulation of the price of bread was an attempt to offset the effects of granting monopoly power to the landlords.

* The authors would like to thank René Belzile, Pierre Desrochers, Peter Hill, Marvin McInnis and Paul Sharp for their comments during the writing of this paper.

It is commonly held in micro-economics that firms with market power will distort quality.[1] To extract the most out of consumers, monopolists cannot provide consumers with their individual efficient level of quality even if pricing is non-linear. Quality for all consumers, except those with the most expensive tastes, will be driven downwards. In such cases, regulation, either by setting quality standards or imposing price caps will reduce distortion. For example Crawford and Shum found that, for cable television in the United States, the imposition of local oversight over cable companies with market power led to an increase in the quality of the service.[2] However, this may not always be the case. In some instances, it is possible for regulation to worsen the situation and increase the size of welfare losses (defined as the as defined by the forsaken gains from too little production). Our analysis of the market for flour in the colony of New France fits such a possibility.

The root of the answer lies in the fact that seigneurial laws forced landlords (who were the only ones allowed to own a mill) to cope with fixed low prices for the transformation of wheat into flour. The monopoly power awarded to them would have created a quality problem, but the enforcement of price controls worsened the situation. Thanks to the possibility of exporting flour at unregulated prices, the landlords of Quebec were incentivized to segment their markets. Peasants would bring their grain to the mill and would receive back very coarse flour. Finer flour would be exported to foreign markets. In the process of producing this higher-quality flour for export, landlords extensively sifted their flour to extract the bran and germ. Since obtaining bran and germ could only occur through proper sifting at the mill, the landlords had a virtual monopoly over these products. These latter two by-products of milling were not subject to price controls and so the landlords gained important profits by increasing the price of both products, which tended to be used as feed for livestock. The production of fine flour being tied to the production of residues, landlords had incentives to produce some fine flour for export, but not in great quantities since they would otherwise eat into their profits from residues. As a result, there were no incentives to produce better-quality flour. More than anything, the high prices and poor quality that peasants complained about were the result of perverse incentives created by the regulatory framework. The root of the problem was in the local monopoly granted to mill-owners, but it was worsened by the price cap.

I

Most of the initial *seigneuries* had *moulins rustiques* (grist mills), which produced flour of very poor quality.[3] Guy Frégault points out that in the early 1710s, discontent in the colony was high as a result of both the scarcity of bread and the poor quality of the available bread. He adds that in 1714, 'a delegation of Québécoises [female inhabitants of Quebec City] protested to the Conseil Supérieur against the excessive price and poor quality of bread'.[4] In 1720, the colonial

[1] Michael Mussa and Sherwin Rosen, 'Monopoly and product quality', *J. Economic Theory* 18 (1978), pp. 301–17.

[2] Gregory Crawford and Matthew Shum, 'Monopoly quality degradation and regulation in cable television', *J. Law and Economics* 50 (2007), pp. 181–219.

[3] Jean-Éric Labignette, 'La farine dans la Nouvelle-France', *Revue d'histoire de l'Amérique française* 17 (1964), p. 492.

[4] Guy Frégault, *La civilisation de la Nouvelle-France, 1713–1744* (1969), p. 64.

administration complained that flour from the colony was of poor quality because it was often mixed with the residues from milling in order to give it more weight.[5] This problem still existed in the early nineteenth century when observers complained about the quality of wheat and flour from Canada.[6] In 1830, Pierre de Sales La Terrière pointed out that while the 'American (that is, United States) flour is fine and white, that of Canada is rather coarse and dark'.[7] The owner of the *seigneurie* of Terrebonne from 1814 to 1824 and member of the Legislative Council of Lower Canada from 1817 to 1838, Roderick MacKenzie, pointed out in the 1826 appendix to the Journals of the Legislative Council that 'the Canadian farmer of this Province seldom cleans his wheat for his own use, the immense quantity of dirt consequently ground with it, added to the bad yeast employed in baking, make the Canadian country bread dark, heavy and sour, and must render it dietetically injurious'.[8]

Dissatisfaction with the quality of the flour available within the colony forced both the French and British colonial administrations to intervene. Whilst individual markets regulated weights, the first weights and measures laws date from 1730. Clerks were mandated to inspect flour sold in markets designated by the colony – the sole areas where grain could be sold. To ensure the monitoring of quality, itinerant buyers of grain were prohibited under French rule, and the British later made it illegal for the peasants to sell their grain on their way to the city or straight off their boats.[9] In 1808, the colonial assembly appointed inspectors who would be paid 4*d*. per barrel to scrutinize flour produced outside the colony and 3*d*. per barrel for flour produced in the colony. These fees were later reduced to 2*d*. per barrel regardless of the flour's origin in the 1820s. This led to discontent on the part of merchants and inspectors who felt that a decline in flour exports was partially due to this reduction in the wages of inspectors who could no longer monitor quality properly. In a petition of 1824 directed to the colonial assembly, some merchants requested an increase in the rates offered to inspectors.[10] During the same session of the assembly (a mere four months later), some peasants presented a similar complaint in a petition of their own, where they discussed the 'insufficiency of […] *banal* mills (with a few exceptions) to manufacture flour fit for exportation'.[11] The problem was obviously a large and costly one for merchants. A distinction must be drawn between flour intended for domestic market and flour intended for foreign markets. The descriptions of flour sold *within* Canada paint it as being of poor quality. The flour exported tended to be of better quality although the quantities were never very important.

The literature on this subject has so far not provided convincing explanations for the poor quality of flour *within* Canada. Historians like Fernand Ouellet blame poor farming methods

[5] Labignette, 'La farine dans la Nouvelle-France', p. 496.

[6] Pierre de Sales La Terrière. *A political and historical account of Lower Canada: with remarks on the present situation of the people, as regards their manners, character, religion &c &c.* (1830), p. 128.

[7] Ibid., p. 128. Note that this darkness to the flour would be the result of the incomplete removal of the dirt attached to grains before they were milled.

[8] *Appendix II to the Journals of Legislative Council of Lower Canada* (1826 edn), unpaginated.

[9] Corrine Beutler, 'Le rôle du blé à Montréal sous le régime seigneurial', *Revue d'histoire de l'Amérique française* 36 (1982), p. 246.

[10] Legislative Assembly of Lower Canada, *Journal of the House of Assembly of Lower Canada, 1st session of the 12th provincial parliament of this province* (1825), pp. 19–20.

[11] Ibid., p. 353.

on the part of the peasants.[12] Meanwhile, historians such as Gérald Bernier and Daniel Salée have suggested that the seigneurial system of land tenure incited landlords to hike prices and reduce quality to gouge their tenants.[13] That being said, the latter authors did not develop their argument, which was understandable given that their concern was not with the functioning of the market.

However, before proceeding to milling, it is proper to point out that the quality of wheat is not at fault. The quality of the flour depends on both the quality of wheat milled and the quality of the milling process. These factors were not perceived as problematic. In report to the House of Assembly in 1816 concerning the state of Quebec's agriculture, a merchant, David Anderson, reported that the 'quality of wheat is perhaps better than the average quality of what is produced in Great Britain: it is not however by any means so good as that cultivated in some counties of England, but superior to that produced in many other parts of the United Kingdom'.[14]

II

Any explanation of the poor quality of flour requires a discussion of the legal framework regulating its production. The key element is the system of land tenure. The seigneurial system of Quebec was brought from France in the late 1620s. It was a feudal system whereby a peasant (*censitaire*) had to pay a rent and undertake duties for his landlord (*seigneur*) for a given plot of land. For his part, the *seigneur* also had numerous obligations toward his *censitaires*. The most importance of these was the *banalité* – the obligation to provide milling services for a fixed proportion of the grain brought to the mill. He would own a monopoly right on milling services whereby no one could compete with his mill. He was legally obliged to offer this service, in return for which for which he had a monopoly within his *seigneurie*.[15] Peasants were prohibited from visiting the mills of other *seigneurs*. This led to numerous court cases where *seigneurs* sued their *censitaires* from areas as far apart as Sorel (1730), Demoure (1716), Argentenay (1736) and Rivière du Sud (1742). In general *seigneurs* were very active in the preservation of their monopoly rights.[16] In some instances, the *seigneur* could licence private individuals to build their own mills – but this was rarely done.[17]

In any case, this monopoly was a de facto monopoly in another sense: that the great distances between the different *seigneuries* did not allow farmers to travel to exploit lower prices elsewhere.[18] There were also de jure restrictions that would have reinforced this monopoly. Itinerant sellers and buyers were legally prohibited. Itinerant dealers in grain were prohibited

[12] Fernand Ouellet, *Histoire Économique et Sociale du Québec, 1760–1850* (1971).

[13] Gérald Bernier and Daniel Salée, *Entre l'ordre et la liberté: colonialisme, pouvoir et transition vers le capitalisme dans le Québec du XIXe siècle* (1994).

[14] Legislative Assembly of Lower Canada, *Appendix to the Journal of the House of Assembly, 1816* (1816).

[15] Peasants could buy flour from other *seigneuries*, but they could not take their grain to any mill other than that of their *seigneurie*.

[16] Québec City Archives, Archives du Séminaire de Québec, document series Seigneuries 2, document number 2, 'Observations sur l'opinion énoncé par le juge en chef, en appel, en janvier 1824 au sujet du droit de banalité'; Louise Dechêne, *Le partage des subsistances au Canada sous le régime français* (1994), p. 217.

[17] Gilles Deschênes, *Quand le vent faisait tourner les moulins: trois siècles de meunerie banale et marchande au Québec* (2009), p. 146.

under French rule and the British reinforced them – the end result being curtailments on the ability of individuals to exploit arbitrage opportunities by buying where prices were lower to sell where they were higher.[19]

So, in law, landlords were the sole source of milling services in New France and the milling of grain within households was prohibited. Peasants were mandated to bring their grain to their *seigneur*'s mill (and not to any other).

In New France, mills were very expensive to build. Correspondence between colonial officials and the royal administration in Paris reveals that the cost of building, repairing and operating a mill in New France was 'double or triple of those in France'.[20] This led landlords in Quebec to defer building mills for as long a period as possible. In turn, this compelled the colonial administration to issue edicts to force landlords either to construct mills or forfeit their *seigneurie*.[21] Unfortunately, the edicts, issued in France, were were not officially promulgated until 1707 when the intendant, Jacques Raudot, noticed that the *procureur général* had never issued the promulgation of them, no doubt due to the fact that numerous *seigneurs* were members of the colonial administrative body known as the Conseil Souverain.[22] Although the edicts were initially ignored, the proportion of estates without a mill declined progressively. As Morris Altman emphasized, this was the result of a growing population, which allowed the landlords to cover their initial capital outlays. However, we must not overlook the fact that there was still a ceiling on the price that landlords could charge to peasants who brought their grain to their mills. In New France, a miller could only take one out of every 14 units (7.14 per cent) of wheat as his toll.[23]

Prices for the same service were much greater in France, where the rate ranged from somewhere between one in 10 and one in 12 units of wheat during the late middle ages (meaning between 8.33 per cent and 10 per cent).[24] Later in the eighteenth century, the rates in Upper Normandy were reported as varying between 6 per cent and 10 per cent and 9 per cent in the neighbourhood of Rouen.[25] In the late eighteenth century, the colony of Upper Canada legally fixed the rate at one in 12 units (8.33 per cent) while the rate in Quebec remained at one in 14 (7.14 per cent).[26] With regard to Colonial America, the rate is reported at 15 per cent, which was considerably higher.[27] This is quite important since the American colonies and New

[18] Benoît Grenier, *Seigneurs Campagnards de la Nouvelle-France: Présence seigneuriale et sociabilité rurale dans la vallée du Saint-Laurent à l'époque préindustrielle* (2007).

[19] Beutler, 'Le rôle du blé à Montréal', p. 246; Adam Shortt, 'The colony in its economic relations', in Adam Shortt and Arthur G. Doughty (eds), *Canada and its provinces: a history of the Canadian people and their institutions by one hundred associates* (23 vols, 1913–17), II, p. 480.

[20] Labignette. 'La farine dans la Nouvelle-France', pp. 491–2.

[21] R. C. Harris, *The seigneurial system in early Canada* (1966), p. 72. The most important edict was the edict of 1686, which warned landlords that they had to build a mill within a year or lose their title and rights.

[22] Deschênes, *Quand le vent faisait tourner les moulins,* p. 153.

[23] Harris, *Seigneurial system,* p. 72.

[24] Roger Grand and Raymond Delatouche, *L'agriculture au moyen-âge, de la fin de l'Empire romain au XVIe siècle* (1950), p. 634.

[25] Judith A. Miller, *Mastering the market: The state and the grain trade in northern France, 1700–1860* (1999), p. 32.

[26] Deschênes, *Quand le vent faisait tourner les moulins,* p. 158.

[27] Thomas L. Purvis, *Colonial America to 1763* (1999), p. 171.

France were faced with similar situations when settlement began to take place and we would not expect such a large gap in pricing practices. The 'scarcity of mills was a real handicap to small grain production during much of the colonial period'.[28] This led to heavy charges for individuals in the American colonies, which was reflected in prices. Virginia millers could not charge more than one sixth (16.67 per cent) of the amount of corn brought in, while Canadian mill owners could not charge more than one fourteenth of a crop.[29]

There was a second set of price controls in place – for bread – which must be outlined. In the late seventeenth century, the Conseil Souverain of New France ordered that bakers had to sell bread at a price based on the price of wheat.[30] Such regulations were still in place in 1845: commissioners were mandated to fix the price of bread in relation to the price of wheat on the first Monday of each month and publish it in the *Gazette de Québec*.[31] One might assume that the bakers bought flour that was already suitable for consumption, but this was not the case.[32] Bakers often bought the coarse flour directly, which they could (but did not always) improve by removing the bran, middling and dirt. But that was very rare. More often, they bought the wheat that the *seigneurs* retained and milled it themselves. Bakers tended to be very enterprising merchants who went beyond the simplicity of their craft.[33]

Having said all this, there were important exceptions to the price controls. First of all (and most importantly), the price of flour exported outside the colony was unregulated. Second, the price of bran (*son*) and middlings (*gru*) – which could be sold to feed animals – was not subject to any form of price controls. Thirdly, bakers were not obliged to mill any grain they bought at the mill of the *seigneurie* in which they bought it: they were subjected to the fixed price, but unlike the peasantry, they could take their wheat to a mill of their choice.[34] Taken together, these three regulatory exceptions explain, in our opinion, the poor quality of flour available within the colony.

[28] Arthur G. Peterson, 'Flour and grist milling in Virginia: a brief history', *Virginia Magazine of History and Biography* 43 (1935), p. 100.

[29] Ibid., p. 100.

[30] *Jugements et délibérations du Conseil souverain en la Nouvelle-France,* III, (1883), p. 869.

[31] 'Commissaires pour la revision des dits actes et ordonnances', *Les Actes et Ordonnances Révisées du Bas-Canada* (1845), pp. 623–5.

[32] They could also buy wheat directly from the peasants. In that case, they would have to incur the *banalité* when they wanted to have it transformed in flour. This was a generalized situation, but it could happen as Solange de Blois pointed out. 'Possibilités et limites d'une entreprise seigneuriale: les Moulins de Terrebonne, 1720–75' (Masters' Thesis, University of Montreal, 1995).

[33] Robert Lamonde, 'Les boulangers de Montréal, de la foundation à 1750: Étude d'histoire socio-économique' (Masters' Thesis, University of Montreal, 1996), p. 81. Note that out of 59 individuals repertoried as bakers in Montreal between 1642 and 1750, 19 are also named as merchants.

[34] Corinne Beutler, 'Les fonctions du blé dans un système colonial: l'approvisionnement de Montréal jusqu'en 1840', in Marceau Gast, François Sigaut, Corinne Beutler and Olivier Buchsenschutz (eds), *Les techniques de conservation des grains à long terme: leur rôle dans la dynamique des systèmes de cultures et des sociétés, fasciule 2* (1985), p. 454.

III

In the previous section, we outlined several elements that can explain why flour was of poor quality. To understand the reasoning behind them, it is necessary to break down the situation according to the types of individuals involved.

Seigneurs had a monopoly, but they also had clear incentives to cut down on quality in order to extract a higher level of profit. The price controls that compounded the monopoly status worsened the situation. Since the milling rates were fixed, *seigneurs* could not exercise their market power through prices and opted to exercise them through playing on quality. Moreover, they could not recuperate losses by increasing the price of flour since the price of bread was regulated as well. Peasants did have the option to mill their grain by hand, but this was wasteful, time-consuming and inefficient. They could also shift to a diet of oats and peas, which would not need milling and which brought the advantage of avoiding the loss of calories that milling involved (20 per cent of calories would be lost in the milling process in addition to one fourteenth of the wheat retained as the milling fee), but again this was not an option which many would have favoured.[35]

Seigneurs were often reluctant to make the initial investment in building and, where they did, they tended to build windmills rather than watermills (although the latter were better and had lower marginal costs in the sense that it was cheaper to mill a single unit of flour, but were more expensive in terms of fixed costs[36]), and use poorer materials (including the millstone). According to Morris Altman, less than 57 per cent of seigneurial estates had grist mills by 1739.[37] Louise Dechêne also points out that *seigneurs* tended not to invest in the facilities needed to mellow the endosperm and toughen the bran.[38] As they only had the facilities to produce low-grade flour, many *seigneurs* preferred to sell their toll wheat to urban bakers rather than mill it themselves. In a few cases, they met their legal obligations by selling their monopoly rights to millers – at a very dear price.[39]

However, we argue in this article that they tended to produce coarser flour for consumption within the colony and better flour for export. In short, they could discriminate between

[35] This proportion comes from Stephen Broadberry, Bruce Campbell, Alexander Klein, Mark Overton and Bas van Leeuwen, *British Economic Growth, 1270–1870* (2015), p. 282.

[36] Gilles Deschênes points out that after the 1790s, when the British allowed all new settlements to be established under freehold tenure (while all previously settled places would remain under *seigneurial* tenure), windmills were disregarded by settlers, who built watermills instead. In areas under freehold tenure, monopoly rights did not exist and farmers were free to choose their mill (Deschênes, *Quand le vent faisait tourner les moulins,* p. 148). The difference in efficiency in favour of watermills is explained by the fact that millers can control water debit to maximize rotations of the millstones while it is impossible to control wind factors. In fact, millers of windmills had to be especially careful in monitoring the winds because if they were too strong, they could rip the windmill sails.

[37] Morris Altman, 'Seigneurial tenure in New France, 1688–1739: An essay on income distribution and retarded economic development', *Historical Reflections/ Réflexions historiques* 10 (1983), p. 364.

[38] Dechêne, *Le partage des subsistances*, p. 90.

[39] Deschênes, *Quand le vent faisait tourner les moulins,* p. 146. Deschênes mentions also that in the densely populated areas of the Richelieu *seigneurie,* the *seigneur* sold the monopoly rights for roughly 1,043 *livres* per year. In such cases, this would not mean that the *seigneur* legalized competition, merely that he opted to sell his rights to someone else in order to obtain a steady income. Overall, this would only reduce the profitability of the monopoly mill operator (pp. 155–6).

different market segments on the basis of quality. Obviously, the quality of the wheat used to produce flour matters. However, we are only concerned with the incentives to transform the wheat brought to the mill. *Seigneurs* tended to be very active in commercial activities and they could market what they earned through the *banalité* (their take of the grain brought to mill) on foreign markets at unregulated prices. In such a situation, they could segment their production and adopt discriminatory practices. The extra costs of producing finer flour from their toll wheat would thus be compensated through higher selling prices on foreign markets. However, there was an incentive to limit the quantity of high-quality flour produced. Some of the costs of producing the flour for the inhabitants could be recuperated by exporting abroad, but in the process of producing better quality flour, one has to sift through the flour to remove bran and middlings. These two items, which were used as feed for animals, were not subject to price controls and mill-owners could increase their prices to compensate themselves. In short, the 'high-quality' flour would be largely destined for foreign markets while the by-products from it would be resold in the colony as feed at higher prices.[40] The *seigneurs* who did invest in the technologies (which meant very high-quality equipment and large installations) necessary for such production – and which were active on export markets – tended to come from well-populated estates where large enough volumes gave a return on the initially high costs.[41] If the *seigneurs* were not active in the export market and were content with selling the share of the grain they took from peasants to bakers who would then produce flour for bread in the cities or foreign markets, then it was the bakers who would sell the bran and the middlings. Bakers were very fond of selling the milling residues, as Louise Dechêne noted.[42]

Examples of *seigneurs* milling grain at the lowest possible level of quality are found mostly in thinly populated *seigneuries.* Small populations meant an insufficient volume of grain to offset initial outlays and thus it was seen as preferable to simply provide poor-quality flour. It was s*eigneurs* on larger estates who had the option of producing some fine flour for export markets and then selling the resulting middlings and bran at uncontrolled prices on local markets.

In order to understand this mechanism – which applied largely to densely populated *seigneuries* – it is necessary to digress on the issue of milling grain. The common practice in Canada was that grain would be milled once (creating *grosses farines*). To obtain better-quality flour, it would then have to be sifted with a bolter (a process known as *blutage* undertaken with a *bluteau*).[43] In addition, higher-quality flour required the extra step of cleaning with a *crible* (a dressing shoe to clean and sort grains). However, as Louise Dechêne and Gilles Deschênes both point out, mills were not always equipped with these tools and it was the bakers who tended to be the owners of *bluteau*.[44] Hence, it seems that the rural peasantry – the bulk of the population, as less than 20 per cent of the population was urbanized in the early 1700s – who ended up with poorer-quality flour. In her work, Dechêne mentions in passing that the

[40] Obviously, we do not claim that the colony would be entirely lacking high-quality flour. It implies that there would be very little available for the bulk of the population.

[41] Solange de Blois, 'Les moulins de Terrebonne (1720–1775) ou les hauts et les bas d'une entreprise seigneuriale', *Revue d'histoire de l'Amérique française* 51 (1997), pp. 39–70.

[42] Dechêne, *Le partage des subsistances,* p. 90.

[43] Ibid., p. 90.

[44] Ibid., p. 90; Deschênes, *Quand le vent faisait tourner les moulins,* p. 240.

censitaires often complain about *blés écartelés*.[45] This was poorly milled wheat in which the bran and germ are still present.[46] In some instances, there are references to the wheat simply not being cleaned before being milled, resulting in the flour containing dirt.[47] The flour that was most commonly traded in the colony and consumed by the peasants who brought their wheat to be milled was second-quality flour which was often not properly sifted: this was called *pain du people* in France.[48] The flour consumed by the bulk of the population did not possess properties that would have made it suitable for a wide range of baking options.

The alternative approach to milling implied a more careful grinding and sifting in order to obtain fine flour.[49] It required the possession of a *bluteau* – which was an expensive piece of equipment. Louise Dechêne mentions a price of 61 livres for a *bluteau*[50] at the time when per capita annual income did not exceed 150 livres per annum.[51] Later sources suggest that, in 1772, the cost of a *bluteau* stood at 270 livres.[52] The expense of acquiring the equipment needed to produce fine-quality flour explains why few mills made the necessary investment. The use of a *bluteau* was a sine qua non if flour was to be exported in barrels.[53] Sifting with a *bluteau* would mean that more germ and bran would be available as a separate product. Given that only a limited number of mills could operate at this level (and in effect operated as a monopoly within a monopoly), there was no incentive to increase the supply of good flour.

We have already seen how the *seigneurs* operated a monopoly. It is also relevant to mention that entry into the baking trade was also regulated. The colonial administration limited the number of bakers that could operate (unless they produced only the *biscuit*) creating some form of market power when bakers were those who sold the residues.[54] In addition, the *seigneurs* also had quite an impact on the high-quality flour market. Since they were exporting on foreign markets and Quebec was a small economy, they were price-takers of the world price. However, the costs of entry into the export business – financial capital, the necessity to have a social

[45] Dechêne, *Le partage des subsistances,* p. 33.

[46] Émile Littré, *Dictionnaire de la langue française, tome premier, seconde partie* (1863), p. 1267.

[47] See quotation from Roderick MacKenzie earlier in this article.

[48] *Encyclopédie Méthodique des Arts et Métiers Mécaniques* (1788), p. 63.

[49] This was not a particularly costly process, but estimates found in the *Journal* of the Séminaire de Québec (Québec City Archives, Archives du Séminaire de Québec, C37, p. 67) suggest that the cost stood at 0.6 *sols* per *minot* in 1788 when the price of wheat per *minot* stood at 93 *sols* (Fernand Ouellet, Jean Hamelin and Richard Chabot, 'Les prix agricoles dans les villes et les campagnes du Québec d'avant 1850: aperçus quantitatifs', *Histoire Sociale/Social History* 15 (1982), pp. 83–128). There was little point in attempting to produce high-quality flour without having properly cleaned the wheat being milled.

[50] Dechêne, *Le partage des subsistances*, p. 90.

[51] Morris Altman, 'Economic growth, economic structure and real gross domestic product in early Canada, 1695–1739', *William and Mary Q.,* 45 (1988), pp. 684–711.

[52] Québec City Archives, Archives du Séminaire du Québec, C35, p. 239.

[53] Dechêne, *Le partage des subsistances,* p. 91. This means that the price of the barrel had to be added to the total – a significant cost. Barrels were believed to contain five bushels of wheat (François Aubry, 'Indicators of economic growth for Lower Canada, 1760 to 1850', Master's Thesis, University of Ottawa, 1971, p. 92) and the Archives of the Séminaire de Québec suggest a price per barrel of 7.8 *livres* (Québec City Archives, Archives du Séminaire de Québec, *Brouillard des Recettes et Dépenses,* C25, p. 107) in 1788 which means the addition of 1.56 *livres* per bushel (or 1.73 *livres* per *minot* at the conversion of 1.107 bushels per *minot*) at the time that a *minot* of flour sold at 11 *livres* (Ouellet, Hamelin and Chabot, 'Les prix agricoles dans les villes et les campagnes du Québec d'avant 1850'.

[54] Dechêne, *Le partage des subsistances,* p. 89.

network to obtain information and financial literacy – were prohibitive. These conditions were easier to meet for *seigneurs* – some of whom were active in the wholesale trading business.[55]

IV

At this point, we shall try to depict the *seigneurs*' profit-maximization process (Figure 1). The *seigneur* is required by law to mill all the wheat harvest (H) he receives from the *censitaires* of his *seigneurie*. The mill produces a quantity of flour equivalent to the output function, M(H). Of that total output, the *seigneur* receives a fraction (b) as his fee, although he bears the cost of milling the total harvest, as we will point out shortly. The next step for the *seigneur* is to allocate which proportion (α) of his flour shall be sold as crudely milled flour, previously called *grosses farines*, which we denote F_2. The remainder will be thoroughly sifted, yielding a proportion (β) of residues sold as animal feeding, which we denote as F_3, and a proportion (1 – β) of high-quality, exportable flour which we denote as F_1. As cost functions, we will assume there is a cost function associated to milling, $C_M(H)$, and a distinct one for the sifting process, $C_S(F_1 + F_3)$ or $C_S(b(1 - \alpha) M(H))$. We will also make the assumption of fixed costs equal to C_F. Naturally, each flour has its own price, noted p_i where $i = \{1,2,3\}$. However, we argue that, due to regulations, the *seigneur*s actually had market power over the residues market. Thus, the price of the residues, p_3, is actually a function, with F_3 as an input, which we will denote $p_3 = P(F_3)$. The profit can be described as:

$$1) \quad \pi = p_1F_1 + p_2F_2 + P(F_3)F_3 - [C_F + C_M(H) + C_S(F_1 + F_3)]$$

or

$$2) \quad \pi = p_1[b(1 - \alpha)(1 - \beta) M(H)] + p_2[b\,\alpha\, M(H)] + P(b(1 - \alpha)\,\beta\, M(H))b(1 - \alpha)\,\beta\, M(H) - [C_F + C_M(H) + C_S(b(1 - \alpha) M(H))]$$

From equation 2), it is easy to see there are actually only two variables determining profit: H and α, the latter being the only one over which control can be exerted. Assuming that the price of high-quality flour exceeds the price of residues ($p_1 > p_3$), it comes naturally that profits would be negatively correlated to the value of β, the proportion of residues extracted from a fixed quantity of low-quality flour through sifting. The parameter b, the fee the *seigneur* can take in return for his providing of the *banalité*, is established by law. Thus, we have to solve two first-order conditions:

$$3) \quad {}^{\delta\pi}/_{\delta H} = 0 \overset{yields}{\rightarrow} Cm_M(H) + b(1 - \alpha) Mm(H)\, Cm_S(F_1 + F_3) = Mm(H)[\alpha p_2 + (1 - \alpha)([1 - \beta]\, p_1 + \beta[p_3 + F_3\, Pm(F_3)])]$$

[55] Christian Dessureault, 'L'évolution du régime seigneurial canadien de 1760 à 1854', in Alain Laberge and Benoît Grenier (eds), *Le régime seigneurial au Québec 150 ans après: Bilans et perspectives de recherche à l'occasion de la commémoration du 150e anniversaire de l'abolition du régime seigneurial* (2004), pp. 22, 28–30, 32. One should be careful not to conflate the fact that that a far from negligible number of *seigneurs* were merchants as a statement that *all seigneurs* were merchants.

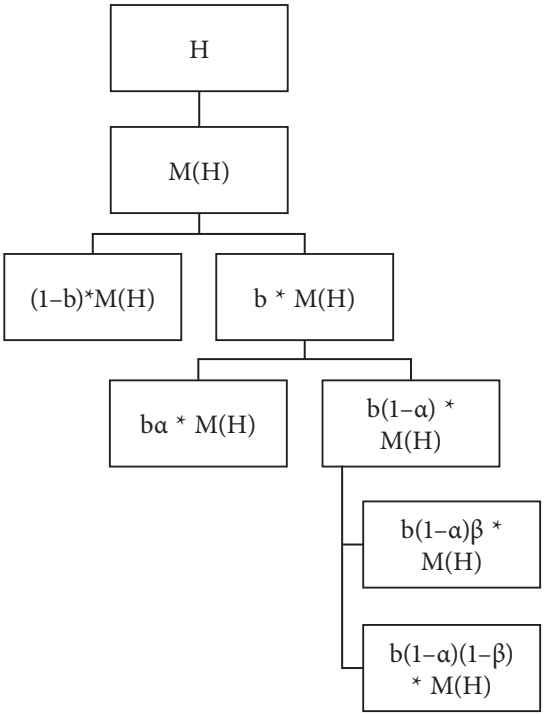


FIGURE 1: The profit-maximization process of a representative *seigneur*.

$$4) \qquad {}^{\delta\pi}/_{\delta\alpha} = 0 \overset{yields}{\rightarrow} p_2 + Cm_S(F_1 + F_3) = [1 - \beta]\, p_1 + \beta\,[p_3 + F_3\, Pm\,(F_3)]$$

By themselves, equations 3) and 4) give little insight as to how regulation or market power wielded by the *seigneurs* had an impact on the quality and/or quantity of flour both in and outside the colony. That said, we can already see from equation 4) that if the following inequality is true:

$$5) \qquad p_2 > [1 - \beta]\, p_1 + \beta\,[p_3 + F_3\, Pm\,(F_3)]$$

then the *seigneur* is compelled to minimize the total cost of sifting by choosing α equal to 1, thus selling only low-quality flour. The next logical step would be to combine equations 3) and 4), giving us:

$$6) \qquad Cm_M(H) - Mm(H)p_2 = (1 - b)\,(1 - \alpha)\, Mm(H)\, Cm_S(F_1 + F_3)$$

Under perfect competition between mills, we would expect marginal cost to equal marginal revenue, equivalent here to $Mm(H)p_2$. From equation 6), it becomes clear that the *seigneur* may rationally choose to sell low-quality flour above its marginal cost if he can recoup his loss by producing both high-quality flour and residues simultaneously. However, when the *seigneur* chooses to do so, he must consider that the sale of more residues might drive down its price. We can also argue that, given the likely high value of our parameter β, the value of p_3 had to remain relatively high in order to justify milling grain and selling it 'below cost'. Thus, the

higher the costs, the higher p_3 had to remain in order to maximize profits. Implicitly, this means less sifting activity, providing for less high-quality flour.

Overall, peasants were provided with low-quality flour. High-quality flour would only be produced in areas where production was sufficiently large to bring large quantities of wheat at the mill. The quantity of high-quality flour would however be limited since an increase in high-quality flour – whose international market meant landlords were price-takers – meant an increase in the quantity of residues available – on whose domestic markets landlords had market power – which would reduce the price (and profits) by *seigneurs*.

V

To produce finer flour for exports, mill-owners would have to sift their flour meticulously. In doing so, they would have obtained greater quantities of bran and germ. These could be sold at unregulated prices. Landlords could recuperate losses from the regulated prices of flour by selling the residues at higher prices. This is easily documented. Peasants could buy 6.5 minots of bran for the price of a minot of wheat in 1688, but that ratio followed a downward trend, ending up at 2.83 minots of bran per minot of wheat in 1740. A similar, but less pronounced trend is seen with regard to middlings (Figure 2). More importantly, the downward trend continued after 1740. In the era of intermittent warfare, from 1740 to 1760, numerous real shocks to supply would have forced landlords to carry losses from milling. At controlled prices, they would have been unable to make the profits they desired (or needed to cover their costs). Hence, during those turbulent years, they increased the price of bran and middlings more rapidly than any increase in the price of wheat.

The relative prices of these residues to wheat meet the first condition required in order to explain the poor-quality of grain in the colony. Throughout the era, the production of fine flour seems to increase in line with exports – a greater than fourfold increase in flour exported between 1720 and 1739 – and the exports were mostly of fine flour.[56] As the production of fine flour increased, so did the production of residues – whose prices increased so as to recuperate losses from the low fixed price for milling services. As the work of Robert Lamonde has suggested, confirming that of Louise Dechêne, the bakers were probably the most active in that line of trade. Lamonde points out that their wealth at time of death was equal (and probably superior)[57] to that of other trades. Most seigneurial estates preferred to sell the grain directly rather than transform the wheat into flour. However, some religious congregations (the Ursulines, the Augustines, the Séminaire and the Jésuites) – which owned *seigneuries* across the colony – possessed the equipment needed for proper sifting and grinding. These were the estates which delivered ready-made flour to the merchants for sale on foreign markets.[58] This

[56] Alice Jean Lunn, 'Economic development in New France, 1713–60' (Ph.D Thesis, Department of History, McGill University, 1942), p. 449.

[57] Lamonde, '*Les boulangers de Montréal*', p. 59. Lamonde finds a difference of between 6.46% and 12.74%, but his period of interest (which ends in 1750) is associated with considerably lower nominal prices than the period with which he compares (1740 to 1809 for craftsmen and 1730 to 1780 for blacksmiths). For the comparison of the price levels, see Vincent Geloso, 'Seeds of divergence: The economy of French America, 1688 to 1760', (forthcoming Ph.D thesis, London School of Economics).

[58] Dechêne, *Le partage des subsistances,* pp. 89–90.

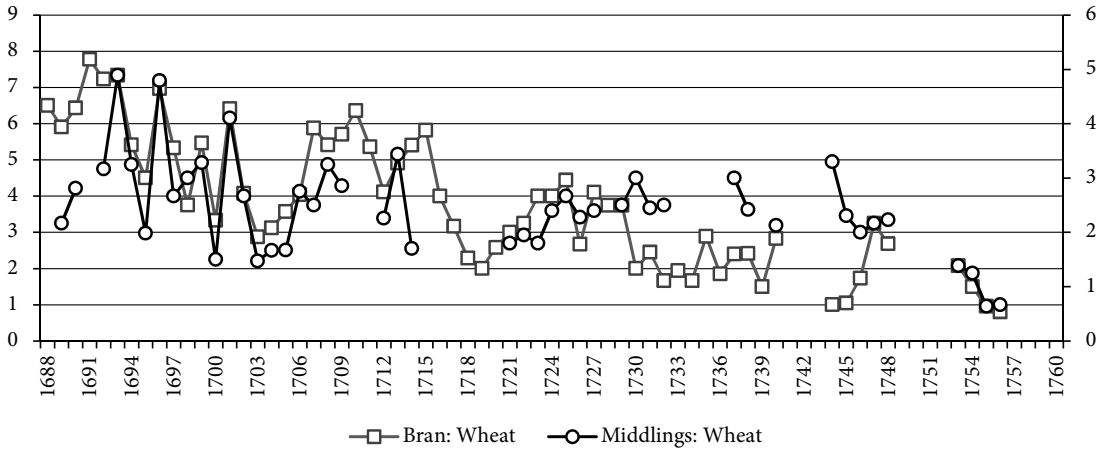


FIGURE 2: How many minots of bran (left axis) and minots of *gru* (middlings on the right axis) could be bought with one minot of wheat, 1688 to 1760.

Source: Vincent Geloso, 'Seeds of divergence: The economy of French America, 1688 to 1760' (forthcoming PhD thesis, London School of Economics).

line of revenue has never been considered by historians in their treatment of the regulations surrounding the grain and flour trade.

As Richard Harris points out, seigneurial mills were not profitable until there were 20 families (roughly 120 individuals) per estate with fully cleared land, as fixed costs stood at close to 500 livres. Before that level, any quantity of wheat milled would imply financial losses for the landlord. However, marginal costs were seen by Harris as being constant.[59] More plausible is the evidence found by Beutler that marginal costs were increasing modestly.[60]

As the return on the investment in milling depended on the size of the population, below a certain threshold it was impossible to make a profit, forcing *seigneurs* to keep costs down as much as possible by reducing the quality of flour produced and cutting other costs as much as possible. As a result, thinly populated *seigneuries* would have poor-quality flour, made in lower-quality mills (windmills instead of watermills), which might be inaccessible as *seigneurs* also limited their investments in roads to access the mill.[61] Obviously, the *seigneurs* owned the mills, but they did not operate them personally: instead they rented them to millers, who were compelled to assume the majority of the risks. Catherine Objois noted that of 74 contracts she found between millers and the *seigneurie* of the Séminaire in the Montreal area in the eighteenth century, 45 (60.1 per cent) stipulated that less than half of the cost of repairs would be met by the *seigneurie*, and in 19 instances the Séminaire accepted no responsibility for repairs.[62] Generally, the contracts give the *seigneurs* a fixed share of the total harvest. In

[59] Harris, *Seigneurial system,* p. 78.

[60] Corinne Beutler, 'Les moulins à farine du Séminaire de Saint-Sulpice à Montréal (1658–1840) : essai d'analyse économique d'une prérogative du régime seigneurial', *Historical Papers/Communications historiques* 18 (1983), pp. 184–207. Evidence presented by Catherine Objois also suggests modestly increasing marginal costs. Catherine Objois, 'Les Meuniers dans la seigneurie de l'Île de Montréal au XVIIIe siècle' (Master's thesis, Université de Montréal, 1981), pp. 212–18.

[61] Objois, 'Les Meuniers', pp. 28–30.

[62] Ibid., p. 44.

some instances, the *seigneurs* of small *seigneuries* demanded a fixed quantity of wheat from the millers as rent regardless of the amount brought to the mill.[63] Everything above that would be the millers' profit.[64]

In more densely populated areas, *seigneurs* would still produce poor-quality flour for the domestic market and save on the quality of the service. To this set of strategies, they would further segment production by producing some high-quality flour for exports but also limit its quantity in order to maximize profits from bran and middlings. Indeed, the *seigneur* had an incentive not to produce too large a quantity of fine flour since he would increase the supply of bran and middlings. Hence, at the point when it became profitable to mill, it was also profitable to restrain the quantity of fine flour produced.

V

The fact that regional monopolies, artificially created by a government, would use their market power to drive down the quality of their output does not come as a surprise. Applied in an historical perspective, this paper tends to confirm the general conclusion of previous work. As an example, Ajodhia and Hakvoort indicate that 'stricter price regulation is associated with a risk of quality degradation and thus a need for quality regulation', when discussing electricity distribution networks.[65] In our case, it is not hard to hypothesize that fearing the creation of monopolies would shift the balance of power in favour of millers, the colonial administration created accompanying price regulation to guarantee accessibility to milling services for peasants. However, the price regulation that *banalité* imposed upon millers, gave them an incentive to recoup their losses through lower quality.

When talking about utility services there is also the question of the form the regulation takes. Milling was as important a service in the colony as telecommunications or electricity are today and so a comparison between the two seems appropriate. In the specific case of US telecommunications, the work of Ai and Sappington surveys the landscape of the regulatory environment.[66] Since 1986, there has been a change of approach on the part of regulators, substituting rate-of-return regulation for other forms of regulation, such as price-cap, earnings-sharing or case-moratoria regulation. The traditional approach of rate-of-return regulation has been considered 'naive' by some, mainly because it did not provide sufficient incentive for the firm to minimize operating costs.[67] The example of price regulation we provide here could be qualified as 'price-cap' regulation, where the regulation 'specifies a path for service prices that is independent of realized production costs during the price cap period, and so can provide considerable earnings flexibility'.[68] Moreover, that regulation would have been considered

[63] Deschênes, *Quand le vent faisait tourner les moulins,* p. 234.

[64] Ibid., p. 240.

[65] Virendra Ajodhia and Rudi Hakvoort, 'Economic regulation of quality in electricity distribution networks', *Utilities Policy* 13 (2005), pp. 211–21.

[66] Chunrong Ai and David E. M. Sappington, 'The impact of state incentive regulation on the US Telecommunications Industry", *J. Regulatory Economics* 22 (2002), pp. 133–160.

[67] Gary Biglaiser and Michael Riordan, 'Dynamics of price regulation', *The RAND Journal of Economics*, 31 (2000), pp. 744–67.

[68] Ai and Sappington, 'Impact of state incentive regulation', p. 134.

implemented on an infinite time period, whereas price-cap regulation imposed over limited time horizons have been known to cause perverse incentives where capital replacement is concerned.[69] Thus, the regulation imposed in the colony might well be considered appropriate, even through the lens of more recent economic analysis. However, our evidence shows that even a price-cap regulation was detrimental to both the quality and quantity of output delivered. Why is that so?

The situation we are depicting here does not relate much to product differentiation or market segmentation: it has more to do with classic oligopoly models. First, we take into account that all millers in the colony act independently. Second, the segmentation we see relates to the characteristics of the product (namely, its quality) and not to who produces the product. Thus, we see a limited number of millers selling something similar, into different, although linked, markets, while competing on price rather than quantity. This is also called Bertrand's competition. However, the classical prediction of Bertrand's competition is an optimum equivalent in price and quantities to what would be observed in perfect competition. Our model and our evidence suggest a different equilibrium on both the low-quality flour market and the residues market. We argue that any discrepancy between these two results can be directly linked to the existence and the extent of regulation.

As in many other occurrences, we might say that industry linkages and product linkages played a part, creating a miller who was both regulated and un-regulated. In return, that duality brought the possibility for the miller of maximizing his profits in the unregulated market, creating a sub-optimal equilibrium overall. Ultimately, we are facing a case of over-regulation. The different layers of regulation could well have resulted in a general equilibrium worse than what would have been observed if those local monopolies would have been left free to impose their own *banalité*, and the peasants, free to choose their mill.

VII

The combination of price controls established under seigneurial law and price controls for the sale of bread incentivized economic actors to curtail quality so as to make maintain profit margins. This tended to keep the price of flour at the low levels mandated by law. However, this also meant that the flour being circulated was of poor quality and that the price of feeds like bran and middlings were higher than they would have otherwise been. The landlords only produced high-quality flour when they could export it and maintained the quantity low enough to maximize profits from the production of bran and middlings (a market in which they could set the price). In short, it was perverse incentives linked to price controls that formed the basis of the inhabitants' complaints about poor flour quality.

[69] Biglaiser and Riordan. 'Dynamics of price regulation', p. 745.

At the cutting edge: edge tool production in southern and south-west England, 1740 to 1960*

by E. J. T. Collins

Abstract

The transition of edge tool making from a workshop to a factory industry is normally associated with the great metallurgical centres of Sheffield and the west midlands. It is assumed rather than proven that in southern England the old industry disappeared during the eighteenth and early nineteenth centuries, snuffed out by northern and midland competition. The paper proposes a different sequence of events. It contends, first, that in the early Industrial Revolution the pace was set, technologically, not in the great historic centres, but in south-west England, where water-powered hammers were first applied in the 1740s to the forging of large-surfaced items, such as scythes, spades and plantation hoes. And second that, whereas elsewhere in England – apart from Sheffield – hand-forging was in decline and by 1880 had largely ceased, in Kent and Sussex it underwent a revival. Located in country blacksmiths' shops, the last edge tool forge closed about 1970, about the same time as the last water-powered forge, in the Black Country.

For the purposes of this paper edge tools are defined as hand tools made from wrought iron with a cutting edge of welded steel. They changed little in their configuration and mode of construction from Roman times to the mid-nineteenth century, when traditional welded types began to be superseded with all-steel tools.[1] The tools found on Romano-British sites strongly resemble those featured in early twentieth-century trade catalogues, or stocked by hardware

* This is an expanded version of an earlier paper read at the S. R. Epstein Memorial Conference, 'Technology and human capital formation in the east and the west', held at the London School of Economics on 21 June 2008, and published subsequently on the School's website. In turn it draws on my paper on edge tool patterns, 'Agricultural hand tools in the Industrial Revolution', in N. Harte and R. Quinault (eds), *Land and society in Britain, 1700–1914* (1997), pp. 57–77.

[1] See R. Burgess, 'History', billhooks.co.uk. This is an over-simplification. Important differences existed between Britain and mainland Europe. Steel being far more expensive than iron, in Britain edge tools were made from two metals – low-carbon wrought iron and high-carbon blister, cementation or crucible steel – in ratios of 6–10 to 1. Much of Europe on the other hand, used just one metal, a low-grade steel, known as German or natural steel, which was made by decarburizing cast-iron in a furnace. 'Patent' scythes with cast steel blades and riveted iron backs were made in Sheffield from the 1790s. Bessemer hot-blast and Siemen's open-hearth steels, so-called mild steels, came into general use from the 1860s, and laminated iron and steel plate from the 1890s. Unlike true steel, carburized iron would not hold an edge, and required frequent sharpening, or in the case of scythes, hammering on an anvil. Mild steel could be pressed and stamped but was difficult to weld.

stores and garden centres today.[2] In earlier times, and for many tasks even now, edge tools were indispensable, and for that that reason, edge tool manufacturing would have ranked as a strategic industry. The tools were essential for a wide range of agricultural and related tasks, and their manufacture a locally important rural trade. Yet, neither edge tools nor the edge tool trades rate more than a passing mention in the standard histories. Moreover, the specialist literature, while extensive, is concerned primarily with Sheffield and the west midlands, the historic centres of the hardware industries, to the neglect of other regions, and the crucial early and middle stages of the Industrial Revolution. This paper will hopefully go part way towards making good the gaps.

Edge tool making was a recognized artisan trade, and edge tool smiths a separate class of metalworker, distinct from whitesmiths and blacksmiths with whom they are often confused. The received wisdom as to its progress during the Industrial Revolution rests on two assumptions, neither as yet properly tested. The first is that by the early nineteenth century edge tool making in southern England had effectively ceased, destroyed by northern and midland competition. And second, that the technical innovations which transformed edge tool making from a workshop into a factory industry, were pioneered in Sheffield and the west midlands. The two most important findings to have emerged from this research, both contrarian, are first, that a technological revolution took place in south-west England, beginning in the mid-eighteenth century, whose principle feature was the application of water power to the plating and steeling of tool blades and bodies, crucial operations hitherto performed by hand. And second, in south-east England in the nineteenth century, there was a revival of hand-forging, at a time when elsewhere in Britain, apart from Sheffield, traditional tool making was in terminal decline or had entirely ceased.

The timing and direction of industrial change in south-west and south-east England differed from the prescribed pattern modelled on the experience of the textile and iron industries.[3] Technologically the pace was set not by Sheffield, Birmingham, or the Black Country, but by a region with no prior tradition, still less a national reputation, in tool making. The water-powered hammer was responsible for a breakthrough in output and productivity, especially in the production of large-surfaced tools, such as spades and plantation hoes, in which south-western manufacturers enjoyed a competitive advantage over their northern and midland rivals until the 1820s.

[2] See K. D. White, *Agricultural implements of the Roman world* (1967); Collins, 'Agricultural hand tools', pp. 57–8. Here we will be concerned with those classes of tool used in agriculture, forestry, mining, and general labouring. They included agricultural tools (scythes, sickles, reaping and fagging hooks, weeding, thinning and digging hoes, dock and thistle spuds, mattocks, digging forks, manure forks, hay forks, hay rakes, hay knives, sheep shears); forestry and woodmen's tools (axes, hatchets, adzes, billhooks, shaves, pruning, trimming, gorse, hedging and slashing hooks, thatching hooks, log splitters); mining and general labouring tools (spades, shovels, pickaxes) and plantation tools (cane knives, machetes, digging hoes). Artisan and tradesmen's tools lie outside the scope of the present study, although many of these were made by the same firms as agricultural and woodmen's tools.

[3] Maxine Berg, *The age of manufactures, 1700–1820* (1985), part 2, 'Pathways to the Industrial Revolution', esp. ch. 11; and Maxine Berg *et al.* (eds), *Manufactures in town and country* (1983), should be read in conjunction with this discussion.

The following discussion is in four parts. Section I begins by examining the history of edge tool making in the subregions: south-west, south-central, and south-east England, before reviewing the evidence of occupations contained in the 1841 census. It then turns to edge tool production in other areas of the British Isles. Industrial progress in south-west England is compared with that in Sheffield and the west midlands in Section II. Section III takes a closer look at the tilt hammer, the dominating element in this first stage in the mechanization of edge tool production in the early Industrial Revolution. Here we seek to explain why the tilt hammer was first adopted in the mid-eighteenth century, and in the south west rather than in the two old established centres. Finally section IV addresses the broader issue of the coexistence in the early twentieth century of different types and sizes of firm and levels of technique. A conclusion (Section V) draws the paper to a close.

I

In this section we consider the regional distribution of edge tool making throughout Britain and Ireland tracing the history of edge tool making in each region.

(a) South-west England

We begin in south-west England where the research has identified 27 water-powered 'hammer mills,' eight in Gloucestershire, 12 in Somerset, six in Devon, and one in Cornwall. The majority of these were specialist edge tool manufacturers, although large-surfaced tools such as spades and digging hoes were sometimes made in ironworks and foundries as sidelines.[4] Figure 1 and Table 1 shows the location and dates of establishment and closure of both water-powered forges and hand forges in south-west and south-central England. So far, the first recorded use of water-powered hammers for forging edge tools was at Coaley in Gloucestershire and Mells in Somerset, both in 1744.

Gloucestershire possessed at least six, and possibly eight, hydraulically powered forges, all dating from before 1801 (Table 1).[5] In 1744, the Coaley Iron Works, a former corn and fulling mill on the River Cam near Dursley, was converted by its new owner, Nathanial Underwood, to an edge tool mill by the addition of hammers. A sale notice of 1855 described it as consisting of five workshops, 19 forges, a grinding mill with three grindstones, and pair of large mechanical shears, together with five waterwheels, four plating hammers with cast steel blocks and heads, plus a further three large hammers and several sets of bellows.[6] A separate hammer in the field

[4] T. S. Ashton, *Iron and steel in the Industrial Revolution* (fourth edn, 1968). According to Ashton (p. 242), in the early eighteenth century, as much as one-half of the domestic output of manufactured iron goods was produced by works with communications with the River Severn. Inexplicably, both Ashton and Harris, *The British Iron Industry, 1700–1850* (1988), appear to have overlooked the large Gloucestershire Severn-side ironworks identified here.

[5] I am grateful to David Grace for kindly supplying me with much of the Gloucestershire information, notably for Cirencester. The Mills Archive at Reading lists in its database 16 water-powered 'forge mills' in Gloucestershire, only three of which feature in my Table 1. The majority though were iron mills or foundries, one a 'tilting mill' (making steel), and another a tinplate works, several of which may also have made edge tools.

[6] R. Wilson, 'Coaley Mill: corn, cloth and ironworks', *Gloucestershire Soc. for Industrial Arch. J.* (1966), pp. 44–5.

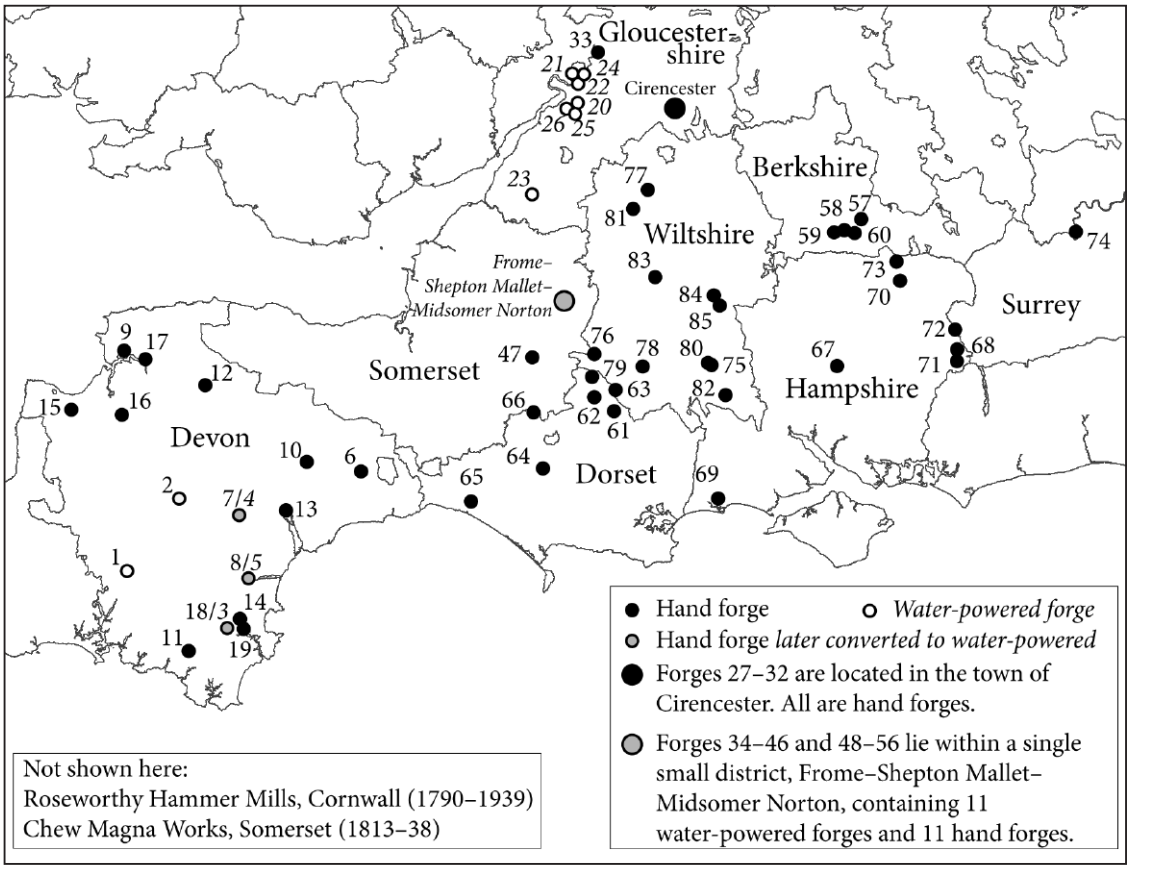


FIGURE 1: Location of water-powered and hand-operated forges in south-west and south-central England, *c.*1740–1960. Numbers refer to Table 1.

Source data for county boundaries: A. E. M Satchell, L. Shaw-Taylor and E. A. Wrigley, *1831 England and Wales ancient counties GIS* (2016). This dataset was created with funding from the ESRC (RES-000-23-1579), the Leverhulme Trust and the British Academy. A description of the dataset can be found in A. E. M. Satchell, *England and Wales ancient counties 1831 documentation* (2016) available at: www.geog.cam.ac.uk/research/projects/occupations/datasets/documentation.html.

adjoining the main mill is shown on the 1881 1:2500 inch Ordnance Survey map. By *c.*1900, power was supplied by three waterwheels, two turbines, an oil engine and a steam engine (later replaced by a turbine).[7]

With a five-acre pond, 16½-ft fall, and power rating of 20–30 kW (32–48 hp) in 1850, Coaley was among the south west's largest manufacturers. In 1850 it was said to have employed about 40 men and boys. A 1914 catalogue advertised 36 patterns of shovel (a Coaley speciality),

[7] See also Wilson, 'Coaley Mill', pp. 42–50; 'Industrial Gloucestershire, 1904', www.coaley.net/indglos_1904/; Illustrated Catalogue, issued by Leonard Thomas & Co., Coaley, *c.*1900–20 (copy in Ryder Collection, Gloucester City Library). I am indebted to Professor Tann, Dr Ray Wilson, David Grace, and Osman Goring (the present owner), for this and other information about the Coaley Works.

TABLE 1: Dates of establishment and closure of forges in southern England, *c.*1730–1970, shown in Figure 1 (From first reference or date of establishment To last reference or date of closure.)

No	*Location*	*From*	*To*
Berkshire			
Hand forges			
57	Bucklebury	<1736	1913
58	Thatcham	<1768	1823
59	Newbury	1791	1820
60	Thatcham	1900	1925
Devon			
Water-powered forges			
1	Tavistock	1800	1850
2	Sticklepath	1814–15	*c.*1950
3	Harberton	1820	1954
4	Dunsford	1826	Still working
5	Holbeam	1830s	1942
Hand forges			
6	Honiton	1762	
7	Dunsford (see 4)	mid-18th century	1826
8	Holbeam (see 5)	late 18th century	1830s
9	Barnstaple	1815–16	1856–57
10	Bradninch	1816–17	
11	Modbury	1816–17	
12	Molton	1816–17	
13	Exeter	1824	
14	Totnes	1824	
15	Woolfardisworthy	1856	
16	Torrington	1856	
17	Barnstaple	1856	1930
18	Harberton	1857	
19	Ashprington	1857	
Dorset			
Hand forges			
61	Fontmell	1714	
62	Orchardleigh	1803	
63	Shaftesbury	1824	
64	Cerne Abbas	1816–17	1824
65	Bridport	1824	
66	Sherborne	1824	
79	Gillingham	1747	
Gloucestershire			
Water-powered forges			
20	Coaley	1744	1944
21	Framilode	<1786	1809
22	Frampton-on-Severn	1786	
23	Frenchay-in-Winterbourne	later 18th century	1879–85
24	Moreton Valence	1761	1879–85
25	Cam	<1816	–
26	Cam	<1821	1831
Hand forges			
Cirencester			
	name of maker		
27	Lane	<1772	1886
28	Cox	1784	1791
29	Wilkins	1772	1784
30	Deighton	1784	1861
31	Hunt	1820	
32	Jackson	1894	1911
City of Gloucester			
33	Cox/Cox-Buchanan	1784	1830s
Hampshire			
Hand forges			
67	Winchester	<1761	1808
68	Conford	1800	1915
69	Christchurch	1816–17	
70	Basingstoke	1824	
71	Griggs Green	1861	1895
72	Dockenfield	1891	1895
73	Bramley	c. 1920	c.1970

No	Location	From	To
Somerset			
Water-powered forges			
34	Mells (Upper Works)	1744	1891–5
35	Nunney (see 46)	1760	<1895
36	Great Elm	1792	<1895
37	Mells (Lower Works)	<1791	<1895
38	Nunney	1838	<1895
39	Chantry	<1806	<1895
40	Railford	<1830	<1895
41	Gurney Slade	1831	1934
42	Stoke Lane	<1817	<1886
43	Stratton-on-Fosse	<1840	1939
44	Chilcompton 2	*c.*1840	1920
Hand forges			
45	Mells	1698	1744
46	Nunney	1717	1760
47	Castle Cary	1719	
49	Stoke Lane	<1744	<1886
50	Ashwick	1818	1831
51	Gurney Slade	1818	1831 (see 41)
52	Picton	1833	1833
53	Chilcompton 1*	1840	
54	Stratton-on-Fosse*	<1840	1939
55	Doulting*	1861	1914
56	Chilcompton 3	<1840	1935
Surrey			
Hand forge			
74	East Molesey	1859	
Wiltshire			
Hand forges			
75	Salisbury	15c	1855
76	Mere	<1683	1889
77	Christian Malford	<1704	1783
78	Tisbury	<1744	
80	Fisherton Anger	1769	
81	Chippenham	1793–98	
82	Downton	1793–98	
83	Great Cheverell	1812	1815
84	Netheravon	1849	1906
85	Figheldean	1889	1915

14 types of fork, and a variety of weeding, digging, woodcutting, gardening and drainage tools.[8] In the 1920s, spades and shovels were made from mild steel, plated under the hammer, then shaped in a hydraulic press to give the correct curvature. Following its sale to A. & F. Parkes, a leading Birmingham manufacturer, spades and shovels stamped 'LT 'or 'Leonard Thomas' (after the previous owner), continued to be produced there until its closure in 1944, due to shortages of labour and materials. At that time, one waterwheel and two tilt hammers were still in operation.[9]

Two water-powered works, Upper and Middle Mills, leased to Nathaniel and Robert Underwood (co-partners at Coaley), were situated further down-river at Cambridge. The former was converted to an ironworks and edge tool mill in 1791,[10] while the latter, 'a former fulling mill now an iron mill', was described in the *Universal British Directory* as 'a very extensive manufactory of edge tools'.[11] A further four works stood on the River Frome. The Lower Iron Works at Winterbourne was built in 1761, and the Upper Iron Works, a grist mill,

[8] Wilson, 'Coaley Mill', p. 46.
[9] Ibid., pp. 46–8.
[10] Pers. comm. Prof. Jennifer Tann.
[11] *Universal British Directory* (1791), p. 854.

converted to edge tools in 1798.[12] Amalgamated in 1810, the combined enterprise conducted a large business in spades, shovels and hoes with other parts of Britain and the Colonies.[13] Little is known about the Moreton Valence works, erected probably in the 1780s, or about the Frenchay Iron Company of similar date, beyond the fact, of enormous significance for the development of the edge tool trades in the west midlands, that during the Napoleonic Wars, a dozen men from these two villages were recruited by John Gilpin to work at his new water-powered mill at Churchbridge near Cannock, in Staffordshire.[14] Framilode Mill in Eastington parish near the River Severn, referred to in a lease of 1786 as 'those stack of iron mills' is believed to have also made edge tools in addition.[15] Their manufacture at Fromebridge Mill at Frampton on Severn, is better attested. A former flour, grist and slitting mill, acquired in 1767 by John and William Purnell, it was claimed in 1789 to be 'one of the largest and compleatest works in the Kingdom for making iron and steel wire'.[16] In 1790 the plant consisted of an edge tool, rolling block, and tilting mill, all 'under one roof'.[17] When the business was advertised for sale in 1830, it was described as fitted out for the different branches of the iron trade, including edge tools. With a two-mile-long dam and a steam engine installed in 1824, the power available was stated to be 'very great'.[18]

For a short while in the third quarter of the eighteenth century, Gloucestershire was a leading producer of both hand- and machine-forged tools. The Cotswold town of Cirencester enjoyed an 'unrivalled reputation for 'heavy edge tools' and curriers' knives, all made by hand, which Birmingham manufacturers are said to have tried to replicate without success.[19] The 1768 Cirencester Poll Book lists 15 makers, working mainly at the commercial end of the town, four miles distant from the nearest grinding mills at Bagendon on the River Churn.[20] The combined workforce of smiths, strikers, journeymen, and apprentices, may have numbered as many as 60, large by eighteenth-century standards, and possibly the historic peak. Competition from the newly opened water-powered works in the Cam and Frome valleys would have been a major factor in the industry's decline after 1780.

References to hand-forging in the standard archival and literary sources are disappointedly few. In the City of Gloucester, an old cutlery centre, the last edge tool makers, Cox Buchanan

[12] C. H. B. Elliot, *Winterbourne, Gloucestershire* (new edn, 1999), p. 64; J. Fisher and D. Fisher, *Bygone Bristol, Frenchay and Stapleton on old postcards* (nd), illus. 34, 35, 49–51. This and other information was kindly supplied by Frenchay Village Museum.

[13] Elliot, *Winterbourne*, p. 64.

[14] Fisher and Fisher, *Bygone Bristol*, p. 64; E. J. Homeshaw, 'Edge tools', *VCH Staffordshire*, II (1967), pp. 259–62.

[15] Pers. comm., Prof. Jennifer Tann, who supplied me with copies of the following archival sources: London Metropolitan Archives, Sun Insurance Registers, 488,383, 1784.F, no. 251,943: 17 Dec 1767, Gloucestershire Archives (hereafter GA), D149/175; D2957/137 *passim* (deeds and other manuscripts formerly Gloucester City Library, Box 27, bdle 17; Box 33, bdles 3–40, bdles 4, 27, 17). See also her *Gloucestershire woollen mills* (1967), pp. 138–41.

[16] S. Mills, 'Fromebridge Mill, Frampton on Severn', *Gloucestershire Soc. for Industrial Arch. J.*, 1998, pp. 6–22; S. Rudder, *A new history of Gloucestershire* (1779), pp. 63, 452.

[17] GA, D2957/137, formerly Gloucester Library Box 33, bdle 4.

[18] *Birmingham Gazette*, 29 Aug. 1830; Science Museum Library, London, The Simmons Collection of records relating to British Windmills and Watermills, vol. A–H, Gloucester Watermills.

[19] Rudder, *New History*, pp. 63, 345, 452; ex. inf. David Grace.

[20] Cirencester Poll Books, Gloucester Library Collections.

(also lessees of the Coaley Iron Works), disappeared from the City lists soon after 1830.[21] The 1871 census returned just three makers (of curriers' knives) in Cirencester, the town's last practitioner retiring in the late 1920s.[22] In 1890, the number of water-powered firms in the county had been reduced to just two, killed off by west midland competition.

The 12 water-powered works in Somerset were mostly established between 1800 and 1840 in the east Mendips, in the Frome–Radstock–Shepton Mallet triangle, in and around the small market town of Mells, the hub of the famous Fussell empire, dubbed the 'Iron Burgh' (see Table 1). In 1744, James Fussell, an edge tool maker of Stoke Lane, leased a plot of land on the Mells stream in the Warbury Valley on which he erected a waterwheel, a tilt hammer, and blade mill for 'grinding edge tools and forging iron plates'.[23] The business prospered, and by 1830 comprised six works – at Mells (est. 1744, 1791), Nunney (1760), Great Elm (1791), Chantry (1806), and Railford (1830) – each specializing in a different aspect of the trade. In 1804, the Mells plant consisted of 24 hearths and anvils, 140 grindstones, and 10 or more tilt hammers, driven by nine waterwheels. With sales throughout the West Country, southern England, south Wales, Ireland, and overseas, and renowned for its superior skills in hardening edge tools and the quality of its scythes (said to equal to those of the Black Country), the firm must then have ranked as the largest in the country.[24] As business expanded, ever larger volumes of water were needed to drive still more wheels, and ensure supplies during times of shortage. Delays in upgrading the plant enabled west midland firms to catch up, and eventually overtake it. In a letter to his landlord of December 1829, John Fussell stressed the urgent need to spend thousands of pounds on steam engines and improved plating and stamping machinery to keep pace with the recent rapid improvements made by 'our competitors in the north'.[25] A round of new investment, including a small steelworks, temporarily restored the firm's fortunes, but not its ranking. To counter falling profits, at the onset of the Great Depression the individual businesses were incorporated into a single holding company, but to no effect, as by 1881 the business was bankrupt, with debts of £60,000.[26] It staggered on, to close finally in 1894. The goodwill was acquired by the Worcestershire firm of Isaac Nash, which continued making Fussell patterns, stamped with the original trademarks, for sale throughout south-west and south-central England, all former Fussell territory.[27]

Fussell's size and reputation appears to have encouraged rather than stifled imitation. In addition to two new Fussell works at Railford and Chantry, at least seven hand- and three water-

[21] *Bailey's Directory* (1784); *Gell and Bradshaw's Gloucester Directory* (1820); Pigot & Co, *National Commercial Directory* (1830), p. 143; *Gloucester Incorporated Chamber of Commerce, Supplement to 56th Report 1897*, copy in Gloucester City Library.

[22] Pers. comm., David Grace.

[23] Somerset RO, DD/X/HNR 484 N20. On the history of the firm see R. Thornes, *Men of iron, Fussell of Mells* (2010), and Burgess's review of it in *Tools and Trade Hist. Soc. Newsletter*, Winter 2010; K. Griffiths and R. Gallop, *Fussell Ironworks, Mells* (1964); R. Athill, *Old Mendip* (1964), pp. 69–73, and *Mendip: a new study* (1974), pp. 167–8; *Fussell of Mells: a reproduction of the late nineteenth century catalogue* (Tools and Trades Hist. Soc., 2001); V. Littlewood, 'The Fussells of Mells', *Tools and Trades Hist. Soc. Newsletter*, 69 (2000), pp. 24–9; E. Tylee, 'An old Somerset industry', *The Somerset Yearbook*, *1934*, p. 62ff.; C. Wood, 'History of the Fussell family', *Somerset Standard*, 7 June 2001.

[24] J. Collinson, *The history and antiquities of Somerset* (1791).

[25] Athill, *Old Mendip*, p. 64.

[26] *Martineau and Smith's Hardware Trades J.*, 31 Mar. 1882.

[27] Pers. comm. Bob Burgess, Tilshead, Wilts, Aug. 2005 and R. Athill, Oakhill, Bath, Aug. 1985.

powered works were established in east Mendip during the first half of the nineteenth century. The Gurney Slade works in Binegar parish, founded by James Fussell Steeds (a prestigious appellation), was fitted with two wheels, one driving the grindstones, the other the 'Great Hammer': it was demolished in 1931 to make way for a water treatment works.[28] A single wheel, tilt hammer, and grindstones were installed about 1840 at Chilcompton Mill, probably the last new water-powered works in the south-west region. Although it closed in the 1920s, edge tool making continued at a hand forge in the upper village away from the river, the grindstones being driven by electricity.[29] The 1840 tithe map shows a cluster of small forges at Stratton-on-Fosse, fed by a stream running along the hillside, with sufficient flow to power a blade mill.[30] Kelly's 1861 Directory lists an edge tool maker at Doulting on the River Steppe: an 1886 map depicts a small works alongside a weir and engine house. An 'iron works', power source unknown, at Stoke Lane below Mells, in the occupation of Messrs Fussell and Wise, is mentioned in 1871, but shown on an 1884 map as disused.[31] Burgess notes a water-powered forge making edge tools and shovels at Chew Magna, near Wells, between 1813 and 1838. Interestingly, a number of edge tool makers, formerly of Chew Magna, were returned in the 1841 census as residing at Coaley, having probably been re-employed by the Coaley Iron Works.[32] The hand forges at Chilcompton and Stratton-on-Fosse were still working in the mid-1920s, the latter until 1939.

Devon stands out insofar as the first water-powered edge tool mills were established in the early nineteenth century, much later than in either Gloucestershire or Somerset, but they endured longer, with four of the five original works still operational in 1940. The earliest, the Tavistock Iron Works, was established in 1800 by a partnership headed by John Gill, a local banker with extensive mining interests, for the manufacture of scythes, reaping hooks, and shovels.[33] A sizeable enterprise, it was described in 1815 as an edge tool works, anchor smithy and foundry, with nine waterwheels and eight hammers. Its early history is unclear. One account claims that the works was sold in 1815 and the hammers disposed of: another that it underwent merely a change of ownership, and with Gill still at the helm, continued making edge tools until about 1850, when it became a foundry. Plans to add a steelworks never materialized, and in 1867 the business was bought by Messrs Nicholls and Mather, 'manufacturers of engines, waterwheels, shovels and 'hammered iron'; the business closing in 1897.

Four mills were erected on fast-flowing Dartmoor rivers. Hill Mill at Harberton, a run-down fulling mill, was converted to an 'edge tool factory' in 1824 by the addition of tilts driven by a large waterwheel fed by a leet from the River Harbourn.[34] In 1850, the plant consisted of two wheels, four hammers, two grindstones, a polishing wheel and an iron splitter. A steam engine

[28] Ex. inf. Mrs Barbara Thorner, Gurney Slade, 17 July 1985. See also *Binegar: a short history* (1974); and Dom Hubert Van Zeller, *Willingly to school* (1952).

[29] Ex. inf. George Gorringe and David Strawbridge, Bowden Hill, 17 July 1985.

[30] Pers. comm. R. Athill, Oakhill, Bath, 5 Aug. 1985.

[31] Ibid.

[32] R. Burgess, www.billhooks.co.uk/edge-tool-makers-of-somerset.

[33] G. Woodcock, *Tavistock's yesterdays,* X (1994), *passim*. See *Devon Archaeological Soc. Proc.*, 67, 2009, for a report on the works. However, Martin Watts (pers. comm.), millwright and mills historian, expresses doubts about the interpretation offered there.

[34] Mrs Nora Peters of East Hanham, Devon (daughter of the last works manager) kindly supplied me with an excellent first-hand account with floor plan of this West Country works as it was in the early 1930s (see Figure 5). I am grateful to Stanley Oldfield for his comments and corrections.

was installed later, and two of the hammers retired in the early 1920s. From 18–20 in 1890, the workforce had shrunk to eight by the late 1930s, and at closure in 1952, to four. Holbeam Mill on the River Lemon, a hand forge, formerly making knives and fish hooks for the Newfoundland Fisheries, installed a pair of hammers about 1830. Sold in 1910 to the Birmingham spade maker, A. & F. Parkes, the business closed in 1942 and the hammers afterwards removed to the Science Museum, where they became part of the permanent display.[35] Dunsford Mill on the River Teign was a hand forge until 1821 when its new owner enlarged the premises and erected a tilt hammer, later replaced by two trip hammers. At least five smiths plus several apprentices and other employees worked there in 1851. Of the south-west region's original 27 water-powered works, only Dunsford survives, making all-steel tools forged by electrically driven hammers installed in 1937.[36]

The Finch Foundry at Sticklepath on the River Taw is one of Britain's best-preserved edge tool mills.[37] According to the official history, in 1815 its founder, William Finch, a whitesmith formerly employed at the Tavistock Iron Works, erected two tilt hammers purchased from his one-time employer in a disused woollen mill. Another account places their acquisition much later, about 1850, but these may have been replacements for the original set. In 1851, all five of the founder's sons and a grandson were employed there. In 1900, the plant comprised three wheels, two hammers, a power shears worked off the main shaft, a bellows, a pair of grindstones, and a foundry, making spades, shovels and the usual range of agricultural tools. A waterwheel, supplemented by a steam engine added about 1860, was the main energy source throughout. By the 1920s, iron and steel laminate and rolled bar steel had mostly replaced wrought iron and welded steel. Following closure in 1952, the site was redeveloped as a working industrial museum, subsequently gifted to the National Trust.

The dates of origination and closure, where known, of the south west's 27 water-powered forges are analysed at approximately 50-year intervals in Table 2. Of these, 13 date from the eighteenth century, the two earliest from 1744 in Gloucestershire, four in Somerset, and one each in Devon and Cornwall. All six Devon and seven of the 11 Somerset forges were founded between 1801 and 1840. Cornwall yielded only one forge, which, in view of its abundant water supplies and extensive mining industry, seems an implausibly small number. It may be that large-surfaced tools, particularly spades and shovels, were made in iron foundries, as a sideline. In 1900, 10 of the original 27 works were still working: one in Cornwall, two in Gloucestershire, three in Somerset and four in Devon. Edge tool mills tended to be long-lived: 14 of our sample for more than a hundred years, the Coaley Works for exactly 200, and the remainder typically for 60–80 years

[35] J. Chard, *Along the Lemon* (rev. edn, 1980), pp. 23–34.

[36] Ex inf., Alec Morris, Dunsford, 20 July 1985; and C. A. Jewell, former Keeper of the MERL, who recorded the Dunsford works in the 1960s. See also W. M. Williams, *The country craftsman* (1958), p. 69.

[37] The Sticklepath Foundry has been extensively researched and recorded. R. A. Barron, *The Finch Foundry Trust* (nd), is the definitive historical account. I am grateful to Mr Barron, a Finch descendent, for sharing with me his unique knowledge of the business and production techniques. See also D. Gordon, 'Industry in a Devon village', *Country Life*, 14 June 1944, pp. 62–4, which contains excellent photographs; J. K. Major, *Finch Brothers Foundry, Sticklepath, Okehampton, Devon* (nd); K. S. Woods, *Rural crafts of England* (1949), pp. 39–43.

TABLE 2: Numbers and dates of operation of water-powered hammer forges in south and south-west England, 1744–1960

	Gloucestershire	*Somerset*	*Devon*	*Cornwall*	*Total*
Numbers of forges	8	12	6	1	27
Number of forges founded in:					
1744–1800	7	4	1	1	13
1801–20	1	3	3	0	7
1821–40	0	5	2	0	7
Post-1840	0	0	0	0	0
Numbers of forges active in:					
1750	1	1	0	0	2
1800	7	4	1	1	13
1850	4	11	4	1	20
1900	2	3	4	1	10
1940	1	0	4	0	5
1960	0	0	1	0	1

The majority of works ranked as large- or medium-sized by early nineteenth-century standards. Nine were in multiple ownerships – the Underwoods with three, all in the Cam Valley, the Fussell family six in east Mendip, and the Purnells two. The 1880s saw the first acquisition of a south-western firm by a midland manufacturer. During the course of the following half-century, three were bought as going concerns, while the patterns and goodwill were purchased at closure in two. The discovery at Dunston Forge of a box containing the metal stamps of some 20 or so mostly midland firms, implies that subcontracting may have been common practice between the wars, contributing to the survival of local firms, and the curious fact that many of the 'traditional' iron and steel welded tools bearing the marks of midland manufacturers were made in south-west England.[38]

(b) South-central England

The Cotswolds formed a natural boundary between the two historic branches of the industry. From Cirencester eastwards hand-forging was the rule, with the grindstones driven mostly by animals, usually donkeys, or by human muscle, rather than by waterwheels. After 1900, oil engines, water turbines and electric generators supplied power for lighting and machinery. In the new century, rolled mild steel plate and steel scrap became the standard materials, eliminating the need for welding, and enabling ordinary blacksmiths to make simple forged or riveted tools, such as weeding hoes. The evidence for the distribution of hand forges is shown in Table 3, from which both the early disappearance of hand-forging in the West Country, and its protracted survival in south-east England, is all too evident.

[38] The stamps were seen by the author on his visit to the firm in 1987.

TABLE 3: Regional distribution of hand forges in south and south-west England at various dates, 1800–1950

	South West	*Central South*	*South East*	*Total*
Operational in:				
1800	25	20	<15	60
1850	12	9	*c*.25	46
1900	5	9	*c*.55	69
1930–36	5	1	12	18
1950		<3	<3	<6

Cirencester and Salisbury were the last strongholds of traditional tool making in southern England, the latter the last town in the region with a still functioning cutlers' guild in the mid-eighteenth century.[39] In 1754, the Swedish traveller, Reinhold Angerstein, reported seeing half a dozen scissor and knife smiths at work in the city itself, and on the outskirts, other smiths making scythes from Swedish iron and cementation steel supplied by the Crowley Ironworks near Newcastle.[40] By 1855 this once thriving industry had been reduced to a single practitioner.[41]

The Down family had operated an edge tool forge at Mere on the Wiltshire–Somerset border from the late seventeenth to the mid-nineteenth century.[42] An 1683 inventory of the contents of Michael Down's 'Shoppe', testifies to a sizeable business comprising a forge, waterwheel and three grindstones, plus a stock of three tons of iron (sufficient for making 1200–1500 billhooks), three hundredweight of steel, 20 dozen reaping hooks, and 10 dozen 'spad' (spade) moulds. Three edge tool smiths of that surname featured in the 1851 and 1861 censuses, in 1881 just one.

The Wiltshire Directory for 1885 lists three edge tool makers – at Salisbury, Netherton, and Mere – and the 1915 volume only Nias Sheppard of Figheldean, shoeing smith and hoe maker.[43] The Shepherd family are said to have taken over a number of village smithies in the Salisbury plain district in the late nineteenth century, and Netherton Forge, famous for 'Buckland hoes', to have once employed up to ten workmen.[44]

Further east, edge tools and plane irons (a local speciality) were made at Newbury, Thatcham, Winchester and Basingstoke.[45] A forge and waterwheel had stood in the village of Bucklebury (west Berkshire), on the diminutive River Pang, since the early eighteenth century. Its stave-type cupola furnace has since been acquired by the Museum of Iron at Coalbrookdale.

[39] R. Haskins, *The ancient trade guilds and companies of Salisbury* (1912), pp. 370–8.

[40] R. R. Angerstein, *Illustrated travel diary, 1753–55*, trans. T. P. Berg (2001), pp. 17–18.

[41] *Kelly's Directory, Wiltshire* (1855 edn).

[42] M. Tighe, 'Edge tool making and the Down family', *Mere Papers* 4 (1997), pp. 68–72. I am grateful to Mr Tighe for this and other information about the Down family and their forge.

[43] *Kelly's Directory, Wiltshire* (1855, 1875, 1880, 1889, 1903, 1911, 1915 edns): *J. G. Harrod and Co's Directory* (1865).

[44] R. Burgess: 'British edge tool makers: A to G', www.billhooks.co.uk.

[45] J. and M. Rees, 'Plane making in Thatcham and Winchester', *Tools and Trades History Society Newsletter,* 67 (1999), pp. 33–40.

A photograph of *c.*1900, shows a signboard above the entrance to the shop reading 'edge tool maker', probably a conceit, as no tools bearing the firm's mark have been found in the district.[46] Berkshire's last-recorded maker, George Pyke of Thatcham, made shaves, drawknives, and billhooks from old files and rasps for use in the local turneries and coppices.[47]

The Moss family of Cornard, near Bramshott on the Hampshire–Surrey border, was a rare example of an industrial dynasty. Established in the early nineteenth century they became the main suppliers of agricultural and forestry tools in the Guildford and Farnham districts, with a reputation as far away as London for the temper of their axes. Between 1800 and 1920, some 48 members of the Moss family worked as blacksmiths, and 15 as edge tool smiths, based at three forges. At one time, it was claimed, a Moss shoeing forge stood at almost every major staging post on the main roads between London and the coast, serving as outlets for Moss tools. Production methods were strictly traditional – steel strips and wedges hand-forged onto wrought-iron backs. The main business ceased in 1915 due to labour shortages. The patterns and rights to the axe-tempering process using silver sand were afterwards acquired by the Black Country firm of Elwell, which featured Moss axes in its catalogues up to the 1950s.[48]

Alfred Willis of Bramley in north Hampshire described himself as the last edge tool maker in southern England. The son of a blacksmith, he showed an early aptitude for fashioning hooks from old blacksmith's rasps. Combining tool making with shoeing and general ironwork, he made as many as 300–350 tools in a good year. Willis's hooks were exhibited at major agricultural shows, including the 'Royal' and are still keenly sought after by collectors.[49] Around 1900, three Surrey blacksmiths – at Farnham, Guildford and Milford, and possibly elsewhere – made farm and garden hoes from commercially supplied steel blanks. John Windsor at East Molesley was possibly a descendant of the two makers of that name working at Salisbury and Basingstoke in the early nineteenth century.[50]

By 1880, traditional tool making in England had largely ceased, apart from Sheffield, where most sickles and reaping hooks were still hand-forged, and in Kent and Sussex where the ancient craft had recently undergone a resurgence. Here there were two distinct types of maker: specialist firms based mainly in market towns, employing two or three smiths plus journeymen, apprentices and assistants, and making a wide range of agricultural, woodmen's, and tradesmen's tools, for sale over a wide area, often across the county boundary. And

[46] Felicity Palmer, *The blacksmith's ledgers of the Hedges family of Bucklebury Forge, 1736–73* (Research Paper 2, Institute of Agricultural History, University of Reading, 1970), makes no mention of tool manufacture. The forge was also a foundry. The purpose of the waterwheel is unclear. The photograph of the forge and signboard is now part of the Dann Lewis Collection, Museum of English Rural Life, University of Reading (hereafter MERL).

[47] Ex. inf. Robert ('Bobby') Brown, owner/manager of one of the two last Thatcham turnery works, 3 Aug. 1985. *Kelly's Directory, Berkshire* (1915). The MERL has several stamped examples of both Pyke and Willis tools.

[48] Ex. inf. R. Burgess, Tilshead, Wilts, 25 Apr. 2008; C. Dunning, Woking, Surrey, 24 July 2003; L. C. Giles and L. C. Moss (descendants), both of Liphook, Hants, 3 Oct. 1984. Clive Dunning's history, *Genealogy of the Moss family and of the forges occupied* (ts, nd), is especially informative. See also G. Bourne, *Memoirs of a Surrey labourer* (1903), p. 183; G. Sturt, *The wheelwright's shop* (1923), pp. 161–5.

[49] Ex inf. Alfred Willis, Bramley, Hants, July 1985.

[50] Blacksmith-made hoes held their own in the market. Surrey farmers bought them to sell to their labourers, 'veritable connoisseurs' of hoes. George Bourne, *Lucy Bettesworth* (1918 impr.), pp. 192–4. *Kelly's Directory, Surrey,* 1891, 1907, 1913.

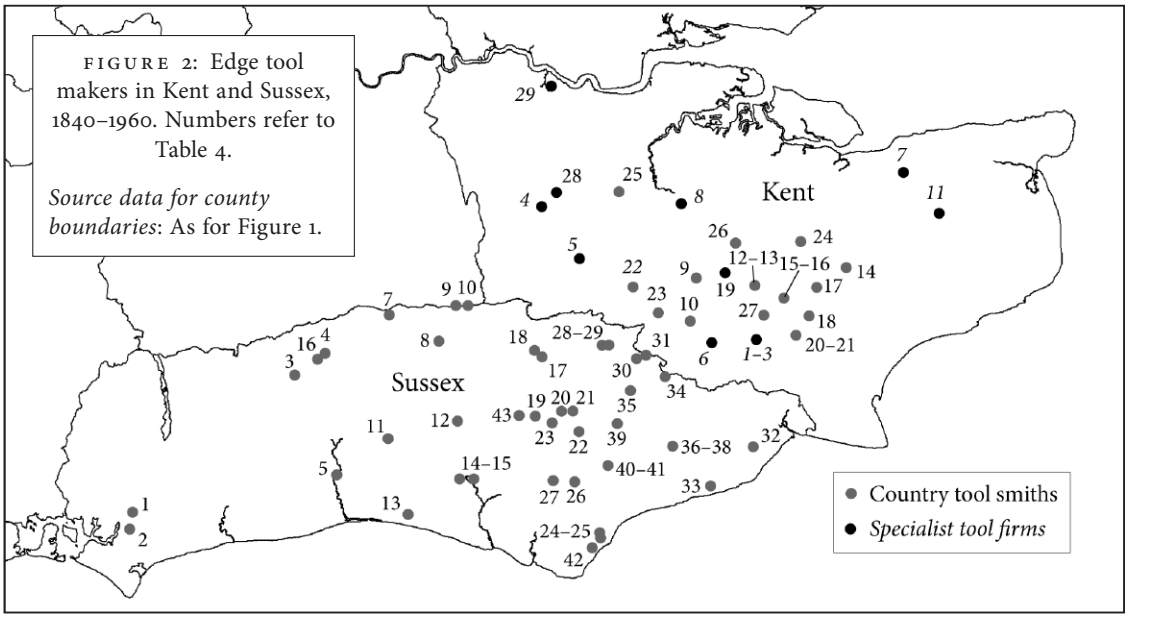


FIGURE 2: Edge tool makers in Kent and Sussex, 1840–1960. Numbers refer to Table 4.

Source data for county boundaries: As for Figure 1.

Kent							
1–3	Tenterden	9	Staplehurst	17	Great Chart	24	Charing
4	Sevenoaks	10	Cranbrook	18	Shadoxhurst	25	Offham
5	Tonbridge	11	Bridge	19	Headcorn	26	Ulcombe
6	Benenden	12–13	Smarden	20–21	Woodchurch	27	High Halden
7	Blean	14	Kennington	22	Brenchley	28	Seal
8	Maidstone	15–16	Bethersden	23	Goudhurst	29	Dartford

Sussex							
1	Chichester	11	Hurstpierpoint	21	Heathfield	33	Hastings
2	Donnington	12	Chailey	22	Vine's Cross	34	Hurst Green
3	Barnes Green	13	Brighton	23	Waldron	35	Burwash
4	Horsham	14–15	Lewes	24–25	Lions Green	36–38	Battle
5	Upper Beeding	16	Boar's Head	26	Hailsham	39	Dallington
6	Burchfield	17	Jarvis Brook	27	The Dicker	40–1	Gardner Street
7	Three Bridges	18	Crowborough	28–29	Wadhurst	42	Eastbourne
8	West Hoathly	19	Framfield (Blackboys)	30	Ticehurst	43	Framfield
9	East Grinstead			31	Ticehurst Green		
10	Holtye Common	20	Cross-in-Hand	32	Icklesham		

Sources: Trade Directories, *c*.1800–1940, *passim*. Makers' marks and other evidence supplied by A. Bayfield, Eastbourne; R. Filmer, Ashford and F. Hams, Challock, Kent.

part-time smiths, working alongside country blacksmiths, supplying the surrounding villages.[51] The locations of the two types of maker are plotted and listed in Figure 2 and Table 4.

(c) South-east England

One would suppose that there ought to be demonstrable links between edge tool making in the nineteenth century and the former charcoal iron industry and cutlery and blade-making centres of Tonbridge and Dartford.[52] But in fact, there is little evidence for this. In the later middle ages, bloomery iron from the eastern Weald was made into 'semi-finished' product wares in the western Weald, and finished in London. Except for Chingley Forge, Cleere and Crossley found few signs of manufacturing activity, still less tool making, on the Weald, possibly because Wealden iron was brittle and difficult to forge.[53] The tradition that edge tool making was introduced into mid-Kent about 1800 by migrant smiths from Ashdown Forest finds little support. The firm of Shoebridge at Seal near Sevenoaks, in existence from the early eighteenth to the mid-to-late nineteenth century, was the sole survivor of the old industry.[54] By the 1830s, Tenterden was now a leading regional centre. A family of French toolmakers, the Bottles, is said to have settled there, probably in the Napoleonic Wars, followed about 1820 by Jasper Beale, a highly regarded tool smith, who popularized the Tenterden billhook.[55] Five edge toolmakers were listed in the town in 1855, and another at Benenden close by. The 1870 directory records five: two at Tenterden, and one each at Tonbridge, Seal, and Blean near Canterbury.[56] By 1900 only two survived: Milstead and Sons, an old Tenterden firm, which had amalgamated with Beales in 1884, and closed in the 1920s; and W. S. Swift, Shoebridge's successor at Seal, which in 1903 relocated to Cannock in Staffordshire, where it continued making Kent patterns.[57]

Far out-numbering the town-based firms were the part-time country tool smiths.[58] Most of the latter were described in censuses and trade directories as 'blacksmiths' or 'smiths', their

[51] Intermediate types of maker included William Tuppenny of Blackboys, near Framfield, E. Sussex. Described in 1891 in *Kelly's Directory* as a blacksmith, he was in fact a full-time edge tool smith, with an apprentice, producing many types of tools, including axes, his speciality. Gaius Carley [Tuppenny's apprentice], *The memoirs of Gaius Carley, a Sussex blacksmith* (1964), p. 20.

[52] C. W. Chalkin, *Seventeenth-century Kent* (1965), pp. 138–9. In fact, out of *c.*500 tradesmen's and craftsmen's probate inventories examined for the period 1640–1710, only two were for edge tool smiths, both sickle makers, pp. 269–70.

[53] H. Cleere and D. Crossley, *The iron industry of the Weald* (1985), pp. 83, 89, 91, 103.

[54] M. Gattell, *The people of the parish of Seal, 1820–80* (Seal and Kensing History Publications, 2, nd), pp. 18–19. Swift's tools 'were famed in the woodlands of Kent, Sussex and Essex'. J. Fox *et al.*, *Seal: The history of the parish* (2007), p. 131; R. Tabor, 'Kentish billhooks', pt 1, *Trades and Tools History Society Newsletter*, 34 (1991), pp. 20–5; pt 2, 35 (1991), pp. 29–31.

[55] Ex. inf. R. Filmer, Kennington, Ashford, Kent; F. Hams, Challock, Kent.

[56] *Post Office Trades Directory for Kent, 1870*, p. 155.

[57] Gattell, *People,* p. 19; Tabor, 'Kentish billhooks', pts. 1 and 2.

[58] The discussion which follows is largely based on information generously supplied by the following tool collectors and tool historians: Robert Burgess, Tilshead, Wilts.; R. Tabor, Essex Naturalist's Trust; Richard Filmer, Kennington, Ashford, Kent; Fred Hams, Challock, Kent; Tony Bayfield, Eastbourne, Sussex. I am grateful to all the above for sharing with me the fruits of their research. Tony Bayfield deserves special mention for his pioneering research on makers' marks and their interpretation. What I term the 'Bayfield Archive', is a body of original material consisting of photographs, tracings, and line drawings of edge tools and marks, plus biographical and family details and in addition, copies of OS maps showing the names and locations of 41 makers in East and West Sussex active between

TABLE 5: Estimated numbers of edge tool makers in Sussex, *c.*1840–1960

Pre-1860	5	1903	7
1862	10	1915	10
1878	10	1924	16
1887	11	1936	4
1891	23	1960	1
1899	11		

Source: Pigot's Post Office Directory, Kelly's Directories, Bayfield Archive.

true occupation concealed. However, tool collectors have succeeded in identifying them from their trademarks, usually consisting of the makers' names or initials, inscribed on the face of the blade. Trademark evidence has allowed at least 20 otherwise unrecorded tool smiths working in Kent in 1890 to be revealed, where the directories list only four. According to Anthony Bayfield, a tool historian, at least 70 were active at one time or another in Kent and Sussex between 1840 and 1960. In 1891, the village of Betherston, near Ashford, for example, with a population of 1030, had two 'blacksmiths', both making edge tools, and elsewhere in the village, another smith, listed as a farrier.

Country toolmakers were more numerous and widespread in Sussex than in Kent. In 1910, five were listed in the county directory, where artefactual evidence suggests at least 23, described as 'blacksmiths'. Altogether, Bayfield has located 14 in West Sussex and 46 in East Sussex, inferring that one in every 20 smithies made edge tools, and in some districts one in 10, with up to 25–30 at work at any one time, based mainly in the hop growing and coppice districts (see Table 4 and Figure 2). From a peak in the mid-1890s, numbers fluctuated, and following a secondary peak in the mid-1920s appear suddenly to have collapsed, the last forge, at Boars Head, closing in the early 1970s (Tables 3 and 5).[59]

The typical country edge-tool forge employed no more than two to four workmen, a smith, a striker, possibly an assistant, and an occasional apprentice. As edge tools involved special skills beyond the capabilities of the ordinary blacksmith, new entrants would normally have served an apprenticeship. Their output can only be guessed at. A team of three might have averaged 6–8 billhooks or three or four axes per day, or 300 tools per half year working part-time, and 600 or so full-time. A skilled craftsman made good money, as 'blacksmith-made' tools normally sold at a premium to the branded tools stocked by local ironmongers, and several times the price of mass-produced mild-steel tools sold in the markets. When business was slack, and in the hunting and ploughing seasons when equine demands were most pressing, the toolmakers would switch to shoeing and general ironwork. Full-time smiths, on the other

Note 58 *continued*
1862 and 1928. The Archive will be deposited in due course with the MERL. A selection of Bayfield's lists and drawings can be viewed at R. Burgess, 'The edge tool makers of Kent and Sussex', www.billhooks.co.uk.

[59] See Table 6 for Bayfield's estimates of numbers of tool smiths in Sussex, mid-nineteenth to mid-twentieth century.

[60] R. Burgess, 'Edge tool makers', www.billhooks.co.uk.

TABLE 6: Regional distribution of edge tool makers by trade and type of tool, 1841

	Edge tool makers	*Tool makers (unspecified)*	*Sickle makers/ grinders*	*Scythe makers*	*Spade makers*	*Shovel makers*	*Shear makers*	*Total*
North	1112	0	21	86	70	63	173	1525
North West	3	2	5	0	0	0		10
South West	171	4	0	2	13	0	0	190
West Midlands	357	0	0	127	357	36	0	877
Central South	20						6	26
South East	2							2
Total	1665	6	26	215	440	99	179	2630

Source: Occupational abstract, 1841 census (1844).

hand, divided their time between tool making and marketing, visiting customers, attending fairs and markets, and selling door to door.

The scale and persistence of hand-forging in the extreme south east prompts the question as to whether this was a purely regional phenomenon, or was more widespread. The fact that outside of the Sheffield and Birmingham regions, the overwhelming majority of edge tool makers featuring in Burgess's master list are located in south, south-central and south-west England, and are otherwise thin on the ground, suggests not.[60]

(d) The evidence of the 1841 census

The 1841 occupational census is the first opportunity to measure the numbers and regional distribution of edge tool makers.[61] The printed returns show Yorkshire and north Derbyshire as the largest region with 58 per cent of the workforce, comfortably ahead of the west midlands with 33 per cent, with the south west a distant third with seven per cent (Table 6).

However, a comparison with the corresponding data for 1851 and 1861 suggests that the 1841 return very considerably understates the numbers in south-west and south-east England, the former returning only six, and the latter just two.[62] Likewise spade makers, the south west returning only 13 when it is known from other sources that spades were one of the region's staple products, indeed, a speciality in many firms. From 1861, workers were no longer classified by trade, but subsumed under the general head of tool maker/dealer. Size of workforce, though, is of limited value as a measure of output and productivity. In the early nineteenth century, output per worker would have been much higher in Gloucestershire and Somerset than in Sheffield, on account of the more intensive use of water power in the former, and large numbers of hand-workers in the latter.

Hand-forging followed a different path. Its decline after 1780 in Cirencester and Salisbury set in motion a general retreat in south-west and south-central England, which accelerated

[61] *GB Census 1841, Occupational Abstract* (1844).
[62] *GB Census* (Occupational Abstract), BPP 1852–3, 1863.

after 1850 and was effectively complete by 1914. The revival in Kent and Sussex from the 1830s was vigorous and enduring. Surviving two agricultural depressions, the last workshop closed about 1970.

(e) Edge tool making in the British Isles generally

Edge tool making elsewhere in Britain deserves mention. Three regions – the north west, the north east around Newcastle, and Ulster – boasted thriving edge tool industries in the eighteenth and early nineteenth centuries. Some 20 or so spade and edge tool mills have been identified in the Lake Counties, the majority established between 1780 and 1820, with two still working in 1907. By the 1820s, Kirkstall Forge near Leeds, a former iron-refining forge, was making spades and shovels. William Park began as a spade maker in 1823 in a former slitting mill in Wigan, which was later to become an important secondary centre of the heavy tool manufacture.[63] Tomlin & Co, a Northampton firm, showed an impressive selection of sickles and shears at the 1851 Exhibition.[64]

The Crowley Iron Works near Newcastle was the largest edge tool manufacturer in Britain, if not in Europe, in the first half of the eighteenth century.[65] When Angerstein visited the firm in 1755, it comprised a slitting mill, steel mill, and three edge tool mills, producing mainly large-surfaced tools, the annual output of plantation hoes alone being of the order of 100,000. At Crowley's death in 1727, 23,000 hoes were stored in his London warehouse awaiting shipment.[66] T. S. Ashton described the works as a mixture of the domestic system and factory production. While water-powered hammers were employed in the steelworks, plantation hoes, on the other hand, were hand-forged by teams of three workmen – a 'master' and two 'hammermen'.[67]

Spade making was an important rural industry in Ulster. Of the 67 water-powered mills uncovered by Gailey, five dated from before 1800, the rest mostly from 1800 to 1835, with several still working in the 1930s.[68] In both Ireland and Cumbria, there are instances of mills erected on the sites of former charcoal iron furnaces, a rare example of continuity.

[63] J. D. Marshall and D. S. Shiel, *Industrial archaeology of the Lake counties* (1969), pp. 238, 251, 263. A map on p. 100 shows *c.*25 edge tool mills in the region, mainly on the west coast, south of Whitehaven, and around Ulverston, mostly unnamed and undocumented alas. This suggests that the Lake Counties were a major regional producer, important enough to have checked Sheffield's north-westward advance. For William Park's business records, see Wigan RO, D/D/Dy Dw B1/1. Bulldog Tools at Chillington Forge, Wigan, was in 1987 Britain's only full-time maker of spades and forks.

[64] *Great Exhibition of the works of industry of all nations, 1851: the official descriptive and illustrated catalogue* (3 vols, 1851), II, p. 592.

[65] On the Crowley Works, M. W. Flinn, *Men of iron. The Crowleys in the early iron industry* (1962); C. Evans, 'The plantation hoe: the rise and fall of an Atlantic commodity, 1650–1850', *William and Mary Q.*, third ser., 69 (2012), pp. 581–610.

[66] Angerstein, *Travel diary*, pp. 17–18.

[67] Ashton, *Iron and steel*, p. 194.

[68] A. Gailey, *Spade making in Ireland* (1982); H. D. Gribbon, *The history of water power in Ulster* (1969), pp. 76–9.

[69] For a detailed account of the Sheffield edge tool industry in the modern period, see D. H. Blackwell, 'The growth of the Scythe/Sickle (Shear) trade in Hallamshire' (PhD thesis, University of Sheffield, 1973). For the earlier period, D. Hey, 'The origins and early growth of the Hallamshire cutlery and allied trades', in J. Chartres and D. Hey (eds), *English rural society 1500–1800, Essays in honour of Joan Thirsk* (1993), pp. 343–67; A. McPhee, 'The growth of the cutlery and allied trades up to 1914' (ts, 1939, in Sheffield Public Libraries).

II

It was inevitable that the south west would soon became enjoined in direct competition with Sheffield and the west midlands: it to those two regions that we now turn. Sheffield's debt to its abundant water supplies is so ingrained in the folk memory as to be axiomatic.[69] In 1740, two-thirds of its 90 or more waterwheels were used for blade grinding. Tilt hammers were probably first used for forging edge tools, initially scythes, in the 1780s. In 1793, the diarist William Bagshawe informs us that Skelton Mills in Norton parish possessed one of the earliest species of tilt hammer, enabling the proprietors to raise their production of scythes to 12–15 dozen per day.[70] In 1785, tilts were added at the Abbeydale Works and Attercliffe Forge, also scythe works.[71] Other early adopters included the Little London Works (1789), the Upper Slack Wheel, advertised for sale in 1785 with 18 grinding troughs and a new tilt and plating hammer, and the Clough Wheels, where a scythe works was erected between 1800 and 1810.[72] The numbers of water-powered works making edge tools in the Sheffield region in 1800 are uncertain, but are unlikely to have much exceeded half a dozen, the majority, if not all, making scythes. There may be more to be discovered, but mill leases and inventories, informative in many other respects, did not normally state the nature of the business carried on there.

Crossley's survey of Sheffield waterwheels lists only 28 tilt hammers, five dating from before 1750, 13 from 1750–99, mostly post-1780, and 17 after 1800.[73] Of these, relatively few, and possibly none before 1780, made edge tools. Only one of the nine wheels on the River Moss was for powering tilt hammers, most of which were sited on the more powerful Don and Loxley rivers.[74] The 1814–15 *Commercial Directory* listed just 17.[75] By 1830, water power had lost its strategic importance, new works being almost entirely steam-powered.[76] Indeed, barely any new watermill sites were constructed after 1800: in 1865 wheels were 60 per cent fewer than at their peak in 1800.[77] Thus water-powered hammers were adopted not only much later here than in the south west, but on a more limited scale, and for a relatively short time,

[70] William Bagshawe, *Chantry land* (1910, repr. 1981), pp. 77–8.

[71] D. Crossley *et al.* (eds), *Water power on Sheffield Rivers* (1989), p. 98.

[72] J. Pearman, *Abbeydale Industrial Hamlet* (sec. edn, 1985), pp. 3–5, 26; Crossley *et al.* (eds), *Water Power,* p. 105 ff and *passim*.

[73] Ibid.

[74] T. L. Platts, *The waterways of Ridgeway and Hackenthorpe* (nd).

[75] *Wardle & Bentham's Commercial Directory, 1814–15*.

[76] Blackwell, 'Scythe/Sickle trades', I, pp. 164–5. The first steam engine, erected in 1789 at Proctor's Works on the River Sheaf, was for driving blade mills.

[77] S. Pollard, *A history of labour in Sheffield* (1959), pp. 53–4, *passim*. Water power enjoyed a modest revival in the 1860s in conjunction with restoration work in the Loxley Valley following the bursting of a reservoir. Crossley *et al.* (eds), *Water power,* p. ix.

[78] Ibid., pp. 53–4.

[79] Blackwell, 'Scythe/Sickle trades', I, pp. 173–4.

[80] G. Tweedale, *Steel City. Entrepreneurship, strategy and technology in Sheffield, 1743–1993* (1995), p. 171.

[81] *GB Census,* 1841, Abstract of Occupations (1844).

[82] Surprisingly, in view of their importance, there is no unified history of the west midland edge tool trades in the early and middle stages of the Industrial Revolution. So far, much of the research effort is centred on the pre-industrial period for which see W. H. B. Court, *The rise of the Midland industries, 1600–1838* (1938); D. Dilworth, *The Tame mills of Staffordshire* (1976); P. M. Frost, 'The growth and localisation of rural industry in south Staffordshire, 1560–1720' (PhD thesis, University of Birmingham, 1973, pp. 453–502); R. S. Roper, *Early north Worcestershire scythesmiths* (1967); M. B. Rowlands, *Masters and men* (1975); Z. Roscoria, *Mills and their changing roles, 1680–1750*

30–40 years.[78] Compared with other regions, the Sheffield edge tool trades, apart from scythe making, were slow to mechanize.[79] As late as 1870, most of the smaller tools – notably sickles – were hand-made.[80] Only 70 spade and shovel makers were returned for Yorkshire in the 1851 occupational census, compared with 357 in the west midlands.[81]

In the west midlands likewise, water power was employed initially mainly for grinding. Blade mills lined the banks of the Rea and Cole and other Birmingham rivers, and along the Tame and Stour and their tributaries in the scythe-making districts of north Worcestershire and south Staffordshire.[82] A 'tilt-mill' and steam engine installed by William Hunt and Sons at the Brades Works at Oldbury in the late 1790s was probably used for steel refining or in the adjoining coal mine for pumping water.[83] Twenty years later, some tools were still being made by hand.[84] In Staffordshire, William Gilpin of Wedges Mills, near Cannock, having no access to proper grinding facilities when he began there in 1790, had to send his tools to be edged six miles away at Bentley.[85] In 1806, a tilt hammer was installed at his new works at Churchbridge in Great Wyreley township on a tributary of the River Penk. Local skill shortages led to the recruitment of a dozen workmen experienced in the use of water power from the edge tool making villages of Moreton Valence and Frenchay in Gloucestershire.[86] Edward Elwell, another pioneer, installed tilt hammers on taking up a lease at Wednesbury Forge in 1817, at the same time switching from hand-made saws and gunbarrels to edge tools.[87] Tilts were probably first introduced into north Worcestershire in the 1790s, when an overshot wheel and drop hammer

Note 82 *continued*
(1988), ch. 3. And for the later period: S. Timmins (ed.), *The resources, products, and industrial history of the Midland hardware district* (1866) (the Timmins family were leading tool manufacturers); Homeshaw, 'Edge tools', *VCH Staffordshire*, II: G. C. Allen, *The industrial development of Birmingham and the Black Country, 1860–1927* (1929). The series of small handbooks by F. W. Hackwood on Black Country towns, 1889–1908, listed in Dilworth, *Tame Mills*, p. 199, remain useful sources.

[83] R. A. Pelham, 'The water power crisis in Birmingham in the eighteenth century', *University of Birmingham Historical J.* 9 (1963), pp. 64–9. Dilworth, 'Tame Mills', pp. 186–8 mentions a 'plating' mill at Wednesbury Forge in the early eighteenth century, possibly for forging bundles of steel rods for making shear steel.

[84] H. W. Dickinson (ed.), 'Diary of John George Bodner', *Newcomen Soc.*, 15 (1929–30), p. 107.

[85] Homeshaw, 'Edge tools', pp. 259–62; Dickinson (ed.), 'Diary', p. 107.

[86] Homeshaw, 'Edge tools', pp. 259–62; B. L. L. Johnson, 'Iron and steel since 1750', *VCH Staffordshire*, II, pp. 123–33; C. R. Peate, *Cutting roads to glory with edge tools* (nd, copy in Birmingham Public Library, Local Collection).

[87] *The mid-Victorian Elwell catalogue of edge tools*, with an introduction by R. Filmer (2000). Edmund Marlow (a former employee), *Reminiscences,* mss *c.*1929, was in the firm's archive when seen by the author in 1985. The firm having since closed (its manufacturing plant sold to China), its present whereabouts is unknown.

[88] *Farmers Weekly*, 16 Dec 1938, pp. 28–9; Historic England, Heritage List, historicengland.org.uk/listing/the-list/list-entry/1100650. See also a typescript history of Churchill Forge, printed and distributed by the present owners.

[89] The token formed part of the permanent display at the Finch Foundry Museum, Sticklepath, Devon, when visited by the author in 2012.

[90] Calculated from entries in the *Universal Directory of British Trade and Commerce* (1798), IV, pp. 708, 814; *Biennial Directory for the Brass and Copper Trades, 1816–17; Worcestershire Directory* (1820); *Pigot's Directory of Worcestershire, 1822*; *Staffordshire Directory, 1837, 1845*; *Post Office Directory of Worcestershire*, *1845*; *Kelly's Directory of Staffordshire, 1864*; *Kelly's Directory of Worcestershire*, *1876*, *1896*. Spade, shovel, and fork production was carried on around Stourbridge, Halesowen, and Lye: 'crown' scythes at Belbroughton and Chaddersley Corbett; plantation hoes, cane knives and machetes at Halesowen, Wolverhampton and West Bromwich; agricultural and woodmen's tools at Oldbury, Wednesbury and Cannock.

were added at the new North Mill at Churchill Forge, near Kidderminster, and soon after a tilt hammer at the South Mill.[88] A rare penny token issued by the Withymoor Scythe Works of Netherton near Dudley in 1813, depicts two tilt hammers and a pair of shears, emblematic of the revolution then beginning to transform the west midland tool trades.[89] The increase in the numbers of spade, shovel, and hoe makers listed in local directories between 1800 and 1825 reflects the increased importance of water power in Black Country forges in the early nineteenth century, their numbers rising from three or four in 1800, to 20 in 1825, to 45, now mostly steam-powered, in the mid-1860s.[90]

In his 1866 survey, Timmins noted that the edge tool trade of Gloucestershire had now been absorbed by the midlands, where some 3500 workers were now employed in their manufacture, and in the major firms up to 300.[91] In the late 1870s, a leading trades journal went so far as to attribute most of the improvements in tool design and manufacture in the previous half-century to the efforts of west midland manufacturers.[92]

III

We turn to consider the origins, technical characteristics, and performance of the tilt hammer, the dominating element in the technological revolution which had begun inauspiciously in Somerset and Gloucestershire late on in the pre-industrial period. An attribute of the waterwheel was that its rolling motion could be harnessed to a hammer beam or helve by means of cams attached to the driveshaft or axle, alternately lifting and releasing the beam, and allowing the head to fall back onto the anvil under its own weight.[93] Tilts differed from other types of hammers in the positioning of the cam between the pivot and the hammer head, as shown in Figure 3. A typical small edge tool mill had two hammers, a 'plating' hammer for spreading and moulding the iron blank, supplied commercially or cut to size by automatic shears activated by the axle, to form the blade or body of the tool, and a 'steeling' hammer for welding a 'string' or wedge of steel onto, or as in the case of axes, inserted into the body, to form the cutting edge.[94] Both operations were performed at high heat – 850°C and 1000°C in the plating and steeling forges respectively – and at speed. Depending on the tool, the steel was either wrapped around an iron core, applied as a tip, or sandwiched between two iron plates. Made from cast iron, the head of the plating hammer weighed 100–250 kg, or as much as 350 kg in a spade forge; and the steeling hammer 50–150 kg, the former delivering 80–120, and the latter 200–360, blows per minute. The even more powerful 'belly-helve' hammer, found

[91] Timmins, *Resources*, *passim*. *Farmers Weekly*, 16 Dec. 1938, pp. 28–9.

[92] *Martineau and Smith's Hardware Trades J.*, 28 Feb. 1879, pp. 52–3.

[93] R. F. Tylecote, 'Iron in the Industrial Revolution', in J. Day and R. F. Tylecote (eds), *Iron and steel in the Industrial Revolution* (1991), p. 246; R. F. Tylecote, *Metallurgy* (sec. edn, 1992), pp. 1035ff.

[94] In scythe and plantation hoe making the steeling preceded the plating; in that of reaping and billhooks, the reverse. Because of their greater length, up to 6 feet, scythe blades were forged in sections working along the blade.

[95] For more about tilt hammers see, Gailey, *Spade making*, p. 28; J. G. Timmins, *The forge and the wheel* (1968); H. R. Schubert, *History of the British iron and steel industry, c.450 BC–1775 AD* (1957), pp. 299–302; Harris, *British iron industry*, pp. 15ff, 44–5; Marshall & Davies-Shiel, *Lake Counties*, ch. 3.

[96] Pers. comm. Mrs Nora Peters, East Hanham, Devon, July, 1985.

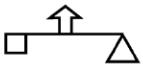
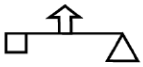
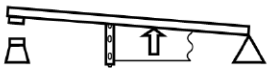
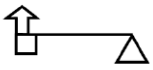
Type	Position of resistance, effort and fulcrum	Class of lever	Forging arrangement	Example
belly-helve		third		Milton Ironworks, Yorkshire
belly-helve		third		Wortley Top Forge, Yorkshire
head-helve		second		Part of Jessop tilt, Abbeydale
tilt hammer		first		Tilt Forge, Abbeydale

FIGURE 3: Types of water-powered hammer showing forging arrangements.

Source: *Scythe making at Abbeydale, Information Sheet*, Sheffield City Museums (4th edn, 1976), p. 3. Drawing by Catherine Glover.



FIGURE 4: Pair of tilt hammers at Holbeam Mill, Devon, *c.*1930.

Source: Museum of English Rural Life, University of Reading, Photograph Collections, Negative number 35/16571.

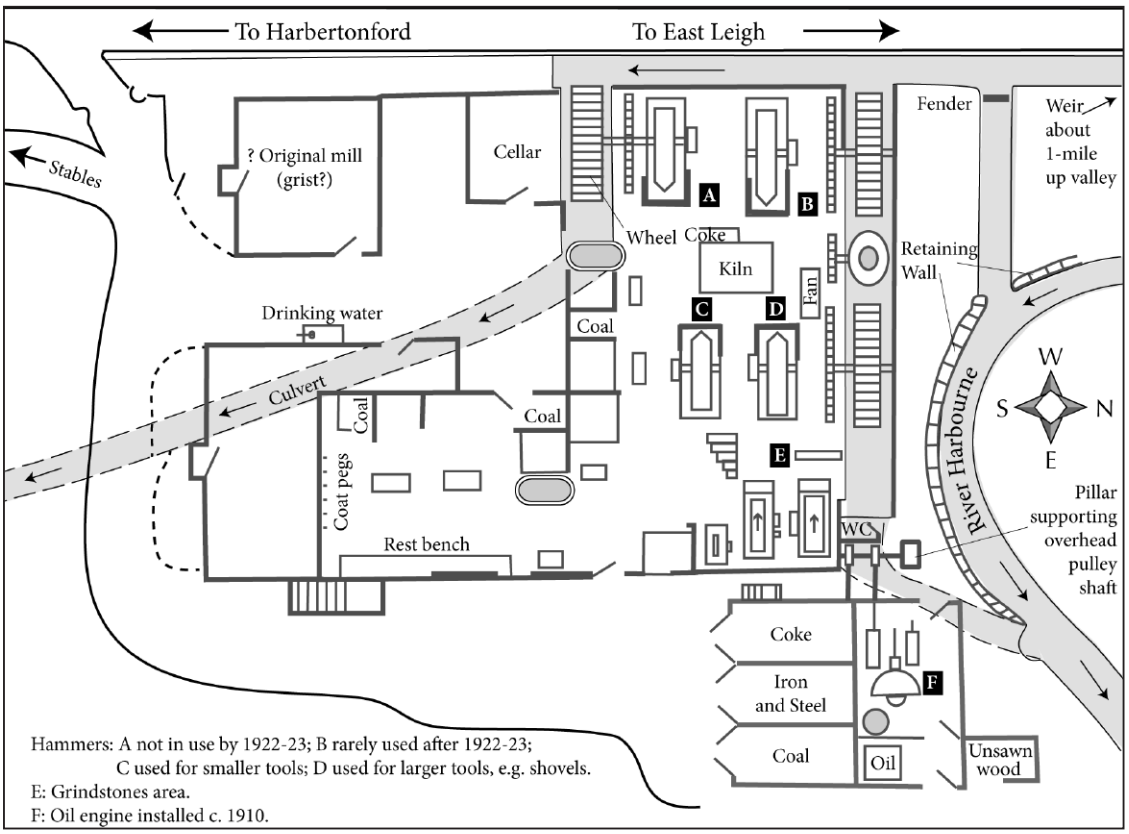


FIGURE 5: Floor plan and layout: Harberton Mill, Devon, *c.*1930.
Drawing by Catherine Glover, based on an original sketch by Mrs Norah Peters.

in iron forges and foundries, was heavier again, but slower-working. It follows that in terms of its potential for work, the tilt hammer was many times more productive than a 6–8 kg sledge or 2–4 kg steeling hammer used in a hand forge.[95]

The tilt hammer was a powerful machine designed to deliver a succession of heavy blows at a preset point. Figure 4 shows a photograph of a pair of hammers, one working, at Harberton Mill, Devon, *c.*1930, and Figure 5 a floor plan of the works at about the same date, drawn from memory by the manager's daughter.[96] It shows a well-equipped mill, equipped with four hammers and hearths (A–D), one pair for large tools such as shovels, the other for small tools, three waterwheels together producing 25–30 hp, a mechanical shears, an oil engine installed *c.*1910, two pairs of grindstones, an oil bath for tempering, a water-powered fan (in place of the original bellows), an iron splitter; and a mechanical saw and lathe.

The resulting productivity gains, while unquestionably impressive, are hard to quantify. A

[97] Armitage, *Chantry land*, pp. 77–8.
[98] Sylvester, 'Scythe making', p. 11.
[99] Ex. inf. R. Barron, Sticklepath Foundry, June 1985. Alec Morris of Dunston Forge told me that his father made 3 or 4 American wedge axes a day in the hand forge in the 1930s.
[100] Brades Works Diary, Worcestershire RO, 706 866 BA 7974/3.

two-man tilt at the Skelton Mills in Sheffield, it was claimed, could forge 12–15 dozen scythe blades per day, compared with half a dozen by a team of the same size in a smithy.[97] At the Abbeydale Works, a team of four turned out 10–15 dozen (or more) scythe blades per day, as against a dozen by hand.[98] The norm at the Sticklepath Foundry, in the 1930s, was 10–15 dozen per day, whereas a smith and striker made 10 at most.[99] Thus, output per head in a tilt hammer forge was upwards of 10 times higher than in a hand forge. Steam hammers were more productive again: at the Brades, at Oldbury, in 1888, the works' diary records that four men with a steam hammer and press could make 50 dozen or more (plantation) hoe blades in a day.[100] Plating and steeling were but two in an extended sequence of operations, following which the part-finished blades had to be hardened and tempered, trimmed, then ground, stamped, polished and painted, and finally fitted with a handle, ready for sale. Thus, the overall productivity gain was in practice less spectacular than might first appear, which may partly account for the tilt hammer's slow rate of diffusion before 1790.

Water-powered hammers were an old technology, employed in iron forges and fulling mills in the later middle ages, and in steelworks and slitting mills since the seventeenth century. Archaeologists, though, have discovered what may have been a water-powered forge for producing edge tools at Bordesley Abbey in Worcestershire, a Cistercian house.[101] Though open to doubt, this interpretation has a certain credence, in that the Cistercians were renowned for their hydrological and metallurgical skills, and it is claimed they employed a tilt hammer in an edge tool forge at Fontenay Abbey in Burgundy, as early as 1220.[102] There exists, however, no evidence of similar such installations at other Cistercian houses in England.

There is no obvious reason why Britain should have lagged so far behind mainland Europe in mechanization. Braudel distinguishes two main types of hammer in use on the Continent in the seventeenth century: the 'German', for forging and refining iron, similar probably to the English belly-helve hammer; and the 'Italian', clearly a form of tilt or trip hammer, which delivered short rapid blows, and is believed to have originated in northern Italy at Brescia, an important weapon- and armour-making centre.[103] The 'tail' hammer was introduced into England from Germany in 1573 for working iron bars into rods and bands, followed in the early eighteenth century by the faster-working 'Osmond' hammer.[104] A smaller hammer, the 'martinet', was used for plating tools in Wallonia in the Belgian Ardennes, a region famous for its metallurgical industries and use of water power.[105] The provenance of the hammers erected at Mells and Coaley in 1744 is nowhere stated, but may not have been, as this author first supposed, somewhere in the west midlands, possibly a steelworks, but much closer to home, at Bristol sixty miles distant.[106] A recent article on the origins of the Bristol brass industry

[101] G. G. Astill, *A medieval industrial complex and its landscape: the metal working watermills and workshop at Bordesley Abbey* (1991), p. 246.

[102] See www.abbayedefontenay/forge-de-buffon; www.grandforgedebuffon.com.

[103] F. Braudel, *Capitalism and material life,* trans. M. Kochan (1974), pp. 279–80.

[104] Schubert, *Iron and steel*, pp. 295–302; Cleere and Crossley, *Iron industry*, pp. 296ff.

[105] A. de Visscher (ed.), *Les plus beaux villages de Belgique* (1981), pp. 121ff.

[106] Sir John Clapham, *A concise economic history of Britain* (1949), p. 227.

[107] J. Day and T. Coverdale, 'The Avon Valley copper and brass industry', *Bristol Industrial Archaeological Soc. J.*, 46 (2013), pp. 1–18. Figure 5 shows a battery of hammers similar to the Sticklepath, Holbeam and Abbeydale examples.

suggests the inspiration may have been an advanced design of hammer used for plating and hollowing brassware at Aix-La-Chapelle in the Meuse-Rhine region of Belgium, brought to England by a company of Bristol businessmen about 1700. Brass was first manufactured at the Baptist Mills on the River Frome in 1702, and in 1704 hollowed out at the Downe Mills by batteries of hammers, each powered by a waterwheel. Any one of seven similarly equipped works in the Bristol region nearby, could have served as the model for Mells and Coaley.[107]

The virtues of the tilt hammer were most compelling when making large-bladed tools, which could now be forged in a single operation, inside a few seconds, without losing welding heat, as reheating made the metal brittle and weakened the bond, thus rendering the tool useless. Moreover, the hammer head fell with a dead blow, whereas other types of hammers bounced about on the anvil, making for inaccurate work. For this reason, it was claimed, Sheffield scythe makers preferred water- to steam-powered hammers.[108] Water power remained the chief energy source in the scythe shop at the Belbroughton Works until the early 1950s, and at the Bache Foundry near Kidderminster as late as 1970.[109]

Making an all-iron spade by hand was highly labour-intensive, and the result uncertain, because the blade tended to bend under stress. Indeed, spade making was considered among the most difficult of the qualifying tasks for membership of the Scottish Corporation of Hammermen.[110] Labour and materials were so costly that, up to the eighteenth century the blades were normally made of wood, encased in a steel shoe.[111] The tilt hammer removed much of the drudgery, but until 1840 it was still not possible to forge-weld iron and steel directly because of the adverse reaction of the fire on the bare steel, which required the blade to be inserted between two layers of iron to protect it from the flame. All-iron spades were anyway heavy and cumbersome, but if made lighter, were not strong enough.[112]

Why should the tilt hammer have been first employed in south-west England rather than in Sheffield or the west midlands? There are institutional constraints to be considered such as tradition, over-regulation, vested interests, and hostility to labour-saving innovations. Such constraints were weaker in the south west, where edge tool making was a new industry and water power was already in general use in the textile and iron industries. Other factors need to be considered though. Gloucestershire and Kent were among the leading industrial counties in the seventeenth and early eighteenth centuries, their prosperity based to a large degree on an intensive use of water power. The one gave birth to a highly successful edge tool industry based on new technology, so why not the other? The application of water power to drive hammer mills was not unknown in Kent. C. W. Chalklin writes tantalizingly of a watermill at Ravenbourne in north Kent, which 'moves the Engines by which the famous Ephraim How makes the best knives in England',[113] referring perhaps to a form of hydraulic hammer, similar

[108] Blackwell, 'Sickle/Scythe Trades', p. 139.

[109] Ibid.

[110] A. W. Beaver, *The art of blacksmithing* (new edn, 1976), pp. 193–5.

[111] R. Webber, *The village blacksmith* (1971), p. 45.

[112] The problem was solved in the early 1840s by the Birmingham spade makers, A. and F. Parkes, who developed a protective flux to separate the two metals during welding.

[113] C. W. Chalklin, *Seventeenth century Kent* (1965), pp. 138–9.

[114] Visscher (ed.), *Plus beaux villages*, p. 121

[115] Martin Watts, a working millwright and mills historian, Pers. comm. June 2010; Crossley *et al.* (eds), *Water power*, pp. 117–18.

to the 'martinet' used in Wallonia for plating tools.[114] Kent was well placed to have developed along the lines of Gloucestershire, but instead did the opposite, undergoing a resurgence in hand-forging.

Hydrology was a key determinant. The energy requirement of a small edge tool mill was far greater than that of the average corn, fulling, or blade mill. A pair of fulling stocks, for example, consumed an estimated 2.5 hp, and a pair of millstones 4 hp, compared with the 10–15 hp of an edge tool mill equipped with two hammers, a pair of grindstones, a mechanical shears, a fan or bellows, and a lathe.[115] At the Sticklepath Foundry, in Devon, the hammer and shears used five or six times more power than a set of grindstones.[116] Energy inputs at large works, such as Abbeydale, Coaley, or Tavistock, exceeded 50 hp, and the very largest, such as Mells and the Elwell, works at Wednesbury, with multiple sets of hammers and other machinery, upwards of 100 hp

Recent calculations of national energy supplies and utilization imply that only a small percentage of watermill sites had the potential to drive a tilt hammer. Indeed, output per wheel is estimated to have averaged only 4 hp in 1700, 5 hp in 1800, and 6 hp in 1850.[117] Admittedly, only very little of the energy capability of most English rivers was utilized for industrial purposes. Yet in heavily industrialized districts, competition for sites was often fierce, and the best sites already occupied in 1750.[118] Although by 1830 steam had supplanted water as the nation's primary energy source, water power usage in industry and mining peaked much later, around 1870.[119]

The average energy potential of Sheffield rivers is put at less than 4 hp. Thus, energy-intensive industry tended to be to be sited on the more powerful rivers, such as the Don and Sheaf, and the less demanding on the smaller streams. The first steam engine, erected in 1789, was for blade grinding, not forging. Birmingham's rivers were neither very powerful nor reliable, their flow reduced sometimes to a trickle during droughts.[120] In the Black Country, the area drained by the upper Tame river system, being one of low relief and gentle gradients, generated very little power. Iron mills and after 1790 edge tool mills were situated mainly in the lower Stour valley, where Stourbridge and Halesowen became major centres of heavy edge tool manufacture.

The emergent edge tool industry in south-west England owed much to the largesse of its rivers. In Gloucestershire, the majority of the 18 watermills in the Dursley valley, and many of the hundred or more in the Stroud and Cam valleys, were rated in excess of 10–15 hp.[121] Of the 11 mill sites in the Mendips surveyed by the Centre for Sustainable Energy, three had a potential of more than 30 kw (42 hp), and seven of 5–10 kw (7–14hp).[122]

[116] Ex. inf. R. Barron, Finch Foundry, June 1985.

[117] P. Warde, *Energy consumption in England and Wales, 1560–2000* (2007), pp. 49–57. The increase in wheel output and efficiency was part due to a switch from under-shot to over-shot and wooden to cast-iron wheels.

[118] See R. B. Gordon, 'Cost and use of water power during industrialisation in northern England and Great Britain: a geological interpretation', *EcHR* 36 (1983), pp. 240–59.

[119] Warde, *Energy consumption*, pp. 56, 74–5.

[120] R. A. Pelham, 'Water power crisis', p. 64. See also S. D. Chapman, 'The cost of power in the Industrial Revolution in Britain: the case of the textile industry', *Midland Hist.* 1 (1971), pp. 1–23.

[121] Ex inf. Osman Goring, Coaley Mills, June 2010.

[122] 'Mendip Mills energy makeover', www.cse.org.uk/projects/view/1006.

There remain the questions of why the tilt hammer was first applied to forging edge tools in the mid-eighteenth century, and whether this was a response to shifts in supply or demand: to which the answer is probably both. On the supply side, there was a breakthrough in hammer design, initially, it is suggested, for beating brass, then applied to edge tools. On the other, we can postulate a marked upturn in demand, particularly for large-surfaced tools, sufficient to have generated the economies of scale needed to justify investment in expensive industrial plant. The expansion of mining and quarrying in south-west England was a powerful stimulus, as evidenced by the location of many of the new edge tool works close to mineral workings. In Somerset, the mainspring was the opening up of the Mendip and Bristol Coalfields – Mells had its own colliery, serving both as a market for its tools and a cheap source of fuel for the hearths, and in Devon and Cornwall the growth of non-ferrous mining.[123] The Severn ports provided access to south Wales, Ireland, and the Americas. Every slave in the Caribbean colonies, it was said, consumed yearly 'two hilling hoes, two weeding hoes [and] two grubbing hoes of English manufacture'.[124] By the 1770s, plantation hoes – all-purpose digging tools – and cane knives, had become major items of Atlantic commerce, benefiting from the close working relationship between manufacturers, agents, and merchants, centred on Bristol. In the 1770s, a merchant with plantation interests living near the city, contracted with the Frenchay Iron Company nearby to supply axes, spades and hoes for export to North Carolina.[125] Other triggers would have included the rapid expansion of the coppice trades and hop industry in south-east England, and arable extension and enclosure on the Cotswolds and southern chalklands.[126]

Whether and to what extent the slow uptake of the tilt hammer prior to the 1780s was due to a shortage of investment capital is a moot point. By eighteenth-century standards, an edge tool works was a relatively costly undertaking, representing an outlay of up to £1000, and in the case of large works, such as Tavistock, Coaley and Mells, considerably more. The housing needed to be robust, preferably of stone, to withstand the vibration of the hammers and the erosive effect of fast-flowing water. Converting an existing mill, while usually cheaper than a new building, would normally have involved further outlays on additions, adaptations, and upgrading the water supply. Most edge tool mills had a long working life, typically 70–120 years, and 200 years exactly in case of Coaley. Their longevity attests to the long-term viability of water power as an energy source, and of the tilt hammer as the technological mainspring.

[123] J. B. Richardson, *Metal mining* (1974), pp. 97–8; 'Mells and the Wadbury Valley', www.bgs.ac.uk/mendips/localities/mells.html.

[124] Evans, 'Plantation hoe': I am grateful to the author for further helpful comments.

[125] Owen Ward, 'Frenchay Iron Company 1776–1780', *Bristol Industrial Archaeological Soc. J.*, 30 (1997), pp. 25–33.

[126] Kent and Sussex were among the most heavily wooded counties in Britain, over 60% coppiced. Between 1835 and 1878 the Kent hop acreage grew from 25,740 to 46,600 acres. In the 1830s an estimated 25M new poles were needed to establish new grounds and as replacements. E. J. T. Collins, 'The coppice and underwood trades', in Collins (ed.), *Agrarian History of England and Wales*, VI, *1750–1850* (1989), p. 488.

IV

What business historians would probably consider the industry's defining feature can be touched upon only briefly. This was the coexistence until the early twentieth century of a wide range of different types and sizes of firm, employing widely varying levels of technique, making broadly the same products, selling for much the same price, quality for quality. In 1866, Timmins wrote glowingly of the technical advances in the midland hardware districts, and in 1883, *The Ironmonger*'s Wolverhampton correspondent described the many great improvements in tool design and manufacture in his district, with the leading firms now equipped with eye-punching machines, hydraulic presses, and steam hammers, and making all-steel tools from mild steel plate, innovations which together revolutionized the production and quality of Brazilian hoes and Anglo-American picks.[127] The south west, meanwhile, with a few exceptions, still relied largely on water power, with steam an emergency backup.

In the 1860s, Sheffield and the west midlands may together have produced upwards of 90 per cent of national edge tool output, and enjoyed a near monopoly of sales. Yet in the 1920s many rural districts in the south east and south west were still to a remarkable degree self-sufficient in agricultural and forestry tools, barring saws and scythes, and, in parts of the peninsula, likewise spades and shovels. When Alec Morris took over the Dunsford Works in the 1930s, he reckoned 'foreign', mainly midland, firms supplied about 50 per cent of the West Country market.

The metalworking trades, as Maxine Berg observed in her classic history of manufactures, spawned 'a distinctive form of specialisation and artisan skill'.[128] More so than other craft occupations, edge tool making was synonymous with a deeply embedded and highly conservative craft culture rooted in obsolescent skills, which delayed mass-production and product rationalization until after the Second World War. The underlying causes, however, may have been less sociological than technical, namely the intrinsic nature and working properties of the two principle raw materials, wrought iron and high-carbon steel. The former was dense, tough and malleable, well-suited for blades and bodies, but difficult to machine; the other, ideal for edges, but difficult to forge and weld. Steel being very expensive, tools were made principally of iron: in the case of plantation hoes the ratio of iron to steel was about 6:1. But while much cheaper and thus more affordable, making welded tools – plating and steeling the bodies then the tempering – demanded special skills. Quickness of eye and fine judgement were needed to shape the bodies, and join together the two metals, each with different welding and melting heats, within a narrow temperature range. At the Elwell Works, in the 1920s, only four of the 25 platers in the forge shop were reckoned really good with edge tools, able to replicate the many different patterns – over one hundred in the case of billhooks – accurately and at speed, with a minimum of rejects.[129] Whether in a Sussex hand forge, a century-old West Country watermill, or a large Black Country factory firm, making welded tools remained the preserve

[127] Timmins, *Resource,* p. 657; *Iron Age*, 29 Mar. 1883.

[128] Berg, *Age of manufacturers*, p. 268, and ch. 11 for the further development of this theme.

[129] I am grateful to the following for this and other useful information about the west midland tool trades and techniques employed in the interwar and early post-war periods. Stanley Hyde of the Elwell Works, Wednesbury; Frank Ellis and John Billingham of Wollaston Mills. Uniquely useful was Edmund Marlow's *Reminiscences*.

of highly trained and experienced craftsman, the aristocrats of the workforce, until the 1950s, when production ceased.

Tools made from 'Bessemer' hot blast and Siemens open-hearth steels, a form of low-carbon iron, could be engineered or press-moulded in just one or two operations using semi-skilled or unskilled labour. But though cheaper, they were less well adapted than wrought-iron tools to withstand the shocks of repeated heavy blows, and were prone to bending or breaking. Despite the use of much improved steels, hedgelayers and woodcutters still much prefer craftsman-made pre-war iron and steel welded tools to the modern, mass-produced all-steel types, which they complain, 'haven't enough iron in 'em'. Being no longer manufactured commercially, they are having to be sourced from car boot sales or second-hand tool dealers. In country households, old tools bearing the mark of some long-extinct maker are treated almost as heirlooms, passed down the generations.

By the late nineteenth century the manufacture of first-quality edge tools was dominated by a few large firms, with national, in many cases international reputations, and countrywide distribution networks. How then, at an advanced stage of industrialization, in a shrinking market, were small producers in rural areas able to beat off outside competition, especially as most towns and larger villages now possessed one or more hardware merchants? Survival depended on being able to exercise a degree of monopoly power through the exploitation of a niche market. Businesses serving remote country districts with poor communications were the best placed. Parts of the Weald and Devon hill country were at times inaccessible in winter until opened up to regular commerce by the motor lorry and macadamized roads in the 1920s. Close-knit social networks made for customer loyalty and a high percentage of direct sales. 'Craftsman-made', customized specialist tools were often more expensive than best-quality factory-made tools sold by ironmongers. Local makers were often the sole source of specialized tools such as 'twybills,' employed in Kent for cutting mortices in gate hurdles, or 'binman's hooks' for cutting down bines in the hop fields.[130] Market failure was the ultimate threat, and the collapse of mining and quarrying in the south west and of coppicing and associated trades in central southern and south east England, took a heavy toll. In the woodland districts of Kent and Sussex, the popularity of chestnut post and wire fencing for use on building sites and public open spaces in London and the Medway towns helped offset the loss of traditional markets. The fate of the country tool smith was sealed by the decline from the 1920s of the working horse, and with it the blacksmiths in whose forges he had worked, and an essential secondary source of income. The final blow was the blocking of supplies of Swedish charcoal iron in the Second World War, for which there was no immediate alternative.

Business survival was largely a matter of opportunism. In 1903, William Smith of Seal, Kent, decamped to Staffordshire where he made edge tools bearing the firm's original marks for sale in Kent, Sussex and the Home Counties, but by 1935 his firm had transformed itself into 'agricultural, electrical and motor engineers', with edge tool making occupying a minor role in a now much larger organization.[131] Alec Morris at Dunsford chose to specialize in West Country, especially Fussell patterns, copying the really old ones, and supplying customized

[130] Ex. inf. Fred Hams, Challock, Kent. See also Tabor, *Kentish Billhooks*, for other examples of Kent tools.

[131] Fox *et al.*, *Seal,* p. 131.

tools to order with guaranteed delivery. Several businesses were saved by being bought up by midland manufacturers as going concerns, or by undertaking contract work.

V

In conclusion: it is hoped that the paper has provided fresh insights into the history of edge tool making in southern England during and after the Industrial Revolution. Technological and structural change, and the transition from hand-forging to full automation, are shown to have been a complex and protracted processes. Contrary to the received wisdom, in the earlier period south-west and south-east England stood firm in the face of northern and midland competition, and grew market share. In 1914, ten West Country water-powered works, and in Kent and Sussex 20 or more hand forges, were still working.

Perhaps the most important finding, deserving, one hopes, of at least a footnote in a history of the Industrial Revolution, is the emergence in south-west England of a regionally important edge tool industry, which pioneered the use of water-powered hammers for plating and steeling, the crucial first stage of mechanization, and laid the foundations of a new branch of the industry specializing in large-surfaced tools. From the mid-1740s to the end of the Napoleonic Wars, the south west set the pace, at the same time playing an important role in the Atlantic trade, and serving as a model for the Black Country. Water power provided the initial impetus, and for many firms in the south west remained the predominant energy source throughout the nineteenth century. Whereas in Sheffield and the west midlands the industry became increasingly urban-based, in the south west it remained a predominantly rural industry throughout.

Three contrasting models of industrial change have been identified: in the south west an industrial revolution; in the south east a counter-revolution; and otherwise a protracted decline, which gathered pace after 1850. By 1920 traditional tool making had come to an end almost everywhere. Further research will hopefully throw more light on change on edge tool production in particular and the manufacturing sector in southern England in general throughout the largely uncharted territory of the early Industrial Revolution.

The 'Big Freeze' of 1962–63: the loss of livestock, the issue of fodder supply and the problem of the commons in two upland hill-farming regions in England and Wales*

by James P. Bowen and John Martin

Abstract

This article explores the impact of the extreme winter of 1962–63 on two upland hill-farming areas: the Cambrian Mountains area of Breconshire, Radnorshire and Montgomeryshire in mid-Wales, and Dartmoor in Devon and parts of south-west England more generally. Based on the detailed study of Ministry of Agriculture, Farming, and Fisheries (MAFF) files held at the National Archives, supplemented with material from the National Meteorological Library and Archive, *Hansard* (Parliamentary Debates) and the farming press, it provides a detailed analysis of the impact of the winter showing how it adversely affected these two upland areas and provoked political debate. The way in which the effects of the winter contrasted with the previous extreme winter of 1946–47 is considered. It argues that, by 1962–63, upland farmers were better equipped to deal with the effects of extreme winters and the Government had learnt important policy lessons from previous experiences.

> After a winter as severe and unforeseen as that of 1962–63 there should be no difficulty in convincing Englishmen of the ability of the weather to disrupt the most highly organized society. That winter was a reminder, and it may be feared a timely one, that we do not yet control and cannot truly predict the weather.[1]

Although we live in an age of climate change, global warming and increasing international food insecurity, the impact of previous instances of extreme weather events, such as drought, floods, storm events and unusually high or low temperatures in Britain has received relatively

* This paper is an outcome of the project: 'Spaces of experience and horizons of expectation: the implications of extreme weather events, past, present and future', funded by the Arts and Humanities Research Council (grant number AH/K005782/1). See J. P. Bowen, 'Spaces of experience and horizons of expectation: the implications of extreme weather events, past, present and future,' *Rural History Today* 27 (Aug. 2014), pp. 4–5. John Martin would also like to acknowledge the award of a MERL (Museum of English Rural Life) Fellowship in 2010–11 to investigate 'Extreme weather and agriculture from 1947 to 1976'. We would like to thank David Stead, Mark Riley and Angus Winchester, who commented on an earlier draft of this article, the editor of the *Review* and the two anonymous reviewers who commented on the article.

[1] E. L. Jones, *Seasons and prices: The role of the weather in English agricultural history* (1964), p. 14.

little consideration by rural and agricultural historians. The impact of weather on agricultural productivity and prices has attracted more attention in other countries, particularly in the United States where seasonal weather patterns can have a much more profound impact on agricultural output and prices.[2] Traditionally historians concerned with weather and climate in Britain have focused on its impact on arable cultivation rather than its effect on pastoral agriculture.[3] Jones' classic study, *Seasons and prices*, was the first to consider the effect of weather on national agricultural production and was published the year after the 1962–63 winter.[4] Local case studies are invaluable given the implications of extreme weather for the productivity and economic viability of agriculture, an issue which is particularly evident in respect of isolated and marginal upland areas which are at acute risk from extreme winters.[5]

The impact of the winter of 1946–47 on the agricultural sector has received limited attention from historians. For example, while Fyrth in his edited volume, *Labour's High Noon*, stresses the significance of 1947 as a turning point, the chapter specifically on agriculture by Chase, which argues that Labour's agricultural policy was 'Nothing less than a revolution', makes no more than a passing reference to the impact of the 1947 winter.[6] In a similar vein, Zweiniger-Bargielowska's *Austerity in Britain* pays little attention to the disruption to the rural sector caused by the winter of 1947.[7] The most detailed account is Robertson's *The Bleak Midwinter 1947*, although this focuses primarily on the origins of the coal crisis and its relationship to the problems of post-war reconstruction.[8] The importance of the 1947 winter has also been largely ignored in specialist studies of the agricultural sector such as Holderness's *British agriculture since 1945* and Martin's *The development of modern agriculture*.[9]

Amongst agricultural historians there is a growing appreciation of the economic impact of extreme weather on agriculture and the response of policy makers.[10] They have considered

[2] M. Atkin, *Agricultural commodity markets* (1989). The United States Department of Agriculture (USDA) provides daily reports on the impact of the weather on agricultural productivity to the farming community see www.usda.gov/wps/portal/usda/usdahom, accessed 10 Nov. 2015.

[3] For example see W. G. Hoskins, 'Harvest fluctuations and English economic history, 1620–1759', *AgHR* 16 (1968), pp. 15–31; D. Stone, 'The impact of drought in early fourteenth-century England', *EcHR* 67 (2014), pp. 435–62; L. Brunt, 'Weather shocks and English wheat yields, 1690–1871', *Explorations in Economic History*, 57 (2015), pp. 50–5. There is a lack of historical accounts that focus on post-war British agriculture (with the exception of specific studies addressing themes such as changes in government policies, rural electrification, output and technical change, and the farm management survey), highlighting the need for an *Agrarian History of England and Wales* IX covering the period 1939–1990. For the Agricultural Act of 1947 and post-war agricultural policy see J. K. Bowers, 'British agricultural policy since the Second World War', *AgHR* 33 (1985), pp. 66–76.

[4] Jones, *Seasons and prices*.

[5] *UK Climate Change Risk Assessment: Government Report* (2012).

[6] M. Chase, 'Nothing less than a revolution? Labour's agricultural policy', in J. Fyrth, *Labour's High Noon: Government and the economy, 1945–51* (1993), pp. 78–95.

[7] I. Zweiniger-Bargielowska, *Austerity in Britain: Rationing control and consumption, 1939–1955* (2002).

[8] A. J. Robertson, *The bleak midwinter, 1947* (1987).

[9] B. A. Holderness, *British agriculture since 1945* (1985); J. Martin, *The development of modern agriculture: British farming since 1931* (2000). For the development of British agriculture during the Second World War and its legacy in the post-war period see: B. Short, C. Watkins and J. Martin (eds), *The front line of freedom: British farming in the second world war* (2006).

[10] J. Martin, 'The bleak midwinter of 1947', *Rural History Today* 18 (2010), pp. 1, 8; J. Martin, 'Long hot summers revisited', *Rural History Today*, 19 (2010), pp. 1, 8; D. R. Stead, 'Irish agriculture and agricultural policy during the hot, dry summer of 1976', *AgHR* 62 (2014), pp. 314–36. C. A. Jones, S. J. Davies and N. Macdonald,

some aspects of the winter of 1946–47, but less attention has been paid to the effects of subsequent severe winters such as 1954–55, 1962–63 and 1978–79, all of which deserve investigation. The extreme winter of 1963, also known as the 'Big Freeze', was one of the longest and coldest winters on record in the United Kingdom. The Central England Temperature series compiled by Manley, which extends back to 1659, records that only the winter of 1683–84 was significantly colder, and that the winter of 1739–40, known as the 'Great Frost' – which affected Europe more widely – was only slightly colder than 1962–63.[11] Booth's snow survey of Great Britain for the 1962–63 season and the Meteorological Office's 'Monthly Weather Reports' provide a detailed month-by-month account of the winter.[12] To summarize, the beginning of December 1962 was very foggy, with a short wintry outbreak bringing snow on the 12–13 December. Towards the end of the month (22 December) a high-pressure system moved to the north east of the British Isles, having formed over Scandinavia. This was accompanied by a cold easterly wind from Russia. A belt of rain over northern Scotland on the 24 December turned to snow as it moved southwards. The snow reached southern England on 26 December and remained over the country resulting in snowfall of up to thirty centimetres in depth. Subsequently a blizzard on the 29 and 30 December across Wales and south-west England caused snowdrifts in a number of localities up to six metres deep. There was widespread disruption, with roads and railways blocked, telephone lines brought down and many villages cut off for days.[13] The snow lay for the next two months and more continued to fall. Whilst there was sunshine, the lack of cloud cover meant that temperatures at night remained low.[14] Throughout England and Wales, the long, bitterly cold spell caused lakes, rivers and even the sea to freeze. In much of upland England, motorized access remained difficult and hay had to be carried to livestock by hand (Figure 1). The coldest winter for more than two hundred years in England and Wales finally abated in early March, and with the thaw came flooding, although not on the scale of the 1947 floods.[15]

This article seeks to address this comparatively neglected winter with two regional case studies of its impact on upland hill-farming areas in England and Wales.[16] It compares and contrasts the experiences of the Cambrian Mountains area encompassing the counties of

Note 10 *continued*
'Examining the social consequences of extreme weather: the impact of the 1947 winter in upland Wales, UK', *Climatic Change* 113 (2012), pp. 35–53.

[11] G. Manley, 'Central England temperatures: monthly means 1659 to 1973', *Quarterly J. Royal Meteorological Society* 100 (1974), pp. 389–405.

[12] R. E. Booth, *Snow survey of Great Britain, season 1962–63* (1963), repr. in Meteorological Office, *British Rainfall 1963* (1971), pp. 9–14. *Monthly Weather Reports of the Meteorological Office* (1963) consulted at The National Meteorological Library and Archive, Exeter.

[13] For a blog exploring the impact on the extreme winter of 1963 on the railways in Britain see blogs.nottingham.ac.uk/weatherextremes/2015/05/04/the-effects-of-weather-extremes-on-the-railways-of-britain-past-present-and-future/, accessed 1 Oct. 2016.

[14] In January 1963 the mean earth temperature was –5°C and the mean air temperature –3°C; in February the mean earth temperature remained below freezing and whilst in March the number of hours of bright sunshine had increased to 2.5–4.0 hours per day, the mean earth temperature had only risen to –2.5°C/–3.0°C.

[15] R. E. Booth, 'The severe winter of 1963 compared with other cold winters, particularly that of 1947', *Weather* 23 (Nov. 1968), pp. 477–9.

[16] The files consulted are held at The National Archives (hereafter TNA), MAF 112/1151 (Losses of sheep during the winter of 1962/63) and MAF 114/689 (Animal welfare and feeding problems: winter 1963). Also consulted was T 311/52 (Economic consequences of severe weather conditions in winter of 1962–3) and AN 183/130 (Lessons of winter 1963–4).



FIGURE 1: Two farmers carrying bales of hay to feed livestock at Frongoch, Bala, Merionethshire, Wales on 1 February 1963. The Geoff Charles (1909–2002) Photographic Collection. By permission of Llyfrgell Genedlaethol Cymru/National Library of Wales.

Breconshire, Radnorshire and Montgomeryshire in mid-Wales with those of Dartmoor and the south west of England. The rationale for focusing on these two case studies is that they are broadly representative of upland areas in Britain. The impact of the winter on the farming community and animals was severe in both of them, and there is an abundance of relevant primary source material that has hitherto not been extensively utilized. These case studies provide pertinent historical examples that can be used to enhance our understanding and inform wider discussion about the influence of extreme weather on British agriculture. Our discussion focuses on the potential and actual losses of livestock, the critical issue of fodder supply and the need for supplementary feeding. The latter can be viewed in relation to the apparent problems which common land presented and debates at the time concerning the need for commons registration. Developments were also linked to debates regarding discussions about the payment of hill sheep and hill cow subsidy and the role of politicians and the National Farmers Union (NFU) in campaigning on behalf of upland hill farmers. In this way, the article contributes to the wider discussion about the government's involvement with the agricultural sector.[17]

[17] J. Murdoch and N. Ward, 'Governmentality and territoriality: the statistical manufacture of Britain's "national farm"', *Political Geography* 16 (1997), pp. 307–24; D. Harvey and M. Riley, '"Fighting from the fields": developing the British "national farm" in the Second World War', *J. Historical Geography*, 35 (2009), pp. 495–516.

We also note that 1963 constituted a major watershed in British politics. In addition to the bad weather, the Profumo scandal and the Great Train Robbery both contributed to the declining popularity of Harold Macmillan's Conservative government and its replacement after the 1964 general election by a Labour administration headed by Harold Wilson.[18] Given these challenges, the Conservative government was more preoccupied with maintaining its reputation for competence and less concerned about appearing partisan by assisting farmers who were traditionally noted for their support for the Conservative party. In passing we will consider several pertinent questions about the government's performance. For instance, is it fair to criticize central government, the county agricultural committees and farmers for insufficiently preparing for extreme winter conditions? Was the winter of 1963 handled well by government and could the policy responses have been more effective? Were the interests of farmers prioritized over those of taxpayers, and to what extent did the winter intensify the need for legislative reform regarding the registration of common land?

I

The agricultural statistics for England and Wales show the long-term relationship between cattle and sheep numbers, with cattle, which were generally less profitable, declining at the expense of sheep.[19] The shift to sheep had been encouraged by the headage payments made under the Hill Farming Act of 1946: more sheep led to increased income for the individual farmer. Headage payments, which were guaranteed, meant that there was less emphasis by owners on trying to ensure that the maximum number of lambs were born and reared. This encouraged an increase in stocking rates resulting in overstocking thereby making the dangers of an adverse winter even greater. Indeed, Crowe has argued that subsidies of this type were counterproductive, failing to promote either efficiency improvements or viable holdings, being least effective on upland hill farms, where headage payments delayed the rationalization of the industry. In her view, headage payments were, in effect, a form of social welfare.[20] As a result of the increase in the size of individual flocks, farmers had more sheep to look after, and saving them in bad weather by digging them out of snowdrifts before they either starved or froze to death was problematic at a time when the amount of labour available had also declined.[21] It is also important to note that cattle were more resilient to periods of bad weather and food shortages. A similar point applies to wethers – the so-called 'policemen of the hills' – which were normally more likely to survive adverse weather than breeding ewes.[22] It can, therefore, be argued that changes in the type of livestock kept on upland farms made the effects of the winter even worse than it otherwise might have been.

[18] R. C. O. Matthews, C. H. Feinstein and J. Odling-Smee, *British economic growth, 1956–1973: The post-war period in historical perspective* (1982). The winter featured in a Pathe Newsreel Review of 1963: www.youtube.com/watch?v=7i07pIUdIz8, accessed 18 Dec. 2015.

[19] MAFF, Agricultural Statistics, 1945–70.

[20] For hill sheep subsidy see: H. Crowe, 'A wasteful use of national resources? Farm subsidy in the uplands 1947–1970' (unpublished MPhil dissertation, University of Cambridge, 2010), pp. 35–44.

[21] An indication of the significant increase in the average size of the individual flock is illustrated in Tables 7 and 8.

[22] A. W. Ashby and I. L. Evans, *The agriculture of Wales and Monmouthshire* (1944), p. 40.

Winter fodder supplies often determined the stocking capacity of many upland farms, as most did not retain a surplus from previous years as insurance in case of an abnormally bad winter. Indeed, following favourable summers, which allowed them to build up their stocks of hay for the winter, they would often increase their stocking. This could take a variety of forms including retaining replacement ewe lambs on the farm rather than sending them to more fertile lowland farms for their first winter. The cost of away wintering was increasing rapidly at this time and it was one way in which financially hard-pressed upland farmers could economize.[23] And, whilst the hay crop in 1962 had in general been gathered in good condition, it was very light as a result of the cold dry spring, which had delayed grass growth.[24] This meant that fodder production had been comparatively low and most upland farmers went into winter with a shortage or deficit of winter fodder from that year and little or no reserves from previous years. Farmers were essentially gambling on the winter being relatively mild, allowing the animals to forage naturally. If this involved a degree of risk, then their luck ran out in the winter of 1962–63.

II

Our first case study comes from central and mid-Wales. The extreme winter of 1962–63 resulted in significant losses of sheep and lambs there and was the subject of questions in the House of Commons (which forced the Ministry to take a continuing interest in events) and extensive reports in the farming and local press.[25]

Once the scale of the Christmas and New Year snowfall had become apparent, it was quickly realized that large numbers of livestock in Wales were at risk. Estimates were made within the Ministry in the first days of January of the likely shortfall in the supply of fodder assuming that the weather remained cold without any thaw. These estimates serve to define the area of crisis. Denbighshire, Anglesey, Pembrokeshire and most of Cardiganshire were largely unaffected, but about 100,000 cattle and one million sheep in Wales were estimated to be at risk in the worst affected counties (Table 1). They were not expected to survive the winter without fodder being brought in from neighbouring areas.[26] Calculating the likely need may well have been prudent, but the worst fears of government seem not to have been realized. It is actually quite hard to establish exactly what the mortality of sheep was in the first months of 1963 and the Ministry's own papers show some uncertainty, as well as a tendency to downplay local difficulties. Press reports were, however, more lurid in their descriptions of the crisis.

[23] E. A. Attwood and H. G. Evans, *The economics of hill farming* (1961), p. 97; M. McG. Cooper and R. J. Thomas, *Profitable sheep farming* (1965), p. 93.

[24] The monthly mean air temperature anomaly for 1962 indicates that the month of March (–2.0°C), April (–0.5°C), May (–0.9°C), June (–0.6°C), July (–1.0°C), August (–1.2°C) and September (–0.9°C) were below the long-term mean. Rainfall was not heavy with the following monthly anomaly recorded for each month January (87 mm), February (–24 mm), March (–68 mm), April (73 mm), May (28 mm), June (–49 mm), July (–35 mm), August (65 mm), September (72 mm). We are grateful to Amy Lennard for providing this data.

[25] See for example 'Winter's tales' and 'The Icy Backlog', *Farmers Weekly* (hereafter *FW*), 22 Feb. 1963, pp. 43 and 47.

[26] TNA, MAF 114/689 (1), Letter from J. Morgan Jones to Humphrey-Davies, 11 Jan. 1963.

TABLE 1: Estimates of livestock at risk and fodder deficiency in Wales by county, 11 January 1963

County	*Livestock at risk*		*Estimates (tons of hay) of fodder deficiency assuming bad weather conditions continue non-cumulative totals*		
	Cattle	*Sheep*	*1 February 1963*	*1 March 1963*	*1 April 1963*
Caernarfon	3000	100,000	500	1150	2000
Merioneth	500	1000	100	350	1500
Camarthenshire	3000	83,000	1000	1890	1890
Glamorgan	18,000	96,000	400	500	100
Monmouth	13,000	130,000	300	500	200
Montgomery	22,000	208,000	800	1200	2500
Brecon	19,000	202,000	100	1200	2300
Radnor	23,000	150,000	200	600	1000
Totals (thousands)	101.5	1175.0	3.4	7.5	11.6

Source: TNA, MAF 114/689, Animal welfare and feeding problems: winter 1963, Letter from J. Morgan Jones to Humphrey-Davies, 11 January 1963.

Nationally, the loss of livestock in 1963, whilst high in some localities, was less than the scale of losses which occurred during the disastrous winter of 1946–47. During that winter an estimated total of 1½ million hill and lowland sheep had been lost, mainly due to the snow, amounting to 20 per cent of the national sheep flock.[27] In 1946–47 the cold spell had been prolonged and uninterrupted, with death from exposure and starvation the main hazard on the hills. In 1963, the number of livestock deaths in the affected upland areas was not immediately reflected in the national agricultural statistics, masking crucial local and regional variations (Figure 2). In part this was because these upland areas produced breeding and store stock rather than fat stock to be sold for slaughter. As a result of this, the effects of these localized losses was not in the short term obvious from the number of fat stock sold.[28] Indeed, it is not necessarily easy to distinguish between losses due to the extreme weather and those that occurred every winter, and from reductions in flock numbers due to other causes, for example, outbreaks of diseases like worms, liver fluke (fasciolosis), clostridial diseases and pasteurella pneumonia.[29] Of course bad weather and malnutrition might be a predisposing cause for the spread of disease like infectious kerato-conjunctivitis (known colloquially as snow blindness) which is caused by high winds and driving snow, and also twin lamb disease which is a metabolic disease caused by energy deficiency in late pregnancy. As the name suggests twin lamb disease was most prevalent in ewes carrying twin lambs. However, multiple births were not encouraged in the uplands as the ewes had difficulty in rearing a single lamb.

[27] Robertson, *Bleak midwinter 1947*, p. 128.

[28] The agricultural data is from the June 4 census for England and Wales published annually by MAFF.

[29] Cooper and Thomas, *Profitable sheep farming*, pp. 115–35.

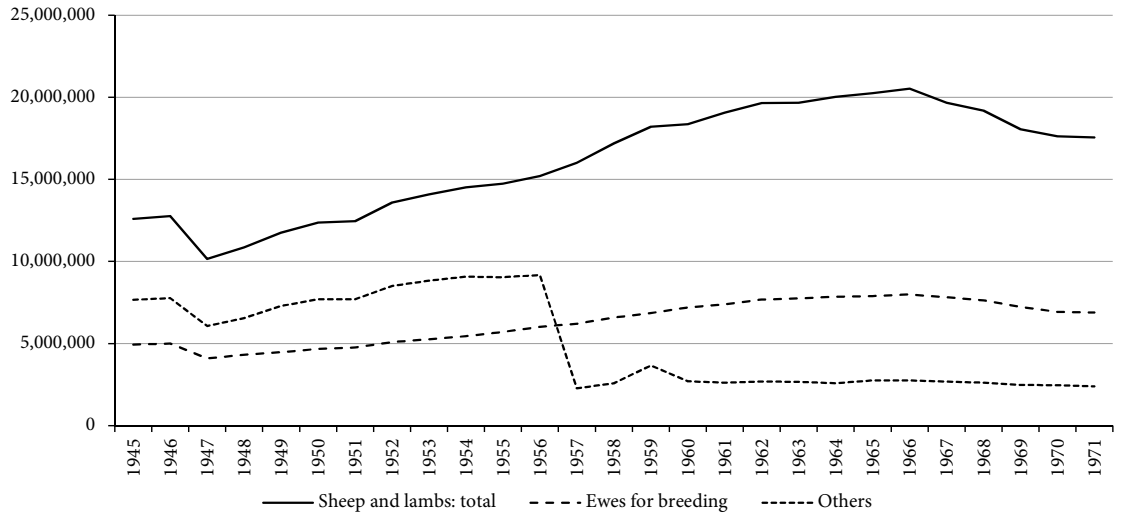


FIGURE 2: Sheep and lamb statistics for England and Wales between 1945 and 1971.

Source: MAFF Agricultural Statistics.

Nevertheless, a picture emerges from the statistics that some districts were particularly severely hit by the effects of the 1962–63 winter, for instance, the Elan Valley in mid-Wales.[30] County-level agricultural statistics for Breconshire, Cardiganshire, Montgomeryshire and Radnorshire show a marked decrease in the total number of sheep and lambs between June 1962 and 1963, although by the following year numbers had recovered and were increasing (Table 2). For example, in the case of Breconshire, the county most badly affected, the total number of sheep and lambs decreased by nearly 10 per cent, from 707,825 in June 1962 to 658,617 in June 1963, but quickly recovered with 705,617 recorded in June 1964.[31] This implies a rapid recovery at least in terms of livestock numbers. Analysis of the unpublished parish summaries of agricultural returns, which were compiled by the Agricultural Census Branch of the Ministry of Agriculture, Fisheries and Food, for sample parishes, reveals the impact of the extreme winter at a local level. Table 3 illustrates the impact of the winter on the parishes of Llanwrthwl (Brecknock), Yspytty-Ystwyth (Cardiganshire), Llangurig (Montgomeryshire) and Llansantffaed Cwmdeuddwr (Radnorshire). Together these parishes constituted the Elan Valley. The returns for these four parishes have been examined for the years 1946–49 and 1962–64. They show that the winter of 1947 had a dramatic impact, the decrease in the number of ewes kept for breeding and the total number of sheep and lambs ranged from 45 per cent to 69 per cent. By contrast the losses in 1963 were comparatively smaller. The decline in the number of ewes kept for breeding was slight, with the exception of Llanwrthwl, and in the

[30] For the Elan Valley see Clwyd-Powys Archaeological Trust, 'The making of the Elan Valley Landscape', www.cpat.org.uk/projects/longer/histland/elan/evintr.htm, accessed 18 Dec. 2015. C. P. Rodgers, E. A. Straughton, A. J. L. Winchester and M. Pieraccini, *Contested common land. Environmental governance past and present* (2010), pp. 137–61.

[31] MAFF Agricultural Statistics, 1962–4.

TABLE 2: Sheep recorded in the June agricultural census, selected Welsh counties, 1962–64

Wales		*Breconshire*			*Cardiganshire*		
		1962	*1963*	*1964*	*1962*	*1963*	*1964*
Sheep and lambs: total		707,825	658,617	705,617	439,225	428,963	464,118
One year and over:	Ewes for breeding	273,590	266,068	284,805	186,489	186,794	196,959
	Two-tooth (shearling) ewes to be put to the ram	88,526	84,778	80,526	41,642	40,454	39,963
	Rams kept for service	7709	7251	7252	5335	5296	5332
	Draft and cast ewes	16,744	14,836	14,194	10,662	10,283	11,409
	Wethers and others	34,091	29,125	29,174	9111	7085	6455
Under one year		287,165	256,559	289,210	185,986	179,051	204,000

		Montgomeryshire			*Radnorshire*		
		1962	*1963*	*1964*	*1962*	*1963*	*1964*
Sheep and lambs: total		805,534	793,292	816,627	557,527	549,575	575,834
One year and over:	Ewes for breeding	298,082	304,101	314,062	196,380	199,074	211,333
	Two-tooth (shearling) ewes to be put to the ram	91,190	91,147	85,701	72,070	71,465	67,723
	Rams kept for service	9044	9065	8887	5460	5462	5638
	Draft and cast ewes	30,966	29,773	28,815	12,102	12,225	11,969
	Wethers and others	14,910	16,751	13,456	25,935	28,378	25,886
Under one year		361,342	342,455	265,706	245,580	232,971	253,285

Source: MAFF Agricultural Statistics.

cases of Llangurig and Llansantffaed Cwmdeuddwr actually increased. Nevertheless the impact of the winter is apparent in the total number of sheep and lambs with Llanwrthwl seeing a marked decrease of 46 per cent, mirroring the loss of breeding ewes, whereas the parishes of Yspytty-Ystwyth and Llansantffaed Cwmdeuddwr lost 29 and 21 per cent respectively and Llangurig saw only a 2 per cent decline.

The farming press reported heavy losses.[32] Newspaper headlines from March included: 'The grim winter takes its toll', 'Sheep farmers fear very heavy losses', and '3,000 sheep died in freeze-up'.[33] In April, May and June newspaper headlines focused on the sheep losses and the need for subsidy, for instance, 'Flockmasters fear heavy losses among North Wales flocks'; 'Sheep have died in thousands', 'Subsidy help for hill farmers', 'Interim payment of hill sheep

[32] 'South digs into fodder stocks', *FW*, 25 Jan. 1963, p. 47.

[33] 'The grim winter takes its toll', *Welsh Farm News*, 2 Mar. 1963; 'Sheep farmers fear very heavy losses', *Welsh Farm News*, 2 Mar. 1963; '3,000 sheep died in freeze-up', *Cambrian News*, 15 Mar. 1963, all in TNA, MAF 112/1151 (3, 4, 6).

TABLE 3: Agricultural returns for the parishes of Llanwrthwl (Brecknock), Yspytty-Ystwyth (Cardiganshire), Llangurig (Montgomeryshire) and Llansantffraid Cwmdauddwr (Radnorshire) for the years 1946–9 and 1962–4

		4 June 1946	4 June 1947	4 June 1948	3 June 1949	4 June 1962	4 June 1963	4 June 1964
Llanwrthwl (Brecknock)								
Sheep one year old and over	Ewes kept for breeding (excluding two-tooth ewes)	6905	3035	4365	4143	7611	4127	6394
	Two tooth ewes (shearling ewes or gimmers)	2445	1093	993	1315	2855	1542	2509
	Rams kept for service	309	98	164	227	289	143	207
	Draft and cast ewes					665	398	600
	Wethers and other sheep 1 year old and over	5525	3126	2868	2489 (male) 866 (female)	5056	2358	3992
Ram lambs kept for service under 1 year old		107	63	89	219			
Sheep and lambs under 1 year old		5610	1389	3735	4143	6144	3631	5674
Total sheep and lambs		20,901	8804	12,214	13,402	22,620	12,199	19,376
Yspytty-Ystwyth (Cardiganshire)								
Sheep one year old and over	Ewes kept for breeding (excluding two-tooth ewes)	5809	1821	2716	2919	5502	4286	5773
	Two tooth ewes (shearling ewes or gimmers)	1585	666	504	872	1445	1034	1104
	Rams kept for service	192	67	89	108	216	139	179
	Draft and cast ewes					142	82	94
	Wethers and other sheep 1 year old and over	1922	622	1076	535 (male) 734 (female)	1233	395	940
Ramb lambs kept for service under 1 year old		59	27	31	35			
Sheep and lambs under 1 year old		4127	964	2646	2979	3575	2616	4875
Total sheep and lambs		13,694	4167	7062	8182	12,113	8552	12,965

continued overleaf

TABLE 3: *continued*

		4 June 1946	4 June 1947	4 June 1948	3 June 1949	4 June 1962	4 June 1963	4 June 1964
Langurig (Montgomeryshire)								
Sheep one year old and over	Ewes kept for breeding (excluding two-tooth ewes)	18,182	9935	12,715	13,697	20,311	20,472	21,521
	Two tooth ewes (shearling ewes or gimmers)	7328	5295	4429	5499	8423	8199	8148
	Rams kept for service	592	402	441	483	658	643	648
	Draft and cast ewes					1698	1753	1973
	Wethers and other sheep 1 year old and over	4359	2866	2955	2040 (male) 2899 (female)	2972	3319	2666
Ramb lambs kept for service under 1 year old		189	217	219	274			
Sheep and lambs under 1 year old		16,581	7244	13,377	14,934	22,375	20,779	23,399
Total sheep and lambs		47,227	25,959	34,136	39,826	56,437	55,165	58,355
Llansantffaed Cwmdeuddwr (Radnorshire)								
Sheep one year old and over	Ewes kept for breeding (excluding two-tooth ewes)	13,039	5130	7211	7283	11,040	10,684	11,220
	Two tooth ewes (shearling ewes or gimmers)	4672	2329	1647	2293	4459	2888	2774
	Rams kept for service	627	231	351	438	477	321	457
	Draft and cast ewes					945	397	550
	Wethers and other sheep 1 year old and over	12,347	7192	7525	6541 (male) 1355 (female)	8782	7494	8033
Ramb lambs kept for service under 1 year old		184	103	198	147			
Sheep and lambs under 1 year old		10,759	2610	6328	7425	9536	5727	9168
Total sheep and lambs		41,628	17,595	23,260	25,482	35,239	27,511	32,202

Source: The National Archives (TNA), Kew, London MAF 68 as follows: Brecknockshire, MAF 68/4810, 4861, 4912; Cardiganshire, MAF 68/4188, 4227, 4264, 4299, 4808, 4859, 4910; Montgomeryshire, MAF 68/4190, 4227, 4264, 4301, 4808, 4859, 4910; Radnorshire, MAF 68/4190, 4227, 4264, 4301, 4808, 4859, 4910.

subsidy', 'Interim payment of hill sheep subsidy because of exceptional conditions', 'Extra aid for farmers urged', 'Big sheep losses bring call for better subsidy', 'Freeze-up may have cut flocks by half', '3,000 dead sheep found in Rads', 'NFU plans to seek aid for winter ravaged sheep farmers' and 'Welsh sheep losses five-year set-back'.[34] The *Times Gazette* of 18 July 1963 led with the headline 'Report on Heavy Sheep Losses', specific reference being made to sheep losses in the Elan Valley due to the extreme winter weather conditions.[35] Surviving film footage shot during the winter of 1962–63 shows Birmingham Corporation staff loading bales of hay into a RAF helicopter that landed in the field between the Elan Valley Hotel and Upper Llanfadog and was used to distribute fodder on the hills for the sheep.[36] It was reported that Corporation staff had buried 3000 sheep carcasses and that the lambing rate was unlikely to reach 15 per cent compared to the usual rate of 70 per cent. Some farmers estimated their losses at between 50 and 70 per cent although it is not clear whether they refer to the actual number of ewes that died, or lambs, or the potential loss of production.[37] The sheep stock books or flock ledger books of the Elan Valley Estate covering the period 1893–1989 (Table 4; Figure 3) confirm the scale of losses of lambs, wethers and ewes, and a reduction in the lambing rate as a result of extreme winters in the twentieth century.[38] Losses were considerably higher among breeding ewes than wethers.

An analysis based on the official agricultural returns does not substantiate the claim that there was a 50 per cent reduction in flock size. In a similar way the national and county-level statistics do not support the claim that the winter had led to a five-year set-back, although, as Table 4 shows, in the Elan Valley it took several years for the number of sheep to return to the pre-1963 winter level. It is evident that there is more than a degree of press exaggeration in these figures. *Farmers Weekly,* which contained numerous articles in January and February covering the impact of the winter throughout England and Wales, provided a more measured

[34] 'Flockmasters fear heavy losses among North Wales flocks, *Welsh Farm News*, 6 Apr. 1963; 'Sheep have died in thousands', *Welsh Farm News*, 13 Apr. 1963; 'Subsidy help for hill farmers', *Cambrian News*, 19 Apr. 1963; 'Interim payment of hill sheep subsidy', *Radnor Express*, 18 Apr. 1963; 'Interim payment of hill sheep subsidy because of exceptional conditions', *Denbighshire Free Press*, 20 Apr. 1963; 'Extra aid for farmers urged', *Western Mail*, 8 May 1963; 'Big sheep losses bring call for better subsidy', *Times Gazette,* 30 May 1963; 'Freeze-up may have cut flocks by half. 3,000 dead sheep found in Rads', *Wellington Journal*, 1 June 1963; 'NFU plans to seek aid for winter ravaged sheep farmers', *Radnor Express*, 30 May 1963; 'Welsh sheep losses five-year set-back.' *Western Mail*, 27 June 1963 all in TNA, MAF 112/1151 (27, 29, 31, 33, 34, 38, 43, 44, 45, 47).

[35] TNA, MAF 112/1151 (68), 'Report on heavy sheep losses', *Times Gazette*, 18 July 1963.

[36] The National Screen and Sound Archive of Wales National Library of Wales, Aberystwyth, 'Elan Village Scenes' [motion picture] title no: 4485388.

[37] There was a need to keep sufficient numbers of ewe lambs to replace the number of breeding ewes which died, or had had to be culled due to a broken mouth (having lost some of the front teeth) or being infertile. Retaining 6% of female lambs each year was insufficient to maintain the numbers of breeding sheep. Even retaining all the ewe lambs as replacements it would take several years before the number of breeding ewes was restored. For example, if the lambing percentage reduced to 40% (40 lambs born per 100 breeding ewes), only 20 of these would be female and it would take 2–3 years before they were tupped and produced lambs of their own. Life expectancy of breeding sheep on the hills was probably only about 5 years.

[38] Elan Estate Sheep Stock Account Books held by the Elan Valley Estate Office. We are grateful to Mr Alec Baker, Land and Estates Manager, Welsh Water Elan Trust for allowing access to the books.

[39] 'The Big Lift', *FW*, 11 Jan. 1963, p. 37; 'Snowbound', *FW*, 11 Jan. 1963, p. 77; 'Blizzard chaos sweeps the north', *FW*, 25 Jan. 1963, p. 47; 'North and West Again Paralysed', *FW*, 8 Feb. 1963, p. 52; 'Winter's Tale', *FW*, 22 Feb. 1963, p. 43.

TABLE 4: The size of sheep flocks on the Elan valley estate as recorded at shearing time between 1945–69

Year	*Number of lambs*	*Number of four year old wethers*	*Stores (Ewes and Wethers where two numbers are given)*	*Total*	*Culls*	*Total*
1945	7122	1518	20,679	29,319	331	29,650
1946	7033	1892	21,678	30,603		
1947	**999**	**1213**	**10,255**	**12,467**		
1948	3677	1788	8957	14,422		
1949	4677	1999	10,286	16,962		
1950	5836	1536	12,821	20,193		
1951	4904	1044	15,797	21,745		
1952	6547	1257	17,529	25,333		
1953	5614	1672	19,293	26,579		
1954	5795	1912	18,806	26,513		
1955	**3717**	**1776**	**17,947**	**23,440**		
1956	6337	2089	16,737	25,163		
1957	7064	2041	18,565	27,670		
1958	5694	1857	20,088	27,639		
1959	7445	1520	20,388	29,353		
1960	4868	1695	21,026	27,589		
1961	7410	1711	20,553	29,674		
1962	6409	1589	21,979	29,977		
1963	**2607**	**1388**	**16,379**	**20,374**		
June/July 1964	6635	1363	16,576	24,574		
June/July 1965	5675	1156	18,155	24,986		
June/July 1966	5528	1122	18,967	25,617		
June/July 1967	8199	904	21,019	30,122		
June/July 1968	6208	1065	22,626	29,899		
June/July 1969	4659	1197	20,891	26,747		

Note: crisis years are in bold.
Source: Elan Estate Office, Sheep Stock Account Books, Vol. 3 1943–63, Vol. 4 1963–83. Complete figures covering the period 1893–1989 can be supplied by the authors.

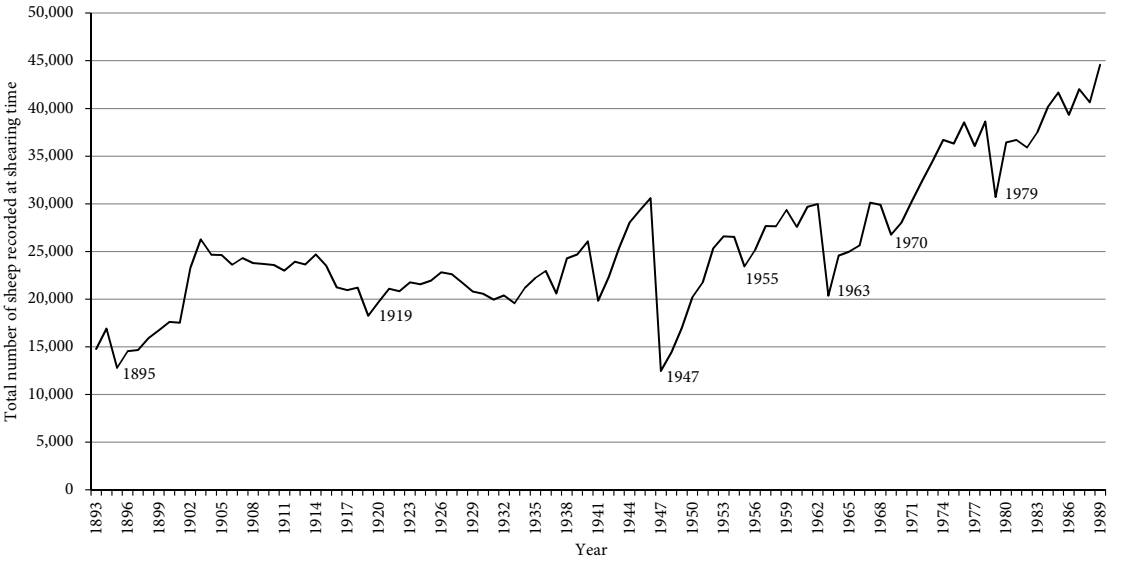


FIGURE 3: The total number of sheep as recorded in the Elan Estate sheep stock account books between 1893 and 1989 and the relationship with extreme winters.

assessment of the extent of the losses.[39] A survey conducted by the local NFU branch found a loss of 'breeding stock' of 15.8 per cent between December 1962 and shearing time in 1963, compared to 2.78 per cent over the same period 1961–62, suggesting an excess mortality of 13 per cent.[40]

Because a question about the scale of the losses was asked in the House of Commons (answered on 8 July) by Tudor Watkins, the Labour member for Brecon and Radnor, the Ministry had to gather what information it could on the scale of losses.[41] Table 5 reproduces the Ministry's own internal estimates of the losses of ewes and lambs in the winter and spring of 1963 for Radnorshire. In the case of the hill flocks that grazed the sheep walks of the Elan Valley area, the lambing rate was reduced from 70 per cent to 15 per cent and the ewe mortality increased from 10 per cent in a normal year to 25 per cent. Bad winters led to many ewes dying before they lambed. Those that survived produced small lambs, among which there was a high level of mortality. Clearly the extreme winter of 1962–63 had an immediate impact in terms of adult sheep losses, but an even more profound effect on the lamb crop.

In October 1963, in response to an internal query as to whether better data was now available, Miss O. G. Tanner of the Agricultural Economic Division reported that the excess losses over the usual deaths of ewes in Wales were approximately 2–2.5 per cent in the early months of 1963, totalling 65,000 ewes.[42] About one third of these losses were in Brecon, which had

[40] MAF 112/1151 (75) 'Winter Increased Sheep Feeding Costs by 275 p.c.', *Liverpool Daily Post*, 3 September 1963.

[41] MAF 112/1151 (42) to (61).

[42] TNA, MAF 112/1151 (77), Letter from Miss O. G. Tanner to Mr. D. B. Davies, 23 October 1963; (97B), Sheep losses, General Note by Welsh Department in response to Parliamentary Question 6308.

TABLE 5: The losses of ewes and lambs in the winter and spring, 1963 for the county of Radnorshire, Wales

Lambing percentages		*Ewe mortality*	
Normal %	1963 %	Normal %	1963 %
Lowland flocks			
150	150	3	3
Marginal flocks			
120	120	5	5
Hill flocks (the Elan Valley areas only, about 12,000 ewes)			
70	15	10	25
Other hill flocks (excluding the Elan Valley Mountain area representing 50,000 ewes)			
85	70	5	5

Source: TNA, MAF 112/1151 Losses of sheep during the winter of 1962/63 (46) Losses of ewes and lambs winter and spring, 1963.

the highest mortality rate of all counties, being about 10 percentage points over the average. There were also high losses of about 10,000 in the counties of Monmouth, Montgomery and Radnorshire; Merionethshire experienced losses of about 3 per cent of the ewe flock (about 8000 ewes), whilst Glamorgan largely escaped additional sheep losses. Table 4 shows that excess losses were usually in the region of 10 percentage points for hill flocks in the Elan Valley area. It was reported that the lambing rate for the whole of Wales was only slightly over 80 per cent compared with an average of nearly 85 per cent in the recent years preceding the winter. This included many lowland flocks, which had a significantly higher lambing percentage. Thus the reduction in the total excess loss of lambs and sheep in Wales was about 140,000, of which 55,000 could be attributed directly to loss of ewes. The remainder of the reduction represented a lower lambing percentage and heavier neonatal mortality. E. L. Jones, Regional Livestock Husbandry Officer for Wales, agreed that the estimates were an accurate assessment and moreover, he observed that generally the losses in 1963 were 'small' and that sheep numbers had recovered. Nevertheless, he pointed out that individual farms and certain localities had sustained very severe losses, in particular the Elan Valley in mid-Wales.

In its public statements though, the Ministry sought to minimize the scale of difficulties and obfuscated the discussion of local problems by citing national figures.[43] In the response to the question laid by Watkins, and answered on 8 July 1963, the Parliamentary Secretary to the Ministry, Scott-Hopkins, said: 'Some special inquiries made in the first quarter of the year suggested that, in Brecon and Radnor as elsewhere, ewe losses among hill flocks had been rather above average, and that lamb losses almost certainly would be'. The extent of the losses would not be precisely established until the results of the 4 June census were available in about

[43] Sheep and Lambs, Brecon and Radnor (Losses) Hill Sheep Subsidy, HC Deb 24 Feb. 1964 vol. 690, c12W; TNA, MAF 112/1151 (60) (61), parliamentary question, 8 July 1963; (66) Royal Welsh Show, Note for Parliamentary Secretary (Commons), losses of sheep and lambs, winter 1962/63.

a month. Even then Scott-Hopkins maintained that it was not feasible to provide really reliable estimates particularly for ewes on a county basis. This served to minimize the gravity of the situation in mid-Wales and the much more detailed figures compiled by the Ministry were not shared with Watkins. Scott-Hopkins further noted that no individual representations about financial losses had been received by the Minister, but he had taken account of the effects of the exceptionally hard winter when he announced on 3 April an interim payment of the hill sheep subsidy.[44]

There was a difficulty in distinguishing the loss of livestock due directly to the extreme weather conditions, from the losses that occurred annually, as well those resulting from other extraneous factors. Some of the effects of the adverse winter were delayed rather than immediately obvious, as in the case of a reduced lambing rate during the spring. Clearly, such factors undermined the accuracy of the earlier enquiries into the number of losses. Hence it was acknowledged internally by MAFF officials that the March 1963 census provided only an estimate because it was based on a sample of one-third of holdings. Moreover, not all ewe losses were known by the census date (4 March) and spring lambing had hardly begun, so it was not possible to gauge precisely the impact of the extreme winter. This was particularly evident in terms of the long-term effects of malnutrition on the breeding ewes. But a comparison between the March census and that of the previous December suggested, at a rough approximation, that the excess loss of ewes might perhaps have been 15–20,000 out of a total ewe population for the two counties of over 500,000.[45] Census returns for the counties of Breconshire and Radnorshire for the years 1961–62 and 1962–63 (December and March), based on a one-third sample of holdings at both censuses showed a reduction in the number of ewes kept for breeding and shearling ewes ('gimmers' or 'tegs') by 19,300 (544,300 to 525,000) and 40,300 (561,800 to 521,500) respectively.[46]

Whilst there were certain localities and individual farms within these areas where exceptionally high or very severe losses were experienced, the Ministry continued to maintain that on the basis of evidence available, overall losses were very small in relation to the total number of flocks that had been deemed at risk (Table 1). A note by the Welsh Department stated that the total number of sheep and lambs in England and Wales, as ascertained by the June 1963 census was 19,664,000, compared with 19,650,000 at the June 1962 census, showing a small increase. In Wales and Monmouthshire the total number of sheep and lambs at the June 1963 census was 5,635,000 compared with 5,704,000 at the June 1962 census, a reduction of less than 1.2 per cent.[47] The MAFF newsletter for November 1963 recorded that for the first time since 1947, the provisional figures from the annual 4 June census showed a reduction in the total sheep population of Wales.[48] Compared with 1962, the total number of sheep and lambs was down from 5,704,000 to 5,605,000, a reduction of 99,000 (1.7 per cent).[49] Breeding ewes

[44] The correspondence and papers generated by this question, and the decision to withhold the data that the Ministry had at its disposal, can be traced through MAF 112/1151 (60)–(76).

[45] Ibid.

[46] TNA, MAF 112/1151 (97A) Sheep losses: response to Parliamentary Question 6308, 24 Feb. 1964.

[47] Ibid.

[48] TNA, MAF 112/1151 (92A) MAFF Newsletter, 22 Nov. 1963.

[49] Ibid. There seems to be some disparity between the figures given in the sources. See footnote 62.

were down by 4100 (0.1 per cent), wethers by 12,000 (8.3 per cent) and lambs under one year old by 83,000 (3.4 per cent).[50] This would imply that wethers bore the brunt of the losses. It is possible that in some instances financially hard-pressed farmers reduced numbers by selling more wethers than usual in late spring, before the 4 June census, although market returns are insufficiently detailed to fully substantiate this point.[51] The number of rams kept for service and draft and cast ewes remained virtually unchanged. It was, nevertheless, conceded that the statistics did not reveal the full impact of the winter of 1962–63. The 1947 winter had reduced the national sheep flock of Wales from 4,049,701 to 2,815,708.[52] These losses had been recovered by 1952, when the figure stood at 4,235,300.[53] Over the following 10 years the sheep population of Wales increased by an annual average of 3.4 per cent to 5.7 million in June 1962.[54] There is evidence that this trend continued into early 1963, as the returns for 4 December 1962 showed that total sheep and lambs had increased to 3,971,720 as compared with 3,817,781 in December 1961, an increase of 4 per cent.[55] This increase included an additional 58,707 breeding ewes and ewe lambs retained for breeding. The key point is that to the decrease of 99,000, shown by the returns for 4 June 1963, should be added the underlying long-term increase in the numbers of sheep and lambs which had been taking place annually since the late 1940s.

The June returns show a varied pattern throughout Wales. In some counties sheep numbers were down, but in the counties of Cardiganshire, Carmarthenshire, Denbighshire and Flintshire, which had a much higher proportion of lowland flocks and which had been less affected by the bad weather, numbers increased. It is reasonable to assume that the increase would have been greater but for the severe winter which was more prolonged than that of 1946–47. The full effect of the spell of bad weather was felt most severely in mid- and south-east Wales, particularly in the area where the counties of Brecon, Radnor, Montgomery and Cardigan converge. A survey of a number of flocks carried out in this area at shearing time revealed that the number of ewes and wethers in 1963 was 19,790 compared with 26,636 in 1962, a reduction of 25 per cent.[56] There was also a 60 per cent reduction in the number of lambs, which had declined from 7,291 to 2,929.[57] In these areas it is evident that the limited area of in-bye land – the part of a farm used for mainly arable and grassland production and which was separated from hill and rough grazings by a fence, dyke or hedge – meant that, given the longer-term increase in stocking levels and the increased size of flocks, farmers were less able than in the past to bring the flocks down to lower ground.[58] This was also evident in other changes in husbandry practice including wintering young replacement ewes at home rather than sending to lowland farms for their first winter. This put greater pressure on the in-bye land and forced a reliance on common grazing.

When representations were made by the Breconshire Agricultural Executive Committee in

[50] Ibid. The number of wethers was undergoing a long-term decline due to a growing taste for lamb as opposed to mature mutton and the decreasing value of the wool crop.

[51] TNA, MAF 112/1151 (92), Sheep stocks: response to Parliamentary Question 6308. *FW,* market reports for Mar., Apr., and May 1963.

[52] Ibid.

[53] Ibid.

[54] Ibid.

[55] Ibid.

[56] Ibid.

[57] Ibid.

[58] R. Muir, *Landscape Encyclopedia: A reference guide to the historic landscape* (2004), pp. 135–6; A. J. L. Winchester, *The harvest of the hills. Rural life in northern England and the Scottish borders, 1400–1700* (2000), pp. 52–5.

September 1963, the Welsh Department was informed that the overall figures for England and Wales showed that losses were only three per cent higher than usual and that there was no dramatic reduction in sheep numbers as a result of the winter.[59] Furthermore, in England hill sheep farmers had themselves provided some indication that losses were not generally very serious, in that only 29 per cent of applicants for the hill sheep subsidy in 1963 took advantage of the Ministry's offer to pay up to half the value of their claims as an interim payment – which was comparable with a similar figure for Wales.[60]

The case for some financial assistance for the worst-affected farmers was pursued by Tudor Watkins. He asked the Minister of Agriculture, Fisheries and Food in Parliament on 24 February 1964 whether he had information as to the losses of sheep during the winter months of early 1963 for the counties of Brecon and Radnor. In particular he requested that the minister respond to representations for some financial assistance towards such losses, as had occurred in 1947.[61] Under the Agricultural (Emergency Payments) Act of 1947, payments of hill sheep subsidy were made on the basis of census numbers from the previous December; however in 1963, these powers were no longer available to ministers, although presumably emergency legislation could have been passed if the government so desired.[62] Watkins requested that farmers who had sustained serious losses during the early part of 1963 should have their payment of hill sheep subsidy based on either their December 1962 or 1963 flock numbers.[63] In response Christopher Soames, Minister of Agriculture (1960–64) dismissed Watkins' request on the grounds that MAFF had already made allowance for ewe losses in December 1962 when paying the 1963 subsidy.[64] Any further financial losses due to a reduction in the lamb crop, wool clip and total income would have to be considered in discussion between government officials and the NFU with respect to the scale of the hill sheep subsidy for 1964. Nevertheless, he made the point clearly: 'But it is a principle, from which I would not be justified in departing in this instance, that the Government does not guarantee farmers against the hazards of severe weather'.[65] This ruled out any form of national aid for sheep farmers. But, as he admitted, 'The only occasion on which we have departed from that principle was following the disastrous winter of 1947, when legislation was introduced to waive the provisions of the Hill Farming Act, 1946, that subsidy payments in any year must be based on the number of ewes in the flock in the immediate preceding December'.[66] Where 1963 differed from 1947 was in part the food shortages of that year, when nutritional levels were worse than even those which had been experienced during the Second World War, hence the need to provide assistance.[67]

By contrast, in 1962, when food surpluses prevailed, there was less political will to assist

[59] Ibid.

[60] Ibid.

[61] Sheep (Losses), House of Commons Debates [hereafter HC Deb.], 24 Feb. 1964, vol. 690, c14W.

[62] TNA, MAF 112/1151 (97).

[63] Hill Sheep Subsidy, HC Deb, 24 Feb. 1964, vol. 690, c12W.

[64] ODNB, 'Soames, (Arthur) Christopher John, Baron Soames (1920–1987)'.

[65] Hill Sheep Subsidy, HC Deb, 24 Feb. 1964, vol. 690, c12W; TNA, 112/1151 (108), 'Farmers cannot be guaranteed against Weather Hazards', *Radnor Express*, 5 Mar. 1964.

[66] For the Hill Farming Act and post-Second World War legislation regarding the agricultural industry see: Martin, *Development of modern agriculture*, pp. 269–72.

[67] Zweiniger-Bargielowska, *Austerity in Britain*, pp. 125 and 218.

[68] J. Martin, 'British agriculture in transition; food shortages to food surpluses, 1947–1957' in C. Martin, J. Pan-Montojo and P. Brassley, *Agriculture in Capitalist Europe, 1945–1960* (2016), pp. 120–1.

farmers to maximize their productivity at a time when budgetary cuts were being imposed on all other forms of government expenditure.[68] Upland sheep farmers deemed by officials to be at best sub-marginal producers did not have the political clout to influence government policy in the way other sections of the agricultural sector could.[69] There was recognition from the minister that, whilst there were heavy losses of livestock in some localities and regions and correspondingly lower lambing figures, nationally the scale of losses had been only slightly higher than normal. He stated that, 'Much as I sympathise with the individual farmers whose flocks suffered badly in 1963, the effects of the winter were not so disastrous or widespread that I would feel justified in recommending similar action to the House today'.[70] This view was persuasively supported by James Scott-Hopkins, MP for North Cornwall and Parliamentary Secretary to the Ministry of Agriculture, Fisheries and Food who explained that the additional loss of ewes attributable to the severe weather in early 1963 for England and Wales as a whole, including lowland sheep, was estimated at the time as little more than fifty thousand or half a per cent of the national flock. The inclusion of lowland sheep obscures what was primarily an upland problem and can be interpreted as deliberate political spin.

Although no formal representations were made by the farmers' unions or individuals in Wales about sheep losses or the need for special assistance for those farmers affected, the NFU did make general representations to the Ministry about the financial position of hill farmers arising mainly from their heavy expenditure on fodder. These seem to have had an effect, leading to discussions about the arrangements for the interim payments of hill sheep subsidy in 1963. At the time there was much debate as to the date when the number of eligible sheep was to be assessed especially in Wales.

Regarding the hill sheep and hill cow subsidy scheme, J. Morgan Jones, Welsh Secretary, Welsh Department, Aberystwyth stated on 6 September 1963:

> The minister has considered whether, in view of ewe losses during the past winter, legislation should be made to enable hill sheep subsidy to be paid in respect of flock numbers in December 1962. Much as he sympathised with individual farmers who have sustained very heavy losses, he would not feel justified in departing from the general principle that the Government does not guarantee farmers against the weather hazards that are inherent in agriculture and which may cause severe losses, especially on hill farms.[71]

In effect the government did not perceive it as their responsibility to subsidize farmers' management of risk. Moreover, specific reference was made to the 'relevant day' – 'the date which determined the number of eligible sheep, and which must under the terms of section 13 of the Hill Farming Act, 1946, be a December day in the year preceding the payment of subsidy'.[72] By focusing on an individual designated day, this snapshot picture of flock counts did not incorporate subsequent purchases and sales as well as losses. In September 1963 the

[69] 'Low Profit Farms are "Beyond Help"', *FW*, 8 Feb. 1963, p. 65.

[70] Hill Sheep Subsidy, HC Deb, 24 Feb. 1964, vol. 690, c12W.

[71] TNA, MAF 112/1151 (83), Letter from J. Morgan Jones regarding hill sheep and hill cow subsidy, 6 Sept. 1963.

[72] Ibid.

Breconshire Agricultural Executive Committee submitted representative figures of livestock losses and urged the Ministry to make arrangements for the continued payment of hill sheep subsidy based on numbers recorded in December 1962.[73] These representations, which were considered by Ministry headquarters, were regarded as 'internal', and thus did not carry the same weight or influence as representations by the NFU. The government's decision not to amend the date when headage payments were determined indicates that the lobbying of these local MPs representing rural areas had little influence on the government's policies. The consequence must have been a sharp reduction in the incomes of some upland farmers.

The additional loss of lambs, including any arising from the death of ewes prior to lambing, was estimated at being in the order of 450,000 in Wales, although it was stated that estimates at county level were not available as it was impossible to account for animals sent to slaughter, the drafting of livestock out of a county and the marketing of ewe lambs.[74] The last were animals that under normal circumstances the farmers would never sell. The sale of ewe lambs, which were normally retained as flock replacements and breeding ewes would not only undermine the farmers' future livelihood but would bring little profit. The malnourished sheep would be of little value as they lacked finish and carried insufficient meat to fetch a good price at market.[75] Most of the sheep were breeding ewes and could not be quickly replaced on commons by bought-in animals, having had to be born and bred in the locality. The instinct of upland breeds like the Herdwick or Welsh mountain of voluntarily restricting themselves to a certain heft (a small local area) throughout their lives allows different farmers in an extensive upland landscape such as the fells of the Lake District or moorland areas to graze different areas of common ground without the need for fences, each ewe flock remaining on their particular area. Offspring learn their heft from their mothers.[76] Very few lambs were retained for winter fattening in these areas with the exception of wethers, numbers of which had been declining since the late nineteenth century and replacement ewe lambs ('tegs' or 'gimmers') which were to become part of the breeding flock. However, even if this drastic last resort of slaughtering breeding sheep had been contemplated, it would have been unfeasible in the crisis months as snow-blocked roads made it virtually impossible to transport sheep to abattoirs and markets.

No evidence of the impact of the winter on farm incomes has yet been found, but one must assume that many farmers were caught between the need to buy in fodder (if they could), a shortage of animals and wool to sell in 1963 and, thereafter, a reduction in their headage payments. A survey by the NFU local committee, whose results were announced in September, found that feeding costs had gone up by 275 per cent (although 'these figures hide very much because in some instances the losses were more serious than the figures indicated'). It was also suggested that the wool clip would be diminished by a third.[77]

[73] TNA, MAF 112/1151 (97), Response to Parliamentary Question 6308. For the continuation of county agricultural executive committees in the post-Second World War period see B. Short, *The battle of the fields: Rural community and authority in Britain during the Second World War* (2014), pp. 269–400.

[74] TNA, MAF 112/1151 (109), Reply by Mr Scott-Hopkins to PQ 6308 from Mr Tudor Watkin.

[75] Market reports published in *FW* during Jan. to Mar. 1963 support this view.

[76] For example in the Lake District areas of open fell common were allocated to farms by the traditional practice of hefting, Winchester, *Harvest*, pp. 111–13.

[77] MAF 112/1151 (75) 'Winter Increased Sheep Feeding Costs by 275 p.c.', *Liverpool Daily Post*, 3 September 1963.

II

The problems of the Elan Valley and mid-Wales generally were well reported locally and in the farming press, but drew little comment nationally. Our second case study demonstrating the impact of the extreme winter of 1962–63 on upland hill farming is provided by the example of Dartmoor in Devon and parts of the south west of England more generally including Dorset and Somerset. Conditions on Dartmoor became a matter of public comment and debate, in part because of the publicity-seeking activities of the Royal Society for the Prevention of Cruelty to Animals (RSPCA), which was able to exploit pre-existing local concerns about the management (or lack of management) of the moor.[78] Historically the 'alluring uplands' of Dartmoor have provided a valuable pastoral resource.[79] In the medieval and early modern periods livestock grazing was seasonal, with livestock being grazed during the summer months as part of a system of transhumance. However, by the twentieth century, livestock were grazed on Dartmoor all the year round; hence the effects of bad weather would be more acute. The commonable animals were cattle, sheep and Dartmoor ponies.[80]

As with all other hill areas in the west of England, Dartmoor was subject to the full force of the severe cold spell and the period of heavy snowfall, which commenced there on 26 December 1962 and continued throughout January, February and March.[81] It was the severest winter experienced in the West Country for over 200 years. Blocked roads and remote, inaccessible land meant that it was necessary to introduce special measures to supply additional fodder to farms or to distribute within farm boundaries. This was done by road as far as possible, but also by air, with perhaps the most dramatic response to the extreme winter of 1962–63 being the organization of an airlift programme which started on 1 January 1963. Fodder had previously been airlifted during the bad winters of 1947 and 1955.[82] The Ministry of Agriculture arranged to pay the cost of aircraft supplied by the Royal Air Force and the

[78] There is a suspicion that the RSPCA was initially interested in the welfare of the Dartmoor ponies. For the longer history of Dartmoor, which puts this episode in context, M. Kelly, *Quartz and feldspar. Dartmoor, a British landscape in modern times* (2015).

[79] H. S. A. Fox, *Dartmoor's alluring uplands: Transhumance and pastoral management in the middle ages* (2012).

[80] W. G. Hoskins and L. Dudley Stamp, *The common lands of England and Wales* (1963), p. 187.

[81] A day-by-day account of weather conditions during the winter of 1962–3 by the headmaster of Princetown County Primary School refers to the closure of the school, the weather conditions, emergency measures, damage and repairs undertaken. Devon RO, 1184C/ESZ/1.

[82] TNA, MAF 196/49 (Winter keep 1954–55: emergency plan, 'Operation Snowdrop'), (60A) During the winter emergency of 1955 the R.A.F. undertook 15 sorties between 25 Feb. and 14 Mar. from RAF Abingdon and Lyneham using Avro Lincoln bombers and Hastings aircraft of Transport Command. They made a total of 34 individual drops, distributing 681 bales of hay in the Cheviot and Alston Moor area. In the process of emergency planning for a similar blizzard to 1947, it was estimated that the Air Ministry would be required to lift between 500–700 tons of hay. The RAF estimated that 50 tons per day could be dropped. With reference to the 1955 winter, it was noted the RAF 'did a magnificent job in dropping over 40 tons of hay to isolated farms. In two cases they also dropped coal. With typical service humour the operation was known, unofficially, as Exercise Haywire; but there was nothing haywire about the way in which it was carried out. The accuracy with which the snowbound farms were located and supplied is a great tribute to the skill of the pilots and their crews. It is no easy task to manoeuvre a four-engined aircraft in steep hill country and to drop supplies from 150 ft. Bad weather frustrated the determined attempts to reach one farm but the fourth effort was successful and the much needed hay was delivered'.

TABLE 6: The number of airlifts by helicopter in the South West of England to 6 February 1963

	Dartmoor	*Exmoor (Devon)*	*Exmoor (Somerset)*	*Devon (other parts)*	*Dorset*
Internal farm lifts	38	3	59	1	0
Fodder supply lifts	57	10	72	20	4
Total	95	13	131	21	4

Note: A distinction was made between internal farm lifts and fodder supply drops undertaken and sourced from outside the immediate area.
Source: TNA, MAF 114/689, Animal welfare and feeding problems: winter 1963 (9B), Brief concerning the present emergency on Dartmoor by P. Holmes, County Advisory Officer, 6 February 1963.

Royal Navy to transport animal feedstuffs to any farm where an essential need was identified and there was no alternative method of supply available. Between 1 and 22 January there were 182 airlift enquiries of which 178 were undertaken, three were refused and the RSPCA carried out one. The number of farms assisted included 52 on Dartmoor (Devon), eight on Exmoor (Devon), 78 in Somerset (Exmoor and the Quantock Hills), 39 in other parts of Devon and one in Dorset.[83] Of the 178 enquiries for assistance with the transport of fodder, 45 were carried out by army lorries brought in to assist local feed merchants. Whilst the government covered the costs of distribution, it was a condition that the farmer agreed to pay the supplying merchant for any fodder acquired.

By the end of January the number of airlifts by Ministry of Defence helicopters in the south west of England totalled 264, including both internal farm lifts and fodder supply lifts as summarized in Table 6.[84] One airlift was also carried out by a large Beverley transport aircraft which dropped supplies to the village of Wiveliscombe in Somerset.[85] In total, 40 tonnes of hay and 31 tonnes of concentrates were transported by air.[86] In addition the army had conducted by road an estimated nine movements in Somerset and 112 in Devon, although no road transport assistance was provided in the Dartmoor area due to the conditions and terrain. The majority of farmers on Dartmoor and elsewhere made their own arrangements. The operation in Devon was managed from the Exeter divisional office by the County Advisory Officer and the Divisional Executive Officer. The emergency airlifts continued until the end of the winter. At the outset, there was consultation with stakeholders. For example, arrangements were made with the Dartmoor Commoners' Association (which had been founded in 1953) that the supply of fodder and its transport to stock on Dartmoor commons would not be undertaken by the Ministry without the agreement of the Association, and that the latter would be responsible for demands and payments.[87] Lifts for the Dartmoor area were organized from fodder assembly centres set up at the towns of Okehampton and Tavistock and the village of Yelverton. Operations at the latter are shown in the Pathe newsreel,

[83] TNA, MAF 114/689 (9B), Brief concerning the present emergency on Dartmoor by P. Holmes, County Advisory Officer, 6 Feb. 1963.
[84] Ibid.
[85] Ibid.
[86] Ibid.
[87] TNA, MAF 114/689 (9B), Brief … by Holmes, 6 Feb. 1963.



FIGURE 4: Still image from 'Snowbound Animals', 1963. British Pathe. www.reading.ac.uk/adlib/Details/archive/110289477.

'Snowbound animals'. It shows people loading bales of straw into helicopters. A farmer boards the helicopter with his sheepdogs. It then takes off and flies over the snow-covered countryside. The helicopter lands, the farmer and his dogs disembark and they go off to find the sheep. This is then repeated with the helicopter being loaded a second time and a farmer transported with the hay to his sheep.[88]

The newsreel also shows a very prominently placed (and marked) Royal Society for the Prevention of Cruelty to Animals (RSPCA) van at the helicopter loading site (Figure 4). The charity independently organized and paid for its own airlifts.[89] In an internal MAFF report it was noted that the RSPCA made no attempt to contact either the Ministry or individual farmers in difficulty. Instead of making fodder drops to individual farms, it scattered fodder

[88] British Pathe news reel 'Snowbound Animals, 1963' see www.britishpathe.com/video/snowbound-animals, accessed 18 Dec. 2015.

[89] TNA, MAF 114/689 (9B), Brief … by Holmes, 6 Feb. 1963.

indiscriminately across Dartmoor without charge to farmers, very few of whom, if any, had asked the Society for assistance. Other well-meaning individuals and groups helped without being asked, but in doing so may have made the situation worse. At times the RSPCA used the same fodder assembly centres at which helicopters were based operated by the Ministry of Defence. Despite this, there was a lack of coordination, with the charity being criticized for failing to prioritize need, but instead entering into competition with the Ministry for the use of available aircraft. Indeed, there was some hostility locally to the RSPCA's endeavours, with threats of actions of trespass against the charity if they did it again.[90] The sources are, therefore, suggestive of what appears to be an effective lack of inter-agency coordination. At a meeting regarding Dartmoor on 14 February 1963, it was recorded that the supply of fodder and concentrates by air had contributed to the welfare of livestock, but recognized that in future closer coordination between voluntary organizations and MAFF was essential should such an operation be necessary again.[91] That said, the Dartmoor Commoners' Association was reluctant to cooperate with the RSPCA until a more radical society, the Dartmoor Livestock Preservation Society, dedicated to protecting Dartmoor livestock, was founded later in 1963.[92]

It is possible that not only the effects of bad weather, but also the weakness in strategic planning exacerbated the effects of the extreme winter, as the dumping by airlift of emergency fodder supplies in specific locations encouraged the sheep to congregate in these locations and overgraze the natural vegetation. The situation could have been made worse when the airlift stopped or moved to other areas, as the sheep would have become reliant on the delivered fodder. Hay and particularly concentrates were considerably more nutritious than the rough winter grasses and mosses the sheep usually survived on. The problem was that in snow the sheep had difficulty in gaining access to their natural forage and the extreme cold weather and wind chill meant that they required even more food to survive.

County-level agricultural statistics for Cornwall, Devon, Dorset and Somerset show that there was no substantial decrease in the total number of sheep and lambs (normal losses were in the order of 3 per cent) which contrasts vividly with the situation we found in mid-Wales and suggests that the airlift programme was a major factor in the alleviation of heavy losses.[93] Agricultural returns for a selection of Devon parishes in Table 7 show that the worst-affected parishes were on the western side of Dartmoor, for example, the hamlets around Okehampton (which correspond with the location of the fodder assembly centres), although even here the scale of losses was not as great as those in mid-Wales (Table 3).

[90] Kelly, *Quartz and feldspar*, p. 383.

[91] TNA, MAF 114/689 (21), Press notice Dartmoor – Meeting in House of Commons, 14 Feb. 1963; Kelly, *Quartz and feldspar*, pp. 383–5.

[92] The Dartmoor Livestock Preservation Society was established on 14 Oct. 1963. TNA, MAF 114/689 (54), minutes of the inaugural meeting, 21 Oct. 1963. They published a booklet, *The Scandal of Dartmoor*, a copy of which is in TNA, MAF 114//689 (58). See also Kelly, *Quartz and feldspar*, pp. 385–6.

[93] The agricultural data is taken from the 4 June census data for England and Wales published by MAFF.

TABLE 7: Agricultural returns for the Devon parishes of Okehampton (hamlets), Ashburton, Widecombe in the Moor, Bovey Tracey and Ugborough for the years 1962–64

		4 June 1962	4 June 1963	4 June 1964
Okehampton				
Sheep one year old and over	Ewes kept for breeding (excluding two-tooth ewes)	7117	5779	6261
	Two tooth ewes (shearling ewes or gimmers)	1669	1268	1238
	Rams kept for service	184	191	176
	Draft and cast ewes	246	179	201
	Wethers and other sheep 1 year old and over	265	294	
Ram lambs kept for service under 1 year old				
Sheep and lambs under 1 year old		5924	5188	5820
Total sheep and lambs		15,358	12,870	13,990
Ashburton				
Sheep one year old and over	Ewes kept for breeding (excluding two-tooth ewes)	2372	2270	2372
	Two tooth ewes (shearling ewes or gimmers)	442	535	442
	Rams kept for service	80	63	80
	Draft and cast ewes	75	18	75
	Wethers and other sheep 1 year old and over	561	198	
Ram lambs kept for service under 1 year old				
Sheep and lambs under 1 year old		2934	2075	2934
Total sheep and lambs		6101	5522	6101
Widecombe in the Moor				
Sheep one year old and over	Ewes kept for breeding (excluding two-tooth ewes)	2005	2056	2227
	Two tooth ewes (shearling ewes or gimmers)	814	640	777
	Rams kept for service	58	72	63
	Draft and cast ewes	31	3	38
	Wethers and other sheep 1 year old and over	222	105	
Ram lambs kept for service under 1 year old				
Sheep and lambs under 1 year old		2036	1795	2304
Total sheep and lambs		5118	4788	5514

		4 June 1962	4 June 1963	4 June 1964
Bovey Tracey				
Sheep one year old and over	Ewes kept for breeding (excluding two-tooth ewes)	1410	1727	1649
	Two tooth ewes (shearling ewes or gimmers)	622	157	98
	Rams kept for service	42	44	38
	Draft and cast ewes	40	33	
	Wethers and other sheep 1 year old and over	250	125	
Ram lambs kept for service under 1 year old				
Sheep and lambs under 1 year old		1203	1615	1737
Total sheep and lambs		3402	3826	3647
Ugborough				
Sheep one year old and over	Ewes kept for breeding (excluding two-tooth ewes)	2589	2820	3226
	Two tooth ewes (shearling ewes or gimmers)	797	893	766
	Rams kept for service	73	79	81
	Draft and cast ewes	130	103	55
	Wethers and other sheep 1 year old and over	98	144	
Ram lambs kept for service under 1 year old				
Sheep and lambs under 1 year old		2300	2714	3338
Total sheep and lambs		5971	6707	7610

Source: TNA MAF 68 as follows, MAF 68/4769 part 1, 4770 part 2, 4820 part 1, 4821 part 2, 4871 part 1, part 2.

IV

National level political discussions of the extreme winter began with questions about government expenditure on funding emergency airlifts but developed into an attack, probably inspired by the RSPCA, on farming on Dartmoor and the Dartmoor farmers. The charge was led by Marcus Lipton, MP for the Brixton division of Lambeth, who did not have a farming background but, according to his obituary in *The Times*:

> had a reputation as a performer in a distinctive, if somewhat limited role in the Commons as a politician with an acute instinct for the newsy and the topical. He was quicker off the mark than most of his colleagues to spot the sort of subject which was bound to make headlines and to raise it in debate, or, more commonly, to ask a question about it in that deep gravelly voice.[94]

[94] Obituary, *The Times*, 23 Feb. 1978.

He placed successive parliamentary questions on 23 and 30 January 1963.[95] The first, to the Minister of Agriculture, Christopher Soames, asked what steps the Ministry was taking to recover the costs of helicopter flights from the farmers assisted. Soames replied that a decision had been taken that the government would stand the costs and a supplementary vote would be sought when the final cost was known. Lipton then banged his drum:

> Does the Minister realise that these commoners turn out their livestock for the winter without caring how the animals will survive – [HON. MEMBERS: 'Nonsense'] – without caring how the animals will survive, and then expect Service helicopters and voluntary organisations to come to the rescue without themselves making any contribution towards the very expensive costs of the helicopter services? Why should the taxpayer continue to subsidise these people in this way after they have been proved guilty of the grossest possible neglect?

Soames answered:

> What the Hon. Member has said is not at all fair. As he knows, it is rare to have a cold spell as severe as this and lasting so long as this. This was a humanitarian action, the cost of which is out of proportion to the value of the animals. However, if we had not carried out this airlift there would have been even more severe losses.[96]

Lipton returned to the fray a week later with a question to Peter Thorneycroft, Minister of Defence.[97] Lipton asked which service department had organized helicopter sorties to help animals in distress on Dartmoor; how many sorties were made; and what expense was incurred. The minister replied that the RAF and RN had flown an estimated 241 helicopter sorties, at a cost of £26,000 to the taxpayer.[98] Whilst Lipton praised the efforts of the helicopter crews for their efforts, he made a sharp attack on the 'callous and mercenary farmers in Dartmoor' who, he suggested, were exploiting the 'humane instincts of the public in efforts to minimize the appalling suffering caused by the selfishness and negligence of these farmers'.[99] Thorneycroft gave him no quarter ('I do not know what farming conditions in Brixton have been like, but they have been rather rough on Dartmoor'). Undeterred, Lipton returned to the fray with a rather tame question on the numbers of animals lost on Dartmoor on 18 February, which was brushed away by Soames.[100]

There can be no doubt that press reportage of the crisis on Dartmoor in these weeks was hostile – if also uncomprehending – to the farmers and did their reputation a great deal of harm, although the circulation of newsreels showing the conditions they had to deal with might have served as a form of rebuttal.

On 26 February Lipton took the opportunity to launch an adjournment debate in which he spoke at length and was answered by the MP for Tavistock, Sir Henry Studholme and James Scott-Hopkins, Joint Parliamentary Secretary to MAFF, who stated that during the emergency

[95] Extracts of Hansard are in TNA, MAF 114/689 (18), (19).

[96] Livestock, Dartmoor (Helicopter Services), HC Deb 23 Jan. 1963, vol. 670, cc58–9.

[97] Dartmoor (Helicopter Sorties), HC Deb 30 Jan. 1963, vol. 670, cc919–20.

[98] Ibid.

[99] Ibid.

[100] Severe Weather Conditions (Losses), HC Deb 18 Feb. 1963, vol. 672, cc8–9.

the number of sorties undertaken in the south-west region had increased to 616 with 199 on Dartmoor alone.[101] Lipton commended the helicopter crews and the 39 RSPCA inspectors who had carried out rescues for 58 days, coming to the aid of 50,000 sheep, cattle and ponies. He attacked the MAFF civil servant, W. J. Bricknell, Ministry Divisional Executive Officer for Devon, who had been quoted in *Farmers' Weekly* as dismissing the complaint about the ill-treatment of animals on the moor as 'frivolous and ill-informed', although this was perhaps the Ministry's view of Lipton's campaign.[102]

The substantive debate centred on whether the pasturing of livestock on Dartmoor as practised in 1963 was sustainable. Lipton drew on the views of numerous local correspondents who condemned the poor standard of sheep husbandry that had resulted in an apparent crisis in the welfare of livestock. Hence he demanded reform along the lines of the Report of the Royal Commission on Common Land published in July 1958. Given that the costs of the helicopter flights had been met by the Government, Lipton argued 'that the taxpayer has some interest and to some extent is a shareholder in the livestock which still survives on Dartmoor'. Discussion focused on the need to close the moor to livestock from December to March (winter months) in the future and the necessity for farmers to adhere to the principle of levancy and couchancy which stipulated that commoners could not graze more livestock than they could over-winter on their holdings.[103] There had been continuing debates about animal welfare and the need for the regulation of grazing. It was argued that hill cow and sheep subsidies had encouraged farmers to increase the size of their herds and flocks, resulting in the moor being overstocked. Lipton blamed the Ministry for not enforcing the condition that those receiving subsidy were to use up to 40 per cent of it to improve the land, although in reality, given that the moorland was common land, there was little if any benefit for farmers in improving it.

There were obvious tensions between Lipton and Studholme, the latter staunchly advocating that the rules proposed by the Dartmoor Commoner's Association to the Royal Commission on Common Land in 1956 should be adopted, thereby highlighting the need for legislation to be enacted to set up an organizing body to allow for the registering of common rights. Scott-Hopkins reiterated that, contrary to press speculation, the farmers and commoners of Dartmoor were concerned about the welfare of their livestock, a view which the RSPCA shared. He pointed out the problems associated with the efforts of well-intentioned people, for example, in terms of the hand-feeding of livestock brought down to villages and the incidences of helicopters frightening sheep, which ran downhill and in one case drowned in the River Taw. He also refuted the point made about the role of subsidy and argued that the moor was not overstocked, concluding that the Government should accept the recommendations of the Royal Commission, which called for the registration of common rights and common lands throughout England and Wales, a process he suggested could take five years rather than the twelve recommended by the Commission.

[101] Livestock, Dartmoor, HC Deb 26 Feb. 1963, vol. 672, cc1200–26.

[102] Ibid.; 'Dartmoor Farmers refute cruelty charges', *FW*, 25 Jan. 1963, p. 47.

[103] G. D. Gadsden, *Law of commons* (1988), pp. 20–1, 101–6.

V

The wintering of sheep was a problem faced by all upland farmers: it limited the expansion of their farm output. For the reasons noted before, little provision had been made in the Dartmoor area, for example, to hold fodder in the event of winter emergencies. In contrast, at the Ministry of Agriculture's experimental husbandry farm at Pwllpeiren, Aberystwyth, Dyfed, on the edge of the affected area, the losses were only just above average and the lambing rate of 78 per cent was only slightly lower than normal. This was because the flock had been brought down to the lower slopes early where it was possible to give them supplementary feed hay and concentrates.[104] The losses in 1963, whilst heavy, were very much less than in 1947.

Overall though, the central issue was whether or not to provide supplementary feed, by providing not only hay but also cereals or concentrated feeding stuffs. Some farmers were opposed to supplementary feeding, claiming that it reduced the willingness of sheep to forage for themselves. A series of tests in Northumberland reported by H. G. Clark revealed that supplementary feeding increased the percentage of ewes lambing and the survival rate of ewes.[105] The Ministry of Agriculture gave widespread publicity to the need for the supplementary feeding of flocks and the maintenance of an adequate supply of winter keep. A MAFF article entitled 'Fodder – will it last?' by J. R. Lloyd, regional nutrition chemist of the National Agricultural Advisory Service in Wales stationed at Trawscoed, Aberystwyth, referred to the rationing of fodder stocks and the need to purchase extra food, either hay or cereal.[106] It highlighted the fact that, if ewes were unable to obtain their normal intake of food by grazing because of the snow, the type and quantity of supplementary feeding required was dependent upon the weather and grazing conditions of a locality. The highest nutritional demands of ewes were in the last six weeks before lambing, in late February and March: the prolonged snow in 1963 had particularly affected upland flocks in this respect.

Of course, the buying of supplementary feed was an option, but this was a cost that not all farmers were able to afford. Simple laws of supply and demand meant winter fodder prices were inflated and access to the upland areas was difficult, if not impossible, when roads were blocked with snow. The necessity to purchase more fodder than usual, and at quite a heavy cost, was given by Soames in response to a parliamentary question as one of the reasons for the granting of an interim payment to each regular applicant who applied, of up to half the face value of his claim for hill sheep subsidy in 1963.[107] There were also calls for the revival of the Agricultural Goods and Services Scheme (Emergency feeding stuffs), which had lapsed with regard to goods and services in 1961 and 1962 respectively.[108] It had been employed during

[104] TNA, MAF 112/1151 (92A), Sheep stocks.

[105] H. G. Clarke, 'Cake for the hill ewe', *Farmer and Stockbreeder*, 23 Sept. 1958.

[106] TNA, MAF 114/689 (6A), J. R. Lloyd, 'Fodder – will it last?'.

[107] Hill Sheep Subsidy, HC Deb 3 Apr. 1963, vol. 675, cc48–9W; TNA, MAF 112/1151 (25), MAFF Press notice regarding the interim payment of hill sheep subsidy.

[108] The Goods and Services (Emergency feeding stuffs) scheme authorised by section 103 of the Agriculture Act, 1947 enabled the Minister of Agriculture and Fisheries 'by reason of abnormal circumstances due to climatic conditions, to procure the supply of any or sufficient feeding stuffs for consumption or use' on the application of an occupier. The Minister or committee was allowed to 'make such reasonable charge as he or they think fit in respect of the supply and delivery of feeding stuffs'. All charges were to be paid by occupiers within one month after receipt of costs and the agreement stated that if the occupier failed to pay, grants

the 1947 and 1955 winters and in recent years had been used on a small scale in response to the damage caused by the flooding of agricultural land and the inadequacy of land drainage, for example, in 1958 when 20,000 acres of land in Lincolnshire, Yorkshire and other parts of Eastern England were flooded, waterlogged and subject to storm damage. It was estimated that damage to crops in flooded areas totalled £200,000.[109] Replying to a letter from the Welsh Secretary of 11 January 1963 regarding special assistance to Welsh farmers, J. S. W. Henshaw of MAFF said that the scheme could be resurrected quite quickly for a limited objective and not 'for the purpose of promoting efficiency in agriculture or facilitating food production' as the Agriculture Act of 1947 specified.[110] It was argued that if the scheme was extended it was not likely to have great impact, as farmers seeking credit from the Ministry of Agriculture for the increased costs of fodder, were required to show that they were unable to acquire credit from their bank or merchant, and furthermore that the Ministry had to be satisfied they could repay the loan. It was pointed out that exploring all of these points was time-consuming and could not be undertaken quickly in response to the extreme winter.

VI

Aside from the immediate problem of fodder supply, the impact of the extreme winter of 1962–63 intensified debates about the regulation of common lands. In the background was the report of the Royal Commission on Common Lands, set up in 1955, the members of which included figures such as L. Dudley Stamp, famed for his contribution to the Land Utilisation Survey of Great Britain, and W. G. Hoskins.[111] Research on the history of common land in England and Wales has outlined its importance as an agricultural resource that was often enclosed and sometimes improved in the eighteenth and nineteenth centuries. Some commons nevertheless survived, the management of which was debated in the twentieth century by stakeholders with conflicting interests, primarily those concerned with their use for agriculture and recreation.[112] It has been shown how the framework of modern environmental governance emerged with commons registration, an objective of which was the sustainable management of common land.[113]

The Ministry considered what factors other than the weather might have contributed to the crisis conditions. One such factor, which is discussed in the MAFF files, is the problem posed by common land, and in particular the year-round grazing of commons and the lack of effective regulation that resulted in widespread overgrazing which in turn made fodder shortages progressively worse.[114] It was, however, recognized that efforts to minimize the losses of livestock in extreme winters could not be confined to Dartmoor or common land in general,

Note 108 *continued*
or subsidies would be retained by the Minister. TNA, MAF 196/49 (81).

[109] Agricultural Land (Flooding), HC Deb 28 July 1958, vol. 592, cc938–9.

[110] TNA, MAF 114/689 (2), Letter from J. S. W. Henshaw, 15 Jan. 1963.

[111] W. G. Hoskins and L. Dudley-Stamp, *The common lands of England and Wales* (1963). For the 'Dartmoor Commons' see pp. 185–190. PP 1958, Cmnd. 462, Report of the Royal Commission on Common Land.

[112] Rodgers, *et al.*, *Contested common land.*

[113] Commons Registration Act 1965. For the legal definition of common land see Gadsden, *Law of commons.*

[114] G. Hardin, 'The tragedy of the commons', *Science* 162 (1968), pp. 1243–8. TNA, MAF 114/689.

as it extended to private freehold land in upland hill-farming areas. Whilst the snow was still lying, Sir Henry Studholme had observed in the House of Commons that losses might have been higher on enclosed land ('where the drifts were worse') rather than on open common.[115]

The problems of feeding sheep on the moor in the winter of 1963 focused attention on longstanding problems of how Dartmoor was managed. A meeting was arranged by the three local MPs (Sir Henry Studholme, Percy Browne, MP for Torrington and Raymond L. Mawby MP for Totnes) on 14 February 1963, to discuss the state of the Dartmoor commons. Briefs produced by the Ministry outlined its concern regarding commons legislation, as well as the nature of livestock husbandry and the current emergency. It was recognized that one of the main reasons for the crisis was the radical change which had taken place in animal husbandry. Whilst the Dartmoor commons, which extended to between 150 and 200 square miles, had been primarily used for summer grazing for less hardy stock from the surrounding lowlands, livestock were now grazed year round. It was estimated that 20,000 breeding ewes were pastured on the moor except at tupping, lambing and shearing times and a further 30,000 sheep, 5,000 cattle and 2,000 ponies were now pastured on the moor.[116]

Officials explained that both sheep and cattle kept on the moor were generally of the hardy mountain type, namely, the Scotch Blackface (90 per cent) and the Border Cheviot and other hill breeds such as Swaledale and Exmoor Horns and were, therefore, suited to upland hill farming. Indeed, they argued that to bring such a breed of sheep down to rich lowland pastures in early winter, clearing the moors for the three months of December, January and February, or alternatively January, February and March, could result in metabolic and digestive upsets. Conversely, returning the sheep to the upland commons in the early spring from rich to comparatively poorer pastures could be even more dangerous, as it was, in effect, returning the sheep to poor pastures at the time when the greatest nutritional demands were placed on the breeding ewe. Cattle, mainly of the Galloway breed were usually brought down to in-bye land and the fringes of the moor so that they could be fed easily during the winter months. The officials accepted that the type of animals, both sheep and cattle, which were kept on the moor, were, generally speaking, well-suited to the upland environment and this type of farming.

Conditions here were contrasted with those in Scotland and parts of northern England where sheep were grazed on clearly demarcated farms or enclosed moors. Here they were herded in such a way that all the ground was regularly grazed and the sheep were not allowed to concentrate on some areas and neglect others.[117] When storms appeared to be imminent, sheep were routinely shepherded to a safer part of the farm. Such provision for livestock in extreme weather was difficult to arrange when grazing took place on extensive areas of open common land like Dartmoor. Officials acknowledged claims made in Parliament and elsewhere that Dartmoor was overstocked and calls for the moor to be cleared of livestock during the winter months but they did not consider that this allegation could be substantiated. Nor did they accept that the hill sheep subsidy had encouraged farmers to overstock the moor.[118] However,

[115] Livestock, Dartmoor (Helicopter Services), HC Deb 23 Jan. 1963, vol. 670, cc58–9.

[116] TNA, MAF 114/689 (12), Brief for Parliamentary Secretary (Commons) regarding meeting 14 Feb. 1963.

[117] TNA, MAF 114/689 (34A), Plans to minimize losses of livestock on Dartmoor: Winter 1962/3.

[118] Ibid.

TABLE 8: Hill sheep subsidy: applicants using grazings in the Dartmoor area

Year	*Number of applicants*	*Number of ewes applied for*	*Number of ewes paid for*
1949–50	195	26,703	26,345
1959–60	227	41,261	37,625
1960–61	200	40,310	37,873
1961–62	201	42,133	37,729

Source: TNA, MAF 114/689, Animal welfare and feeding problems: winter 1963 (9B), Brief concerning the present emergency on Dartmoor by P. Holmes, County Advisory Officer, 6 February 1963, Appendix A.

TABLE 9: Hill cow subsidy – applicants using grazings in the Dartmoor area

Year	*Number of applicants*	*Number of cows applied for*	*Number of cows paid for*
1955	227	3028	1934
1957	199	3451	2566
1960	186	4763	3557
1961	183	5180	3732
1962	182	5896	4559

Source: TNA, MAF 114/689, Animal welfare and feeding problems: winter 1963 (9B), Brief concerning the present emergency on Dartmoor by P. Holmes, County Advisory Officer, 6 February 1963, Appendix A.

contrary to the official view, Tables 8 and 9 for the Dartmoor area show the number of sheep and cows applied for and granted payment under the hill sheep and cow subsidy system continued to increase.

Nevertheless, this raises an important point about the stocking densities in upland England and Wales. Agricultural statistics for the period 1945–65 and the figures for the Elan Valley shown in Figure 3 illustrate the dramatic long-term rise in the numbers of upland livestock, particularly sheep, since the early 1950s, reflecting an underlying effort to increase productivity and output. This was the result of the state-directed agricultural expansion programme identified by Brassley and others taking place between 1945 and 1965.[119] This meant that upland areas such as the Cambrian Mountains and Dartmoor were under tremendous pressure, with overgrazing being compounded by changes in winter feeding which encouraged sheep to concentrate in those localized areas where supplementary feed was provided. As a result, there was a danger of a Hardinesque 'tragedy of the commons' scenario.[120]

[119] P. Brassley, 'Output and technical change in twentieth-century British agriculture', *AgHR* 48 (2000), p. 76; Martin, *Development of modern agriculture*, pp. 88–91.

[120] Hardin, 'Tragedy'. This contrasts with E. Ostrom, *Governing the commons: The evolution of institutions for collective action* (1991). This upward trend of stocking densities in the uplands of England and Wales continued until the 1990s when agri-environmental schemes placed grazing restrictions on areas which were designated for their ecological significance, for example, as Sites of Specific Scientific Interest (SSSIs). Rodgers *et al.*, *Contested common land,* pp. 30–1.

The brief went on to note that concerns about the welfare of livestock on Dartmoor, as well as other open moorland areas, had previously been voiced in the spring of 1962 when there was a shortage of grass. However, generally speaking, the welfare of animals pastured on the moors had not attracted national attention, although the condition of moorland and mountain ponies had been the subject of representations from animal welfare societies like the Horses and Ponies Protection Association, which had led to the Ministry's veterinary field team attending the annual autumn sale.[121]

The County Advisory Officer for Devon, P. Holmes, made a series of personal observations on husbandry problems in a memorandum of 6 February 1963.[122] He remarked that he considered the existing hardy hill breeds of sheep and cattle needed to be maintained under the current husbandry system if optimum output was to be obtained from Dartmoor as a whole. The livestock, he wrote, were capable of living on the moor in normal winter weather conditions and he suggested that additional hand feeding practices over and above the existing arrangements had limited value. Land improvements could only be achieved by the erection of internal fences and phosphate dressing, although he recognized the difficulties of undertaking such work as large areas of the moorland were strewn with rocks, or were steep or boggy, all conditions which prevented the utilization of orthodox methods of fertilizer application. Significantly, he criticized the existing antiquated free-for-all system, advocating that it should be replaced by a form of commons registration. Whilst acknowledging that the Dartmoor Commoners' Association had taken an active interest in livestock and land improvement, he explained that they could not put their proposals into practice because of legal problems and the lack of any effective power to control access to the commons. They had drawn up a nine-point plan which he believed formed an 'excellent basis for overcoming the present husbandry problems and weaknesses, and every encouragement should be given to enable the following improvements to become effective'.[123] Holmes then turned to attempts to mitigate the effects of bad weather. He identified the need for the adequate provision of winter keep in the form of hay and concentrates for sheep, especially the more vulnerable ewe hoggs, as whilst there was some evidence of in-wintering through agistment, it was acknowledged that fodder was expensive and there were management problems such as the issue of containing hill sheep in small enclosed lowland fields which hampered such efforts.[124]

Whilst recognizing that the tors and steep valleys provided adequate protection in many areas, Holmes nevertheless advocated the establishment of fodder banks at selected sites on or near the open moor to act as permanent reserves for emergencies and the planting of shelter belts of trees to give livestock cover in bad weather.[125] Moreover he commented that it was

[121] TNA, MAF 114/689 (21), Press notice, Dartmoor – Meeting in House of Commons, 14 Feb. 1963.

[122] TNA, MAF 114/689 (9B), Brief … by Holmes, 6 Feb. 1963.

[123] Ibid.

[124] In the two upland areas examined there is no evidence of the use of silage. Farmers seem to have continued to use primarily hay and additionally concentrates as winter feed. For silage in Britain see: P. Brassley, 'Silage in Britain, 1880–1990: the delayed adoption of an innovation', *AgHR* 44 (1996), pp. 63–87 and M. Riley, '"Silage for self-sufficiency"? The wartime promotion of silage and its use in the Peak District', in Short, Watkins and Martin (eds), *Front line of freedom*, pp. 77–88. Agistment is the movement of animals to summer grazings, usually areas of high ground. Winchester, *Harvest*, pp. 29, 32, 81, 93–8, 109.

[125] The Ministry of Agriculture veterinary staff subsequently pointed out that more sheep had died as a result of a lack of water than a lack of food in the

felt that there was a genuine desire on behalf of the Dartmoor Commoners' Association, the Duchy of Cornwall, and the landowners to further improve their contribution to the 'national larder.' As Holmes concluded:

> I am confident that all parties would follow any lead which can be given to them, and that they would effectively organize their own affairs with the help of all interested parties, including our Ministry. The co-operation given by Dartmoor farmers to the National Agricultural Advisory Service in their advisory work, has always been of the highest order.

G. W. Ford of the Ministry's south-west regional office, Bristol, also penned a note at the beginning of February.[126] He stressed that the previous month had been the worst January experienced in the West Country for a century and that Dartmoor and Exmoor had both suffered more extreme conditions than the wider region. Exmoor had experienced snowdrifts up to 30 feet deep, but did not have a significantly higher than usual mortality rate of sheep resulting directly from the snows, although the indirect losses at lambing were higher because of the increased pressure on the commons. Rather than being critical of farmers, he was sympathetic to their plight explaining that: 'No prudent farmer with exposed lands could be expected to have anticipated and planned to meet the weight of trouble that he had to encounter'. The winter conditions had set in a week or two earlier than usual. The main reason for keeping sheep was the need to produce lambs for sale, a process which required them to take care of and look after the sheep. No farmer kept sheep on Dartmoor simply for subsidy. He criticized the RSPCA for their response to the crisis on the ground and in the media, which 'did put the backs up of some of the farming community, who were in the midst of frightful conditions battling to keep themselves and their livestock alive'.[127] Certainly aspects of the RSPCA's operation, for example, the indiscriminate dropping of bales of hay amongst sheep and the presence of their inspectors, had annoyed farmers.

VII

Whilst the winter of 1962–63 has not received the level of attention from historians given to 1946–47, it is clearly deserving of more detailed investigation. This article has shown that whilst the exceptionally hard winter of 1962–63 caused localized problems for agriculture in upland hill-farming areas, at a national level it did not have the widespread effects of the winter of 1946–47. Changes in livestock husbandry, especially the increase in stocking densities and the decline of wethers, meant that the effects of the winter were worse than they could have been. Our findings support Crowe's assertion that marginal upland areas were acutely susceptible to a 'hard winter or dry summer'.[128] Immediate policy responses in the form of supplying fodder to farms either by road or air appears to have been generally effective and prevented

Note 125 *continued*
emergency and that future arrangements should be made for sheep to have access to water when brought into feeding centres. TNA, MAF 114/689 (34), Summary of a talk given by the County Advisory Officer, Devon, G. W. Ford, 8 Aug. 1963.

[126] TNA, MAF 114/689 (9A), Note by G. W. Ford, 7 Feb. 1963.

[127] Ibid.

[128] Crowe, 'A wasteful use of national resources?', p. 47.

losses of animals on the scale of 1946–47. Indeed an impression emerges that policy makers had learnt valuable lessons from previous extreme winters. Reference is made in the files to the emergencies of 1947 and 1955, and show that measures were already in place to counter any recurrence.[129] The interim payment of hill sheep subsidy may have been a help to farmers, but overall no extra funds were forthcoming. It was simply not possible to resolve the crisis by acquiring fodder from other regions due to the difficulties of transporting fodder on roads that were snowbound. It is also evident that farmers' traditional opposition to supplementary feeding had changed between 1947 and 1963 and that this factor accounted in part for the lower levels of mortality. They were, therefore, better equipped to deal with extreme weather. Yet the immediate effects included a reduction in the lambing rate and a decrease in the size of the national sheep flock for the first time since 1947.

This regional analysis of the winter of 1962–63 illustrates the complex way in which extreme weather impacts on the agricultural sector. A general point can be made that the weather was a major factor in determining the productivity of sheep flocks as indicated by the significant yearly fluctuations that were the result of extreme winters. It is not a simple linear correlation, of the worse the weather the greater the impact, but that there is a tipping point which can have a long-term disastrous effect on particular upland areas. The national data which covers both lowland and upland areas obscures the impact on the latter, estate and parish level data revealing the plight of particular localities such as the Elan Valley and Dartmoor, highlighting the inherent tension between micro- and macro-level studies.

The extreme winter should also be viewed in its wider political context. In Dartmoor provision was made for a second hard winter in 1963–64 but none came, perhaps proof of how exceptional conditions in 1963 had been.[130] In national terms, the government's attitude to the winter emergency marked the continuation of a traditional, non-interventionist approach towards British agriculture where the state declined the responsibility for compensating farmers for weather-induced risk. As illustrated by the case study of Dartmoor, the winter highlighted on-going debates about the need for the formal regulation of common land. Also apparent are the tensions between campaigners concerned for the welfare of livestock, and farmers, who were criticized for a lack of preparedness; unfairly it seems, given the exceptional circumstances. The crisis in Dartmoor probably vindicated those who before the winter emergency questioned the (over-) stocking of the high moorland: it may perhaps be argued that the RSPCA were the only winners from these exceptional circumstances.

[129] TNA, MAF 196/49.
[130] Kelly, *Quartz and feldspar*, p. 385.

Book Reviews

Britain and Ireland

DAVID COX, *The Church and Vale of Evesham 700–1215: Lordship, landscape and prayer* (Boydell Press, 2015). 228pp., 14 illus. £60

Established around 701, the early minster located on a promontory in the lower Avon valley would develop by the time of the Norman Conquest into a regionally, if not nationally, important Benedictine abbey. David Cox charts the history of this transformation in the fortunes of Evesham Abbey in the context of its relationships with first regional, then national, Anglo-Saxon and Norman kings; other ecclesiastical authorities, most particularly successive bishops of Worcester; members of the regional nobility; and the people who lived and worked in the Vale, including the growing numbers who settled in the burgeoning town beyond the abbey's precinct wall. Drawing on a wealth of published editions and commentaries on a broad range of primary sources, Cox seeks to set this religious community in its valley landscape through an exploration of landholding over time and its impact on the spiritual life of those inside, and, to a lesser extent those outside, the cloister.

The book is divided into three sections, the first offering a chronological narrative from the foundation of the earliest church by Bishop Ecgwine with King Æthelred's support to the abbacy of Æthelwig. Within this, the introductory chapters provide some valuable details concerning the regional kingdoms and how the early secular division of the area was mirrored in the ecclesiastical make-up of the Vale and adjacent territories. Æthelwig's abbacy straddled the Conquest and the abbot is shown to have worked hard, and sometimes aggressively, to maintain and even enhance his abbey's estates. The differing characteristics of the various abbots form the skeletal framework of much of the first and second sections, the latter devoted exclusively to Walter's (1078–1104) abbacy and including amongst other matters, the abbey as the controlling power in the spiritual lives of the inhabitants of the Vale.

Because this is a history of an important Benedictine house, it is not surprising that developments within the precinct boundary – such as the growth of book production in the scriptorium, the creation of several shrines for the abbey's increasing relic collection by abbots Ælfweard and Manni, and the enlarging of the church under Abbot Manni – form the core of Cox's study. In addition, there is some consideration of the abbey as landholder and landlord including its relations with the peasantry, but more on these aspects of the abbey in the landscape would have been welcome. However, this may not have been possible due to a lack of suitable sources for the institution's Anglo-Saxon and Norman history, and to a degree this is remedied in the third and final thematic section which covers the long twelfth century.

For this later period, Cox charts the activities of particular abbots – most notably Abbot Norreis – who were in dispute with those within their own community as well as with outsiders, especially the bishop of Worcester, that at times involved matters of lordship, both ecclesiastical and secular. As he highlights, at Evesham, as elsewhere, this led to and was the product of a marked expansion in the use of written evidence: charters, cartularies and estate surveys. His assessment of the various seals is interesting in terms of how visual symbols of saints might be employed to enhance the abbey's credibility, and these ideas are similarly explored with respect to the abbey's saints and its abbots through pilgrim tokens and written sources including the revised *vita* of St Ecgwine, a compilation of miracles of the Virgin and the *Gesta abbatum*.

Although in this third section the chapter on 'Investment' briefly mentions the countryside, much of the chapter is on the town at the abbey's gate. This focus on the urban landscape is not surprising because of its proximity to the monastery and the close relationship between the two communities either side of the precinct hedge, and then wall. Being particularly interested in urban development this caught my attention, although Cox's end date of 1215 meant that matters such as any move towards the seeking of civic autonomy by the townspeople was beyond the scope of his study.

Overall, this is a well-structured and clearly written account of the leading personnel at Evesham's religious

community over 500 years as they mostly sought to enhance their house's wealth and prestige, and to defend it from threats from outside and less frequently from within. By supplying this study on Evesham, Cox has provided another piece in the national jigsaw and a valuable addition to the histories of Benedictine communities in Anglo-Saxon and post-Conquest England. Consequently, this book will be of interest to those researching both early monastic and diocesan development and the regional history of the West Midlands.

SHEILA SWEETINBURGH
Canterbury Christ Church University

MICHAEL HICKS, *English inland trade, 1430–1540: Southampton and its region* (Oxbow, 2015). xvi + 184 pp., 154 diagrams/graphs, 41 maps, £45 (hardback), £22.50 (e-book).

This volume serves as a technical introduction to the rich potential of the brokage books, which contain enormous detail relating to the goods transported overland out of Southampton between 1430 and 1540. The brokage books are famous without necessarily being well-known, a contradiction that arises from their possible uses and the problems presented in interpreting their contents. Many of these problems would be greatly reduced if all the extant books had been transcribed so that we could know if the 27 years which are available are also typical. Sadly, despite the best efforts of those involved in working on the brokage books, it has so far proved impossible to get the necessary funding, though it might be assumed that amongst the aims behind this publication is another attempt to get that funding.

The bulk of the 17 chapters are the work of Michael Hicks and Winifred Harwood closely followed by John Hare, with Helen Bradley and Tom Beaumont James each contributing one paper. Between them, the five authors shed light on the riches offered with discussions of the brokage system, Southampton's foreign trade, the books' economic context, the trading calendar and the freight transport of Southampton. The chapters that follow contain detailed descriptions of Southampton's trading partners starting with Salisbury, London and Winchester, which each get a chapter. The small towns of Hampshire and Wiltshire are taken together and are followed by a discussion of the more distant locations. Chapter 11 discusses the brokage books as sources for local and family history – the books are, after all, lists of people and places as well as goods. Chapters 12 to 15 cover specific commodities: wine, luxury goods (spices and wax), fish and cloth. Chapter 16 considers a wide range of goods: grain, hops, wool, hides, salt, tin, lead, coal, iron, building materials and finishing with bowstaves.

At the end of the volume are a number of intriguing distribution maps. For instance, Map 18 shows the distribution of materials for the cloth industry for all years. On the facing page are nine small maps showing the same data broken down into pairs of years: 1439–40, 1447–48, 1461–62, 1462–63, 1477–78, 1491–92, 1492–93, 1527–28 and 1539–40. Even in those two cases where the maps represent successive pairs of years, the destinations are noticeably different. Where there are wider time gaps, the differences can be very marked and extremely thought-provoking.

The project's website, www.overlandtrade.org, gives a brief introduction (which pre-dates the publication of this book) together with some fairly simple notes. However, it is well worth exploring the interactive map option, which allows you to search by commodity as well as the carter, recipient and destination of the goods. Selecting one or more of these options brings up an appropriate section of the map and allows you to refine your search. Even far-distant Manchester, for instance, is known to have received both wine (via four carts) and oil (via three carts). Further exploration of the options leads to the creation of a .csv file which can be downloaded via Excel, although note that by no means all the transcribed data is accessible via this search function.

This reviewer has attempted to give a flavour of the volume and the potential of the resources it describes knowing she must fail – you will have to read the book and explore the website yourself.

JENNIFER HOLT
Rossendale

A. T. BROWN, *Rural society and economic change in County Durham: Recession and recovery, c.1400–1640* (The Boydell Press, 2015). xv + 288pp., 19 figures, 32 tables, 4 maps. £60.

Focusing on the development of agrarian capitalism in county Durham between the turn of the fifteenth century and the eve of the Civil War, this book provides a detailed view of the fortunes of three groups of landowners: the bishops of Durham; Durham Cathedral Priory (later the Dean and Chapter); and lay landowners, both large and small. The existence of relevant material – including a range of Inquisitions Post Mortem, accounts, wills and probate inventories – in both cathedral and university library archives in the city has greatly assisted the analysis presented. In his introduction, Brown notes that economic change in the region was not the result of a single factor but rather the combined effect of three factors:

increased commercialization; demographic changes; and changing relationships within the class structure. Brown also stresses the importance of analysis which straddles the late medieval/early modern divide, arguing that the 240-year period in question is best seen not as a 'transitional era' but as a long agrarian cycle during which changes occurred which were important to the development of agrarian capitalism. The book examines the effects on landed society of low prices, low rents and high wages during the recessionary fifteenth century, before progressing to consider how landowners' responses to these issues affected the ability of their successors to deal with the high levels of inflation experienced in the sixteenth century.

As one would expect for Durham, there is a seam of coal running through the book. Whilst the bishops exploited the mines economically, albeit through lease income, thereby avoiding the costs of actually winning the coal, the Priory kept their mines in hand so as to meet the demands of household consumption. As for its farms, the Priory weathered the recession by firm management of arrears, improved rent collection, reorganization of farms and a move to leasehold arrangements. In contrast, the diversification of income sources by the bishops in the fifteenth century also extended to forests and parks, as well as mines, with little change in the agricultural estate, leading to the survival of copyhold tenure. Thus, in the following century, those copyhold farms had rents that were difficult to increase, resulting in nominal payments during inflationary times.

Having concentrated on the effects of these economic circumstances on the two major estates of the bishops and of the Priory in the first two chapters, the book moves on to consider lay landowners: whilst they were able to build up their estates during the fifteenth century, the late sixteenth and early seventeenth centuries resulted in the fragmentation of many of these estates. The fortunes of the gentry are considered in Chapter 4 where the problems facing the aristocracy are shown to have been to the benefit of the lesser gentry. Chapter 5 considers the wealth brought to the rural economy by merchants. Brown suggests that not all merchants were looking to become landed gentlemen, but rather they bought land because of the coal and other minerals beneath it, which in turn had the potential to enhance their merchant status. The book then examines the emergence of the church leaseholder – that is, those tenants who were leasing land from the Dean and Chapter – while the final chapter explores the situation for the yeomen and smallholders on the estate of the bishops of Durham who were able to buy and farm their own land. By retaining 'yeoman values', as opposed to those of gentlemen, they were able to raise considerable profits, which funded further purchases of land thereby amassing reasonable fortunes by their deaths.

Overall the book is generally well produced with the exception of a few typographical errors: 'amble' rather than 'ample' being one instance. What lets the book down, however, is the application and quality of its maps. For those unfamiliar with the geography of the area, a good clear map with key locations marked thereon would be a great improvement to that presented on page 23. The maps of townships on pages 211 and 219 lack both clarity and any form of key. Given that they are from the late eighteenth century and do not relate to any of the tabulated records of tenants presented in that chapter, their relevance is also questionable. Another concern is the repetition of key points: for example, we are told about the differing responses to economic circumstances and their subsequent effects at least twice before page 26 – and twice again on that page. It would also have been helpful to understand how much coal there was in a chaldron and how much lead in a fother.

Notwithstanding this, Brown's is a valuable book from an early-career historian. In his conclusion, he notes that neither national nor regional generalizations apply to the area under consideration. Therefore, the focus on this one county for a specific time period enables an in-depth understanding of the effects that the development of the coal industry had on both the economy and society. Overall, then, this book provides inspiration to undertake similar focused studies at a local level, both for different areas and for different periods.

ALAN WADSWORTH
Chippenham

RONAN O'DONNELL, *Assembling enclosure: Transformations in the rural landscape of post-medieval north-east England* (University of Hertfordshire Press, 2015). 164 pp., 32 illus. £14.99.

Enclosure, as readers of the *Review* will appreciate, took various forms and occurred in several phases. This book, an addition to the University of Hertfordshire Press's *Explorations in Local and Regional History* series, arises from the author's doctoral research at Durham University, which explored the post-medieval enclosure process in the north east of England. It offers a valuable regional perspective focusing on five case study townships namely Learmouth, Milfield, Howick, Longhorsley and Elsdon and drawing on the estate collections of the Greys of Howick and Howards of Naworth. Close attention is given to local

detail revealing how events that are seen as part or related to enclosure – for example, farm consolidation – were more complex than often assumed, taking place before and after enclosure rather than simply being the outcome.

The introduction provides a summary of enclosure historiography and crucially emphasizes the need for small-scale studies to counteract the large-scale national studies of enclosure. It points out that enclosure processes 'were performed by individual people who lived and worked at the level of villages, townships and farms, not that of nations, continents and worlds' (p. 2) This argument supports the numerous county and local studies of enclosure, particularly of the parliamentary period. There follows a synopsis of the regional context and the reasons behind the selection of the case studies. This structure is applied consistently throughout the chapters, aiding comparison. In the last sub-section of the chapter the author outlines the different types of enclosure, how it changed over time in different regional settings – for example, the midlands and Cumbria – and the different forms and chronologies of improvement that have been linked to the agricultural revolution debate. Agricultural and rural historians rarely engage with social theory, which is often more readily employed by landscape archaeologists and cultural geographers. Approaching the much-studied subject of enclosure from the standpoint of Actor-Network Theory (ANT), O'Donnell explores the role of numerous local 'actors' including landowners, tenants and even the landscape in shaping the enclosure process in Northumberland during the eighteenth and nineteenth centuries.

Thematic chapters consider specific aspects of the enclosure process, for example, the abolition of common rights, consolidation and ring-fencing of farms, rearrangement of land-use patterns, dispersal of settlement and the adoption of new technology and methods, all familiar to agrarian historians. Chapter 2 outlines each township's enclosure history with formal and informal or piecemeal enclosure being identified. For example, at Longhorsley and Milfield there was enclosure by agreement in 1664 and 1789, at Howick and Learmouth by unity of possession in 1635 and 1799, whilst Elsdon was enclosed by Act of Parliament in 1731. Emphasis is placed on individual or group decision-making and the significant influence of human agency in the enclosure process. As O'Donnell argues, 'the context of each particular enclosure event, the number of landowners, their wealth and status, their knowledge of enclosure, the type of land to be enclosed and the details of its tenure are all highly significant to the way in which the process actually played out' (p. 32). Chapter 3 examines the creation of ring-fenced farms in the post-medieval landscape through engrossment and land consolidation associated with late seventeenth and eighteenth-century estate management. Discussion is not centred solely on enclosure but rather related factors such as the role of tenants and the pattern of boundaries. This leads onto a consideration of the conversion of land between arable and pasture. As shown, the land-use pattern changed in the post-medieval period as the extent of arable and pasture varied regionally between lowland and upland areas. Similarly commons were intermittently cultivated and arable converted into grass. Although it is recognized that these changes were often not permanent and the processes complex, enclosure is cited as an influential factor in speeding up this transition in the eighteenth and nineteenth centuries. Settlement dispersal, which is usually viewed as a consequence of enclosure, is addressed in Chapter 5, the case studies underlining the importance of local conditions. Settlement patterns resulted from different circumstances with enclosure, engrossment and the creation of ring-fenced farms all being causes for dispersal, which occurred alongside increases in farm size, consolidation and land-use change.

In Chapter 6 the local uptake of agricultural improvement is examined showing how the economic motives of improvement reflected a wider national movement. The case studies exhibit the typical features of improved estate landscapes including the building of cottages and model farmsteads, the establishment of plantations, drainage improvements, the reorganization of field boundaries and the adoption of improved husbandry practices. Changes in labour organization and leasing arrangements during the nineteenth century are also outlined. It is suggested these are indicative of the contemporary awareness of improvement through published material and the desire of landlords and tenants to benefit from greater profit and status. The penultimate chapter proposes a new approach to enclosure emphasizing the proactivity not only of gentleman farmers but also those of humbler social standing, notably, small tenant farmers. Other aspects discussed include the availability of capital and the role of landlords, tenants and land agents in pursuing policies of estate improvement. It is rightly emphasized that factors such as family relationships, marriage and inheritance were significant in leading to the creation and division of estates.

The concluding chapter summarizes findings, reaffirming the value of ANT for history and archaeology. It identifies further questions as to how enclosure can be interpreted at different levels, whether locally, regionally, nationally or globally, demonstrating

local history's relevance in testing larger-scale models or hypothesis. Although concerned with only five townships, the book is a useful addition to the long-established historiography, having the potential to be extended geographically, and is innovative in its theoretical underpinning. Does this approach constitute a new theoretical history of enclosure? And if it does, to what extent will the current generation of historians engage with this viewpoint and what insights, not hitherto revealed by the traditional historiography, will it shed light on? It certainly does adopt an interesting theoretical perspective, which will enhance the current enclosure debate. The book is illustrated with farm and township plans and photographs and has a bibliography and index. It will be relevant to landscape archaeologists, historical geographers and economic and social historians studying enclosure, and local historians interested in the rural landscape of the north east of England.

JAMES P. BOWEN
University of Liverpool

ANDREW MACNAIR, ANNE ROWE and TOM WILLIAMSON, *Dury & Andrews' map of Hertfordshire: Society and landscape in the eighteenth century* (Windgather Press, 2015). 240pp., 84 illus. £35.

Why would anyone who doesn't live in that county want to read a whole book about a county map? The answer is that the authors of this book have provided a template for all future studies of maps as documents, rather than just as 'pretty pictures'. Maps can be, and have been, looked at as works of art, as moments in cartographic history, or as sources for landscape history. This book starts by looking at the Hertfordshire map *qua* map and in its context – but then goes on to show how, by digitization and geo-rectification, it can become a fundamental source for understanding the settlement, agricultural and social history of this county. Beautifully produced and extensively illustrated, the book also includes a DVD with a larger-than-life scan of the map broken into 36 separate images, plus the digitally redrawn map, with accompanying maps of the underlying relief, geology and soils of the county, and separate maps showing the wastes, woodlands, arable, pasture, churches, roads, mills and other features.

The authors are under no illusions about the quality of this map. Made by two London-based cartographers of Huguenot extraction, and influenced by the work of Dury's father-in-law, the prolific map publisher Jean Rocque, also a Huguenot, in many ways the map harks back rather than looks forward to the new age of map-making. It was published in 1766, as the first epoch of county map-making based upon regurgitating the works of Christopher Saxton and his contemporaries was giving way to the new era of Society of Arts influenced, large-scale, mathematically accurate, functional maps. In 1759 the Society had issued an advertisement offering cash prizes for county maps at the one-inch scale or better, based upon trigonometrical surveys, using theodolite and perambulator; and in 1765 had awarded its first such prize for Donn's map of Devon. Dury and Andrews never applied for a prize, and probably would not have been awarded one had they done so. Although published at a scale of 1 mile to 1.95 inches, their map tells us nothing about where the map-makers laid out their baseline, nor where their stations were located, which perhaps gives rise to some suspicion as to their methods. Unusually, too, Dury and Andrews appear to have taken Hertford Castle as their prime meridian, rather than St Paul's, London, or even Greenwich Observatory, which was becoming the norm at this date. Moreover, they appear in many cases to have filled in the topographical details by eye, or even by imagination, with the field boundaries in particular showing little relationship to reality. On the other hand, they took great care with their cartouche, wherein their 'target market' of a gentleman, standing with his gun dog before a classical country house, is illustrated in a rococo style influenced by Rocque. By this date, this was beginning to look a bit old-hat, although it no doubt still appealed to the 169 noblemen and gentry whose names appear upon the map alongside their residences.

Nevertheless, as the authors move from a discussion of the map itself to the next stage of digitizing and geo-referencing in order to make it available for the analyses to come, the usefulness of the map for today's historian become clear, for all its shortcomings. Using Adobe Photoshop for the digitization, each feature – boundaries, roads, windmills, parks and the like – was drawn in by hand as a separate layer in Photoshop. The map was then 'warped' to fit some 113 control points taken from the British National Grid, using mapping software ArcGIS, after which new layers were added from modern maps showing the underlying relief, geology and soils.

The final section of the book then uses this geo-rectified map to discuss the detailed landscape, settlement, social, agricultural and industrial character of the county in the eighteenth century, and from that point goes back in time to consider developing patterns. As just one example, the authors look at the 44 places named on the map as containing the place-name element 'bury', showing how these places emerged in the mid-late Saxon period on the light,

free-draining soils of the county, many of them going on to give their name to their parishes.

There are detailed endnotes to each chapter and an extensive bibliography which perhaps not surprisingly lists some fourteen references by J. B. (Brian) Harley, the doyen of cartographic historians and perhaps the first to study the corpus of eighteenth-century county maps. Unfortunately, his untimely death in 1991 only just post-dated the launch of the first edition of Adobe Photoshop (1988), so he never got to digitize or geo-reference his maps. However, he would have loved this book, which can be commended to anyone who wants to know how to use old maps to their fullest extent as key – albeit often overlooked – historical documents.

BILL SHANNON
Preston

ERIC JONES (introduction), *The farmer's world: Richard Jefferies' agricultural journalism in the late 1870s* (The Richard Jefferies Society, 2016). xxvi + 260 pp.

Richard Jefferies is best known for his prolific work about natural history, rural life and agriculture. His lyrical style was informed by his experiences on the land and the close affinity he developed with the rural communities he lived and worked in earned him an outstanding reputation. He also demonstrated expertise in journalism, contributing to some of the leading newspapers and journals of the late nineteenth century. Born in north Wiltshire on 6 November 1848, his formative years were shaped by his rural encounters, whether with people and places or flora and fauna. Moreover, generations of his family had been farmers whose livelihoods revolved around the land. This undoubtedly influenced his writing. *The gamekeeper at home* was inspired by his memories and encounters with a local gamekeeper he had befriended, and was based on 24 articles originally published for the *Pall Mall Gazette*. *Hodge and his masters* – again collected from articles – depicts a rapidly changing rural world and combines his affection for traditional practices and customs with an acknowledgement that the new could in fact often harmoniously coexist with the old.

Having begun his journalism career at the age of 18, Jefferies' work gained prominence in the 1870s after three of his long letters on the condition of the Wiltshire labourer were published in *The Times*. This book focuses on Jefferies' later contributions to agricultural journalism – the articles he wrote for *The Live Stock Journal and Fancier's Gazette* in the late 1870s. This publication was established in 1874 and reflected the increasing importance of livestock in English farming in the 1870s. It was at the forefront of an agricultural press that was now catering for specific sectors of farming and explicitly targeted breeders and stockowners. Jefferies' articles were about the agricultural economy and farming – chiefly livestock – and were a synthesis of both his observations and experiences and his knowledge and expertise in the field.

Published by the Richard Jefferies Society, this new book is valuable in bringing to the fore some of Jefferies' lesser-known writings. Its existence is all the more impressive when its origins are considered. Samuel J. Looker, undertaking research on Jefferies in the 1940s, found reference to the *Live Stock Journal* in his field notes and sought out the collection in the British Library. Numerous articles bore the style of Jefferies but none were signed. Eventually receipts came to light that substantiated that these articles were indeed the work of Jefferies. Whilst Looker republished some of these articles, this book brings together all the articles from the *Live Stock Journal* identified to be the work of Jefferies and combines them with new introductory material from economic historian Eric Jones.

The edition begins with a biographical note about Jefferies that charts his career. The foreword then explains the role of Looker and the Society in identifying and publishing these letters. An excellent introductory essay by Jones expands upon the biographical information to provide the context to understanding the significance of the excerpts from the *Live Stock Journal*. Jones's commentary is critical, examining and questioning the approach taken by Jefferies in order that the reader not only fully recognizes the importance of the works reprinted here but also the influences behind their existence. Jones encourages the reader to view the articles both as descriptions of agriculture on the cusp of change and as providing an insight into agricultural thought of the time. As Jones concludes, 'The book's insights into a genuinely crucial turning-point in rural affairs, presented in Jefferies' inimitable style, make it a significant source for agricultural historians' (p. xxiv).

This contribution to the study of rural and agricultural history is evident in the articles themselves that follow Jones's introduction and are reproduced in chronological order. They appear almost as they would have in the *Live Stock Journal*, although it is noted that obvious typographical errors have been corrected and some punctuation added. Each entry notes bibliographical data along with information about how it became assigned to Jefferies. Collectively they offer a window onto a short but crucial period in English agriculture between 1877 and 1878, a period when the agricultural sector was on the tipping point between a

golden age and a great depression. Recurring themes addressed imports and competition from abroad, especially American meat; employment issues; the distance between centres of supply and consumption; livestock breeds and the use of shorthorns on arable land; pasture and stock; milk and dairy; the weather; hunting and game; and trespassing. Jefferies' journalistic style was direct and challenged his readers to question their own practices and to innovate.

This book thus provides important insights into aspects of the 'farmer's world' and the agricultural journalism of Richard Jefferies. It is a significant reference text that allows the reader to consult the work of Jefferies on a number of notable topics as well as consider the contribution of agricultural journalism in a changing world where farmers faced new challenges. As such the book should appeal to students, researchers and academics along with those with a general interest in farming in the second half of the nineteenth century.

SARAH HOLLAND
University of Nottingham

JON STOBART and ANDREW HANN (eds), *The county house: Material culture and consumption* (Oxbow, 2015). 256 pp., 100 illus. £70.

The country house is an excellent collection of essays, which grew out of a 2012 conference held at the University of Northampton and co-organized with English Heritage. Each of the chapters has something original to contribute to recent discussions about material culture and consumption in the period since 1700. In particular, several essays take novel approaches to illuminate the transnational movement of goods and intellectual and aesthetic ideas, and trace the national and local networks of consumption in which the country house was involved.

The international approach taken by several of the contributors offers useful comparisons as to the motivations for building country houses in different European contexts. Yme Kuiper and Johanna Ilmakunnas look at country house building in the seventeenth-century Dutch Republic and eighteenth-century Sweden respectively, and show that the motivations behind building country houses were varied and complex. Along with Shelley Garland's essay on Earl de Grey's choice of a French style of architecture at Wrest Park, and Victor Hugo López Borges's chapter exploring the Anglo-Irish influences on the building of the Palacio de Castrelos in Spain, these essays demonstrate the transnational movement of design and intellectual ideas which influenced architecture and design across Europe.

Another group of essays study the proliferation and popularity of exotic goods in the eighteenth century. Kate Smith explores the complex meanings attached to global and imperial objects. Smith argues that these were not just objects of high fashion but were valued for the sentimental and personal memories attached to them through gift giving and dynastic inheritance. Helen Clifford looks at where different imperial objects were placed within the houses of Sir Lawrence Dundas, an eighteenth-century businessman who invested heavily in the East India Company. Clifford argues that there were a myriad of meanings attached to different properties held in one family, meanings that are revealed through the moving and placing of items in certain properties. Through this study of objects and place, Clifford supports the overarching argument of this collection that a country house needs to be understood in the context of its wider geographical, social and economic networks.

Another strength of this collection is furnished by the essays that look beyond the walls of the house to the wider estate and country. Jane Whittle's superb chapter on the consumption habits of the Le Stranges of Hunstanton in the seventeenth century is an excellent example of the fruitfulness of looking beyond inventories in order to study the processes of consumption in a country house. By using household accounts, Whittle traces the supply of mundane and ephemeral items that do not appear in inventories. In doing so she finds that the seventeenth-century country house had strong economic links with both local rural society and large urban areas. Jon Stobart and Mark Rothery's essay on the geographies of supplying Stoneleigh Abbey and Arbury Hall in the eighteenth century supports this understanding of the country house as part of a wider economic and social network. By tracing the suppliers of these neighbouring estates, Stobart and Rothery argue that personal preferences and family loyalties were often the deciding factor in the consumption habits of the elite. In considering the life cycles and seasonal mobility of aristocratic families, they argue that the 'local' was a 'fluid concept' to eighteenth-century families. This conclusion is supported by the contribution of Annie Gray in an essay on the supplying of food to the Victorian country house. Gray considers the entire process of food consumption from acquisition to preparation to disposal, bringing together the house and its surrounding estate. The journey of foodstuffs demonstrates that country houses were linked to other properties in the family network and that 'local' was a variable concept. A section on interpretation and representation poses challenging questions about the future and memory of the country

house. Karen Fielder's wonderful essay on the lost house of Coleshill challenges the concept of treating the country house as separate from the wider estate, arguing that the landscape of the Coleshill estate can only be understood through an awareness of the house that once stood there.

As a whole, the contributors draw a coherent and persuasive argument that we cannot understand the complex and shifting meanings and uses of a country house without considering the wider geographical, economic and social contexts in which they are situated. By focusing upon consumption and the country house, this collection shows that it is possible to re-place the country house within transnational, national, local and personal networks and see it as a 'fluid' rather than a fixed and isolated entity. This thought-provoking collection of essays is therefore essential reading for historians, archaeologists, geographers and others concerned with the development of the country house and its contribution to rural and urban economies, as well as for all those interested in wider histories of consumption across the last three centuries.

SARAH SHIELDS
University of Hull

CHARLES WATKINS, *Trees, woods and forests: A social and cultural history* (Reaktion, 2014). 312 pp., 112 illus. £27.

While trees have always captured the popular imagination, the same has not always been true of the attention of British historians and historical geographers. If trees played an important part in foundational works of landscape history by such scholars as H. C. Darby and W. G. Hoskins, the spur to take trees seriously as objects of historical study came not from not from history but ecology and environmental change. In particular, the early work of the late Oliver Rackham proved pivotal, his *Trees and woodland in the British landscape* (1976), *Ancient woodland. Its history, vegetation and uses in England* (1980), and *The history of the countryside* (1986) all now recognized as pioneering, classic works. In turn, historians and historical geographers were inspired to turn to trees, to head to the woods and forests, both as objects and spaces of interest in their own right but also a way of thinking through wider questions in social and cultural history. Today, such studies are many, the foci and approaches diverse, but – until now – there has not been a study that has brought together these interdisciplinary advances. Charles Watkins's excellent *Trees, woods and forests* is the study this recent blossoming of research deserves and the field of woodland and forest research needed, and Watkins the scholar uniquely qualified to deliver.

Both an act of synthesis and based on considerable new archival material, Watkins' latest book is of great value in drawing much recent work together whilst at the same time suggesting important new directions for research. Indeed, the subtitle *A social and cultural history* does the book few favours, for it is far more than just concerned with the social and cultural, much of the material rooted in economic, environmental and ecological approaches too. It is also important to note that while much of the analysis in *Trees* relates to Great Britain – for instance, Sherwood Forest is the sole focus of chapter six – the book is global in scope, the tenth and final chapter a return to Watkins's long-standing interests in the 'semi-natural' woodlands of Liguria, Italy. Much of the analysis also speaks to the fact that while trees are materially rooted in place, not only are seeds and saplings highly mobile but knowledge pertaining to tree-management practices (and fashions) has a long history of being truly globally networked. Nor is *Trees* a study bound only to one period, for while the analysis of the modern predominates the first substantive chapter considers 'ancient' tree management practices and chapter two the ways in which European forests were created, managed and represented as spaces of spectacle and display in the classical and middle ages.

Perhaps unsurprisingly, given Watkins's recent excellent biography of Uvedale Price (2012) and (with Paul Elliott and Stephen Daniels) his illuminating study of the science and culture of the arboretum in nineteenth-century Britain (2011), *Trees* is arguably at its very best in making connections between the emergence and diffusion of new ways of thinking and changing practices of planting and managing trees. Thus we learn that celebrated Arts and Crafts designer William Morris advocated allowing pollarded hornbeams in Epping Forest to return 'to nature', something changing middle class sensibilities – informed by 'aesthetic tastes and scientific principles which were national or international rather than local' (p.138) – supported. Similarly, the famed Beech Avenue of Sherwood Forest is shown to have survived two world wars and colliery development due to the persistence of picturesque values, but ultimately fell foul to quasi-commercial replanting, disrepair and storm damage, eventually being felled in the 1970s (pp.160, 169, 171).

If human enrollments of trees in cultural and economic circuits necessarily dominates the analysis, there is also a sense in which the love of trees (arborphilia), something that richly saturates the book, gets us closer to thinking of trees as (after Donna

Haraway) companion species. For instance, Watkins relates that the American actor Kim Novak was so attached to the redwoods in the grove in which Alfred Hitchcock filmed her for his classic *Vertigo* (1958) that the trees became fellow actors (pp. 224–5). Better known was John Ruskin's love, he feeling a 'boundless affection and admiration' for trees, an emotional state that he believed was 'nearly [a] perfect test of our being in the right temper of mind and way of life' (p. 202). If the lone tree or avenue was, as Watkins's analysis shows, so often the subject of a more-than-human love, this is not to say that copses, coppices, coverts, plantations, woods and forests were not also subject to affection. But commercial, military and other political impulses often rode roughshod over picturesque sentiment and arborphilia, while other tree spaces that have become defining features of the landscape were often the result of sporting and recreational imperatives.

Trees establishes – if it were in any doubt – Watkins as the bard of all things bosky. This is a beautifully written book, one that never gets lost in the detail, the narrative skipping along from one place and time to another with grace and ease. It is also richly illustrated, much of the credit for which must go to publishers Reaktion who continue to set the standard for sensibly priced accessible books with high production values. What of niggles? One might argue that orchards and fruit trees do not get the prominence they deserve, though this is perhaps a reflection on the relative paucity of recent academic work on the history of orchards, and to the pride of place given to woods and forests in the book. Similarly, foresters themselves might revel in the details of woodland management related but see little about their forebears who laboured managing woods and forests and otherwise found employ in woodland crafts (for which see Mairi Stewart's *Voices of the forest. A social history of Scottish forestry in the twentieth century* (2016)). This is small beer. *Trees, woods and forests* is a splendid, timely book that will no doubt become a standard work of reference for all interested in the history of that which singularly unites all countries and all times – trees.

CARL J. GRIFFIN
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MIRANDA MCCORMICK, *Farming, fighting and family: A memoir of the Second World War* (The History Press, 2015). 256 pp., 33 illus. £14.99

The idea of the Second World War as 'The People's War', in which a united nation was all in it together, civilians as well as military, was questioned by Sonya Rose in *Which people's war?* (2003). She and others have examined questions of community and identity, civilian morale, the impact of austerity, class, gender, fair shares and equality of sacrifice. Their writing has changed the emphasis from the similarity of experiences to differences. *Nella Last's war* (1981) was not the war of *Mrs Milburn's diaries* (1979). Much depended on individual circumstances, which is perhaps why there continues to be a readership for wartime memoirs. And they continue to appear, as the wartime generation dies out and the post-war generation, on sorting out their papers, realizes that their contents further illustrate the enormous variety of wartime lives. One of the results is Miranda McCormick's book, which weaves together the experiences of a soldier, a farmer, and his daughter, using family letters, memoirs and diaries as well as public archive material.

The soldier was David McCormick, the author's father. He was a member of the family that founded the Chicago-based International Harvester company. His father had moved to England and married the daughter of a Yorkshire landowning family, and David led the life of a young man with a private income before the war. In 1940 he enlisted in the artillery, and was subsequently commissioned and sent to join the Royal Horse Artillery in North Africa in 1941. In December of that year he was captured and so began nearly four years as a prisoner of war, initially in Italy and later in Germany. The story of his life in the army and as a prisoner is told through extensive quotations from a memoir that he wrote after the war, from regimental diaries, and from the letters that he wrote to Pamela Street. She was 18 when the war began, a farmer's daughter living just outside Wilton, to the south of Salisbury Plain, where he was undergoing officer training in the late summer of 1940. They met at a dance in Salisbury, and he was soon a regular visitor to her home. At the time, she was training as a nurse, although she later joined the Auxiliary Territorial Service, in which she was eventually commissioned. Her diaries from that time reveal vividly the pressures and difficulties that young women had to deal with. By the time he was captured their letters to each other more or less assumed that they would be married on his return, and that was what happened. After the war, and some time spent in London, he took on a farm a few miles from her old home, helped by his new father-in-law, who was the farmer, writer and broadcaster Arthur (A. G.) Street.

Apart from its intrinsic interest as a good story well told, the book's main claim to be noticed in this *Review* is for the extra light it shines on A. G. Street, one of the more prominent public faces of English farming before, during and after World War II. He was a tenant farmer, with a 300-acre farm on the

Earl of Pembroke's Wilton House estate, which he had farmed since 1917. He survived the difficult farming years of the 1920s and 1930s by transforming a mixed farm into a dairy farm with a milk round, but also by becoming a popular writer. He had a critical and commercial success with *Farmer's glory* in 1932, and by the beginning of the war had published several novels, one of which, *Strawberry roan*, was filmed. He had also written a number of books on farming, and had established himself as a broadcaster and journalist, with a regular column in *Farmer's Weekly*. The account of his wartime experiences presented here shows how important his writing was to the family income, and gives us a more rounded view of the man than his own writing and the biography that Pamela produced after his death. This book is a reminder, if one is needed, that farmers are people too, and that their farming decisions are affected not only by economic and technical factors, but also by personal and family considerations. It is a welcome, well-produced and sensibly priced addition to the histories of wartime agriculture and the war in general.

PAUL BRASSLEY
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OLIVER FINNEGAN and CATHERINE GLOVER (eds), with an introduction by RICHARD W. HOYLE, *British farm surveys 1941 to 1943: The National Farm Survey of England and Wales and the Agricultural Survey in Scotland. Reports and statistical analysis* (List and Index Society, 2014), iv + 236 pp plus CD. £75 (non-members). Special offer price of £45 for members of the BAHS.

The National Farm Survey (NFS) of England and Wales, and its counterpart in Scotland, sought to address the state of farming during the Second World War. Following the formation of 61 County War Agricultural Executive Committees (CWAECs), an initial survey of farming was conducted in 1940. The government then launched, in 1941, the most comprehensive survey of agricultural holdings in British history. The surveys were implemented over the following two years, and would influence both wartime production and post-war planning. They aimed to record data for every farm concerning land-use and farming type, machinery and labour, condition of drainage and buildings, stocking of the farm, and standards of farm management. Such was the level of detail that the farm surveys are now a hugely important source of information for historians.

British Farm Surveys, the 354th volume produced by the List and Index Society, focuses on the summary report of 1946 and county tables of data rather than the individual surveys. The book and accompanying CD contain an abundance of quantitative and qualitative data relating to farming during the Second World War at both the national and county level. The book begins with an introduction by Richard Hoyle, which provides useful context for understanding the National Farm Survey, including its origins and objectives and an explanation of the intended uses of the survey at the time. Throughout the introduction are reminders of the significance of the data presented in the book and on the CD – most notably that statistical analysis of the NFS at both county and national level has so far attracted little in the way of attention.

Following the introduction by Hoyle, the book is subdivided into three parts. Part 1 is a reproduction of the summary report, which was originally published by HMSO in 1946. The preface states that whilst the survey had served its immediate purpose of increasing production, its significance would lie in post-war planning. The report provides and explains the definitions and classifications used, and notes that the results given in the report 'are based on a random sample drawn from the total of nearly 300,000 records' (p. 29). Data concerning types of holdings and types of farming, size of holding, economic type of occupier, rent, length of occupancy, convenience of layout, condition of farmhouses and farm buildings, management grade, infestation, water supply and electricity are tabulated; whilst the proportion of each county occupied by tenants, rent per acre, length of occupancy per county, number of farm cottages per 100 workers per county, holdings with piped water supply and electricity is mapped. This is accompanied by explanatory text guiding one though the data. The original appendix to the report is also reprinted, including documents concerning the farm survey sampling technique; descriptions of the main types of farming and agricultural regions; statistical tables per county; and a copy of the farm survey itself.

Part 2 of the book introduces the county reports, listing the 61 administrative areas for which a county report was produced and noting whether any data is missing for particular counties. The county tables were never published, and an attempt has been made to present them in the form it is assumed they would have taken based on the summary report. A sample county report, Bedford, is printed in the book. This section is accompanied by volume 2 of the book – a digital file on the CD with all the county reports. On loading the CD, the less digitally inclined may at first be daunted by the different files listed but it is worth persevering. There are two PDFs – one provides the reports county by county and the other is in table order, both of which allow you to browse through the tabulated data. The

CSV files, again by county and table, can be imported into spreadsheet or database applications, and have infinite potential in terms of calculations. In fact, it is easy to appreciate the time and effort that has gone into inputting the data and providing an invaluable opportunity for historians to analyse the data in depth.

Part 3 is the final section of the book and deals with the Scottish material. It reproduces the abridged report of the agricultural survey in Scotland, beginning with an introduction that sets out the context for this survey and its aims and objectives. The report includes the questions asked and the instructions given, before providing some analysis of the data. This focuses on the potential of the land, factors impeding maximum production, crops and livestock, and different land type. There are also a series of tables with data for each Agricultural Executive Committee District in Scotland, and accompanying data on the CD.

British Farm Surveys is indeed a valuable source of information for historians, and this volume helps make a wealth of important data much more readily available for historical analysis and research. Despite the scepticism expressed at the time – and noted in the introduction of this volume – about the reliability of the data, the scale and scope of the project was huge and making it accessible to a wider audience is a commendable achievement. The qualitative and quantitative data encourages comparative work within and between counties. Such a volume has the potential to inspire the reader to consider the differences in data and approaches between England and Wales on the one hand and Scotland on the other; the comparative nature of farming in different counties; and to position individual farm returns in the context of the relevant county report. In essence, it paves the way for interesting and engaging historical enquiries, and raises the profile of previously neglected material.

SARAH HOLLAND
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ANDREW HUMPHRIES, *Hill sheep husbandry in England: Adaptive to change in diverse ecosystems* (Foundation for Common Land, 2015). viii, 78pp., illus. £8 plus £2 p&p UK only.

This in-depth study of hill sheep farming, especially as regards nutrition, is not aimed at the agricultural historian, but nevertheless provides considerable food for thought for anyone interested in the evolution of our northern landscapes. The book is targeted at the non-farming professional concerned with the management of cultural landscapes. In places, it is highly technical, and perhaps is not for the faint-hearted, but it is worth persisting with, not least for the occasionally stunning and always informative photographs, especially those attributed to Kath Birkinshaw.

Lying behind the work is the big question of the balance between shepherding as a business requiring a financial return, and the hill farmers' role as custodians of the countryside, managing a 'non market public good', namely a landscape which is regarded by visitors as wild and natural, but which the sheep themselves have created over thousands of years. As Humphries makes clear, if grazing ceased, or even if stocking densities were to be significantly reduced, the grassland of the hills would revert to ferns and heather, followed in time by a birch scrub, and eventually a climax woodland vegetation. This question has become more urgent recently with the purchase by the National Trust of Thorneythwaite Farm, Borrowdale, pricing out local farmers, with the intention of reducing sheep numbers and encouraging wood cover as a means of providing natural flood management. It is perhaps a pity that the author nowhere mentions 'rewilding', although its presence is the elephant in the room throughout the book, especially when we recall George Monbiot's description of the Lake District as 'sheep-wrecked', and his referral to the 'white plague' of sheep which, in his opinion, no longer have any place on the fells.

Of particular interest to historians is Humphries' account of the changing structure of the flocks, and the impact this has had upon the demands they place on the vegetation. From Neolithic to Norman times, mixed flocks grazed the fells, producing meat, milk and wool on a subsistence basis. The make-up of the flocks changed with the introduction of commercial wool production by the Cistercians and others, as the flocks came to be dominated by wethers (castrated males), which were clipped for three or four years, then sold on for mutton. This economy lasted effectively until the appearance of the first New Zealand lamb shipments in the 1880s. Tastes changed, and there was no longer a demand for mutton, while later the price of wool collapsed. The hill farmers responded by replacing their wether-dominated flocks with flocks of breeding ewes, and their output changed from wool to lamb. But, whereas the wethers could thrive on the rough grazing of the hills, the nutritional needs of a ewe, especially one carrying twins in late pregnancy, may be three times greater. This has resulted in the growing importance of the 'in-bye' lands for winter fodder – but also requires expensive supplements of cereal-based products, with added protein, minerals and trace elements, especially during the 'hungry gap' from January to April, when pregnant ewes draw heavily on body reserves, as they also do during early lactation.

Yet although supplementary feeds are the hill farmers' greatest variable cost, nevertheless the main source of nutrition for their flocks continues to be the 'natural vegetation', itself a misnomer. While the vegetation may ultimately be determined by the soils, climate and topography, it is modified by management systems such as burning, which encourages a species mix, and gives greater grazing choice, while over-grazing reduces selectivity and encourages the predominance of certain species. Humphries is particularly good on the strengths and weaknesses of the range of species the non-specialist tends to lump together under the generic name, 'grass'. Thus we learn that sheep's fescue (*Festuca ovina*) is probably the best all-round feedstuff, while *molinia* is highly variable at different seasons, and heather is of low digestibility, limiting milk production and hence lamb growth. Chapter Six, with its detailed descriptions of the commonly grazed plants, and accompanying photos, is of particular interest.

The traditional practice of grazing the sheep on the hills for much of the year, bringing them down to the in-bye in winter, to supplement grazing with hay and browse, has been modified such that the ewes now come down to the in-bye for 'tupping' (mating) in November-December, then return to the fells until April for lambing, returning again to the fells from June to October, apart from a brief return for clipping in July. Although we talk of 'hill farms', the enclosed lowland of the in-bye is in fact crucial to survival and the hills cannot be considered in isolation from them. Historically, up to the twentieth century, the in-bye grew oats and root crops for the livestock, and potatoes for the humans, on a small-scale rotation. Reseeding of grassland was rare and fertilization was by animal dung and urine, with perhaps a little lime. Today, the in-bye is drained, and fertilized with nitrogen, phosphates and potassium, and is sown with grass and clover.

The fell pastures where the flocks spend much of their lives are sometimes common land, and are often in 'heafs' to which the flocks are habituated from one generation to the next. These pastures fall squarely into the EU category of 'Less Favoured Areas', areas with natural handicaps of climate, infertile soils and topography and are only suited to low-intensity systems. The policy aim, both within the EU and within Defra is to balance livestock production in these areas with other 'public goods' - the flora, fauna and 'landscape' – and the improve environmental outcomes whilst increasing food production (Defra 2011). But are these outcomes mutually incompatible? Heather moors, perhaps thought of as the typical landscape of the hills, covers some 466 kHa of England, an area equivalent to twice the size of the Lake District, spreading from the Borders, through Cumbria and the Pennines, to Derbyshire and reappearing in the south-west (the author is not concerned with Wales or Scotland). That landscape, and the wider surrounding grassy hills, are the creation of sheep husbandry. Sheep today are healthier and more productive that at any time in history, thanks to an understanding of sheep nutrition. But shepherding is a business whose aim is to produce from a fixed amount of land, the maximum number of good-quality lambs each year, at minimum input and allowing for uncontrollable variable such as the weather. That output depends on the health of the ewes, which in turn is dependent upon breed and feed. This book makes a useful contribution in helping the non-specialist to understand a little of the feed variable.

The book contains a useful glossary of hill-farming terms from the different regions. If you ever wondered about the difference between a tup, a wether and a gimmer, or the difference between a hogg and a twinter, you need go no further.

BILL SHANNON
Preston

J. P. BOWEN and A. T. BROWN (eds), *Custom and commercialisation in English rural society: Revisiting Tawney and Postan* (University of Hertfordshire Press, Studies in Regional and Local History, 14, 2016). xvi + 310pp. pb, £18.99

In a real sense this book announces the arrival of a new generation of economic and agricultural historians. The work of a number of younger historians – the two editors, Tom Johnson, Simon Sandall, Alex Sapoznik – is placed alongside that of a couple of older figures marking their mark on the profession in a second career – John Gaisford, Bill Shannon – and some old hands – John Broad, Chris Dyer, David Rollison, Sheila Sweetinburgh and Andy Wood. Bowen and Brown, who coincided as research fellows at the Institute of Historical Research and held a conference there in 2013 out of which this book has evolved, have brought together a team which has produced consistently good work although inevitably some of it wanders from the book's theme.

The two editors begin with an interesting introduction musing on custom and commercialization. It was custom that allowed commercialization to take place, at least in the form that it took in early modern England – itself a suggestion to think through. I would go a little further and suggest that custom is actually about the allocation of profits of agriculture. The form that custom took in the sixteenth century and later ensured that profits remained with the people

who generated them rather than all sliding into the pockets of landowners. In this way custom in England is fundamentally different in its implications to the operation of custom at other times and in other places where its benefits were much less marked. Custom also allowed, as the editors note, tenants to accumulate land. By depriving lords of the ability to manage their land, they could not take advantage of growing demand for land in the sixteenth century to split tenements or build cottages: for this reason any tendency towards the immiseration of the whole population was defeated, and instead society became polarized.

In a useful essay Dyer writes about Tawney and Postan, and unpicks their intellectual formation and contribution to economic history. I had never quite appreciated that they were colleagues at LSE and, come to that, both admirers of Eileen Power (whom Postan married). One assumes from what Dyer says that they collaborated in the Economic History Society and on *Economic History Review*, but we never have a piece of correspondence between them cited, nor any comment of what one thought of the other: one is left wondering what survives. He ends with some comments on their service to the profession, with some asides on how the service commitment they exhibited is largely lacking today.

Sapoznik gives a good overview of our state of knowledge of the iron industry in medieval England and the closely related charcoal trade, which acknowledges the importance of archaeology and landscape history in making up for the considerable lacunae in the historical record. Her arguments for the importance of iron in agriculture are well made, and the presence of smiths is most villages can be taken as further proof that villagers needed iron on a regular basis for horseshoes, ploughshares and a range of other tools. (Nails and nail making deserve more attention than they get here.) But, as she shows all too well, the very ubiquity of iron makes it elusive in the historical sources. Perhaps the next place to look is in the records of the debt jurisdictions for people trading in iron and iron goods.

Next comes an ambitious paper by Broad. His initial contention is that visitors to eighteenth-century England, who were so impressed by capitalist agriculture and who took home notions of the tripartite division between landowners, farmers and labourers, misunderstood what they saw. The processes which saw the emergence of capitalist farms were driven by farmers not landlords, and often involved farmers renting land from more than one owner. Enclosure, Broad argues, was not an important factor in the creation of large farms. The essay covers a lot of ground, perhaps too much, and embedded within it there is a study of the Wiltshire village of Wylie that really needs expounding at greater length. Custom is one of the foundations of the essay: that it was the existence in England of peasant ownership guaranteed by custom that formed the basis of the rise of the farmer. I can accept this so far but have to note that in a large part of England customary forms of ownership did not take root, and it is arguable whether copyhold for lives should really be treated as a form of custom in the sense Broad means. But this is a challenging essay, which continues the tendency of other recent years to give more weight to the farmer and less to the landlord. It deserves careful reading.

The next few essays are empirically rich but perhaps less ambitious than the first three. Sweetinburgh offers a solidly documented essay about the Kentish marshlands in the later middle ages. Bowen ranges widely over commons, cottagers and enclosure in Shropshire in the sixteenth and seventeenth centuries very much in the terms laid down by Tawney. In an essay which sits a little oddly amongst the others, Johnson looks at the 'economics of shipwreck in late medieval Suffolk', including an account of the capture of porpoises, an exotic commodity never previously mentioned in the *Review*. This was all subject to customary rules though, which justifies its place in the book. Shannon offers an excellent review of the tensions over woodland in Furness (Lancashire) where the Duchy of Lancaster seems to have been hamstrung between its desire to profit from the woodland and its willingness to accept the customary claims of the tenants. There are implications here for the history of tenant right: the tenants come over as well-organized and persuasive, if only through weight of numbers, and able to defeat the managerial aspirations of the Duchy. Many of the same themes are taken up in Sandall's account of the Forest of Dean in the early seventeenth century. Sir John Winter was able to exploit ill-defined customs to secure wood for his iron works; but here the Exchequer was finally able to move against Winter for his destruction of wood. And yet this essay begs more questions than it answers: the reason for the slow speed with which the Exchequer operated, the apparent impotence of the local forest courts and the Exchequer's surveyor to stop (or restrain) Winter, whether Winter ever paid the fines levied on him, even whether he was put out of business.

Brown follows with a dense essay (which repays some perseverance) on the supply of victuals and coal to Durham Cathedral and Durham Priory, the survival of rents paid in food but also the discovery that some rents, apparently paid in money, were actually

supplied in grain and animals. The interest of the essay lies in its discussion of rents paid in provisions. The suggestion that there were coin shortages in this part of the North makes sense, and helps explain fears about coin being drained out of the North by the Dissolution of the Monasteries. I can readily accept Brown's point that payments in grain and other commodities made good sense to both landlords and tenants and their introduction should not be read as being a backward step. This could have been usefully developed. Brown seems unaware that Felicity Heal wrote about Elizabethan bishops maintaining their corn rents (in her *Of prelates and princes*, 1980) and he might usefully have referred to the Corn Rent Act of 1576, which laid down that a proportion of rents on future leases granted by Oxford and Cambridge, Eton and Winchester colleges were to be paid either in kind or in cash at current prices.

By comparison Gaisford offers a crisp essay on a small group of Elizabethan Wiltshire clothiers, delineating the activities and networks of figures who have hitherto been obscure and suggesting that they were every bit as wealthy as their Henrician predecessors. At his death in 1603, Edward Horton had nearly £18,000 out on loan – a fantastic amount. One would have liked a fuller analysis of his money lending: was he still active as a clothier at this time? The overall conclusions – that these clothiers were substantial figures and that the Wiltshire clothing industry remained in good health late in the sixteenth century – seem unarguable. Rollison continues the West County theme with an account of conflicts in Cirencester between the abbey and the townsfolk, and the continuation of the same disputes into the eighteenth century. I was puzzled by a couple of points, notably the question of who owned the manor of Cirencester after the Dissolution and why the townspeople made no attempt to purchase it: perhaps they did. The account Rollison gives is rather inward-looking, but there is a question of how the town related to the county JPs, for whom it was surely a problem to be managed. A comparison with another town with a similar history, Bury St Edmunds, might have been rewarding.

Finally, Wood supplies an 'afterword' which seems to have strayed in from another book. It makes little mention of the essays presented here, and virtually no reference to either Tawney or Postan, commends a number of recent historians of whom he approves and offers a wish list (not always a practical wish list one has to say) of areas where Wood thinks more research is needed. Interesting, but inappropriate here.

So whilst the book's themes get lost at some points, these are individually strong essays, all of which have something interesting to say. Some of them ought to make a rapid appearance on undergraduate reading lists, and the book is to be recommended to anyone who wants to see for themselves the vitality and range of early modern rural history. One reflection on the book as a whole might well be that Tawney still has the capacity to stimulate, even if only as a jumping-off point, where the intellectual contribution of Postan seems less enduring. I might add that it is an inexpensive book which maintains the established standards of the University of Hertfordshire Press. But am I the only reader to dislike their practice of putting the body text in a sans-serif text (perhaps Arial) and the running heads and footnotes in a serif text (perhaps Times Roman?) Possibly I am old-fashioned to object to the mixing of fonts in this way, but if so, old-fashioned is what I'll have to be.

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Europe and beyond

A. T. BROWN, ANDY BURN and ROB DOHERTY (eds), *Crises in economic and social history: A comparative perspective* (People, markets, goods: Economies and societies in history Vol 6, Boydell Press, 2015). xvii + 401 pp., 23 figs, 18 tabs. £25.

As Gordon Brown discovered in 2008, however much we try to marginalize 'exogenous factors' within our understanding of the economy, they have a habit of coming back to bite us. Given the resultant topicality of concerns about economic crises, this volume of essays provides a welcome reinsertion of the exogenous into historical accounts of economic and social history. The essays range very widely, from environmental crises, to epidemics, to business crises, to industrial problems and decline. Chronologically, they extend from twelfth-century England, early modern Czech lands, nineteenth-century Malta, the late nineteenth-century United States, early twentieth-century Latin America, the so-called 'oil-shock' of the 1970s and the Northern Rock debacle in 2007. This is an interesting mix, and it eschews some of the staples of the econometric literature including Tulip-mania, the South-Sea Bubble, the US stock market crashes of 1873 and 1929. This allows the authors to offer new perspectives and new ways of integrating natural phenomena (the two horsemen of famine and pestilence) into accounts of economic change, and in thinking more systematically about the local consequences of man-made economic problems.

Obviously, any such study has to begin by defining the concept of 'crisis', given that the subsequent

essays apply the term in a number of different ways. The introduction represents something of a missed opportunity in this respect, because it settles for representing all the different ways in which crises might manifest themselves and how they provoke responses. Perhaps it is naive or overly reductive to hope for the formulation of a kind of benchmark, but it would have been very helpful to have a discussion focused on what scale or duration a natural or economic event would need to have in order to stand outside the normal cyclical variations. Such broadly accepted definitions exist in demography to indicate 'crisis mortality'. Would it have been possible, on the basis of the essays represented here, to posit 'natural' crises based on, say, two consecutive years of harvests 50 per cent below the long-term mean; or climatic conditions of two or more years where average seasonal temperatures were 5 or 10 per cent different from the long-term mean; or economic crises that involved two consecutive years in which the money supply contracted, or GDP dropped consistently by more than 1 or 2 per cent?

It would also have been useful if the editors had attempted some kind of conclusion, to draw out common themes. This is particularly pressing, because the essays in this volume point to a *compound* crisis in later medieval England and Europe, in which climatic abnormality allied to human and bovine/ovine epidemics, substantial disruption of credit markets, sustained credit contractions, and extreme cyclical variations in international markets. Rather than the (twentieth-century) examples chosen in Singleton's essay on the possible ways in which a 'disaster cycle' of crisis, response and recovery might aid historical explanation, it would have been intellectually stimulating to see this approach applied to considering the two centuries that were required to overcome the cumulative catastrophes of 1310–50. The reader who seeks such answers may need to find them in Bruce Campbell's newly published magnum opus, *The great transition. Climate, disease and society in the late medieval world* (CUP, 2016).

Even so, there are some fascinating, and thought-provoking essays in this collection. Mark and Catherine Casson provide a chronology of crises in late medieval England that will undoubtedly form a foundation on which much future scholarship is constructed, a kind of Phelps-Brown and Hopkins index of cyclical economic stress. This has obvious, but slightly underexploited, connections to Nightingale's chapter on late medieval English credit crises. Philip Slavin's exciting research on the sheep and cattle diseases that accompanied the Great Famine in early fourteenth-century England, emphasizes how terrible life was for the generation born before the Black Death, and his discussion of recovery strategies links to more general discussions in chapters by John Singleton and Samuel Cohn. The case studies of economic, demographic, financial or industrial crises by Pavla Jirkova (Czech Plague), Josette Duncan (nineteenth-century Malta), Anne Murphy (Bank of England in the 1780s), John Lee (late medieval English cloth trade), Cinzia Lorandini (nineteenth-century Tyrolean silk industry), Peter Bent (1890s US tariff debates), and Alan Knight (Latin American Great Depression), each offer well-worked considerations of the role of exceptional change in provoking responses or initiating decline.

However, the chapter that illustrated the fertility of this attempt to integrate the exogenous shock into existing market-based historical interpretations was John Martin's account of the international crisis of 1972–77. Martin's analysis refutes the explanation of the inflationary spiral of the 1970s as a consequence of the 'oil shock' after the 1973 Yom Kippur War. He embeds these events in two long-term climatic anomalies: a series of abnormally dry summers in the southern hemisphere in 1971 and 1972, followed by ones in the northern hemisphere in 1975 and 1976. The former also produced El Niño effects in 1970–71 reducing the South American anchoveta harvest, and the supply of fish-meal fertilizer. The latter drove the Soviet Union onto world grain markets as a buyer at the moment when the main world market supplier, the US, suffered a significant harvest fall (as it had in 1972). Similar problems were seen in the production of staple crops such as potatoes, sugar beet, and a shortage of livestock fodder after the dry summer of 1976. Rising oil prices and industrial problems in many western countries exacerbated these movements but they did not cause them. 'Exogenous factors' did, and Martin remarks, may well do again, if the predictions of climate scientists about man-made climate change are realized.

Martin's essay illustrates the way that crises can compound each other, and how the abnormal and the 'non-economic' can (and should) be incorporated into historical interpretations. As noted, the essays deserved a slightly stronger interpretative introduction, and (in particular) something by way of synthesis in conclusion. However, this volume is very valuable in puncturing the endogamous supply-and-demand, rational market bubble in which much economic history still resides.

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PETER M. JONES, *Agricultural enlightenment: Knowledge, technology and nature, 1750–1840* (Oxford University Press, 2016). xi + 268 pp., 9 illus. £60

Peter Jones is familiar to many as a historian of rural France, although his most recent book was on the knowledge economy of the West Midlands in the late eighteenth century. Now he has returned to agriculture – but retaining his focus on the production, transmission, use and impact of knowledge – and to France, but also to much of the rest of Europe, between (roughly) 1750 and the 1840s. This takes him into several big questions, from van Zanden's idea of the Little Divergence between the countries around the southern North Sea and the rest of Europe, to the effect of changing markets and institutions, the role of literacy on farm management, and the process by which changing knowledge affects technical adoption decisions; in fact, most of the central concerns of agricultural historians.

He begins by tracing the emergence of new ways of thinking in the second half of the eighteenth century: physiocracy and cameralism, political economy and agronomy, a term which appeared among French writers in the 1760s, and was defined as a theory of agriculture informed by science – especially chemistry – in the 1798 dictionary of the Académie Française. New ideas crossed national boundaries. Duhamel de Monceau's *Traité de la culture des terres*, beginning its publication in 1750, was influenced by Jethro Tull's work of twenty years earlier; Albrecht Daniel Thaer, who established an agricultural school at Möglin outside Berlin in 1806, was inspired by Adam Smith and Arthur Young. He quotes with approval Young's contention that after the end of the Seven Years' War in 1763 almost all the European states applied themselves to the study of agriculture, leading to a 'pan-European context of agricultural renewal' (p. 43), with various fiscal and agrarian reforms, cadastral surveys, land clearance and enclosure initiatives in France, the Habsburg Empire, Russia, Prussia and Spain. The wars at the turn of the century may have disrupted knowledge transmission, but they could not prevent it altogether. In 1798 Sir John Sinclair, President of the Board of Agriculture in London, was receiving requests from France for the latest English books on agriculture and rural economy, and in 1809 he made contact with the President of the Agricultural Society of Paris to request samples of spring wheat, which, with the Emperor's approval, were duly sent, along with the President's latest pamphlet on cereal cultivation. Contemporaries remarked on the increasing production of agricultural literature in most European countries and languages in this period. Landowners, farmers, nobility and writers all travelled to widen their agricultural knowledge, agricultural and economic societies were formed, and parish priests from Spain to Finland were used to both gather and disseminate information.

More than 100 million people were added to the population of Europe between 1750 and 1850, and they were mostly fed by a European farm labour force decreasing as a proportion of the total. Jones devotes three chapters to assessing the extent to which the spread of knowledge was translated into changes in practice, and new practices into increased production; in effect, a wide-ranging survey of European agriculture in this period. Demonstration farms, agricultural shows and societies, enclosure, farmers and labourers who were persuaded or attracted to travel to transfer their skills, improved ploughs, 'numberless new-fangled machines', and new crops: the effect of the agricultural enlightenment, Jones argues, was to ensure that these could be found on farms across Europe. It was a 'highly complex and multi-faceted' process, and these chapters explore both its successes and failures. He also provides an account of developments in agricultural science, and a 26-page bibliography of primary and secondary sources.

In recent years, thanks to the efforts of international research groups and latterly to the meetings of the European Rural History Organisation, a number of books have been produced in which the experiences of different countries have been explored in separate chapters, often beginning or ending with an attempt to draw some overall conclusions. This book is one of the first to carry the process of integration and comparison to the next level, in which each stage of the argument is related to the experience of several different countries, so that an individual paragraph might mention estates in England and Prussia, landlords in Denmark and France, and farmers in Scotland and Spain. Peter Jones has the linguistic ability to read the necessary literature in several languages, and in the central theme of agricultural enlightenment he has found a focus which brings together most of the questions that concern agricultural historians. The result is an important book, which opened my eyes to comparisons I had never previously considered, and it is to be hoped that the publishers soon produce it in paperback form so that it attracts the wide readership that it deserves.

PAUL BRASSLEY
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JOSEP COLOMÉ, JORDI PLANAS and FRANCESC VALLS-JUNYENT (eds), *Vinyes, vins i cooperativisme vitivinícola a Catalunya* (Publicacions de l'Abadia de Montserrat, 2015). 664 pp. €28.

The publication of a book that incorporates the Catalan viticulture memory within the great European history puzzle from the seventeenth century until today is always good news. From different perspectives and throughout the period, we find 15 contributions that help us to understand the agrarian development of Catalonia, the Spanish industrial locomotive. The authors tell us about the chronology of a 'frontier vine-producing expansion' founded on forest and waste-land ploughing, with large investments in labour and capital (new vines), under the *rabassa morta* contract, which guaranteed the farmer 'useful domain' – that is, actual possession and use of the land until the death of the vine and the owner, providing him with rents with little effort in return.

Enric Tello and Marc Badia-Miró begin the first chapter questioning the Hecker-Olin model and the logic of relative prices: the increasing international demand (Smithian effect) and the population density intensified vine planting in two waves (Boserupian effect); the first, more egalitarian, focused on brandy (in the eighteenth century); the second in the nineteenth century was more unequal and focused on low-quality wine, under some specific agrarian, climatic and socio-institutional conditions. Analysing the Francesc Sunyer supply chain, Josep M. Grau Pujol and Francesc Valls-Junyent show the control of the great traders in the brandy market in Tarragona, dominating the entire logistics chain, both in the domestic market and export, leasing manorial and church rights, making unfair loans in exchange for future forced productions. However, as Francisco J. Iglesia Berzosa shows, they failed to extend their business to the rest of Spain. According to Llorenç Ferrer Alòs, the existence of these great traders would explain why the Tarragona areas better resisted the devastating phylloxera plague whereas their absence (and other factors) plunged the Barcelona area (focused as it was on local consumption) into a permanent crisis, very well analysed by Pere Pascual Domènech in his research on the sharp decline of the wine railway traffic and by Ricard García Orallo through his detailed comparative research on the rural loan market in the areas of Alt Empordà (Girona) and Conca de Barberà (Tarragona).

Regarding the areas of Girona and Vallès Occidental, Rosa Congost, Enric Saguer and Pere Roca Fabregat confirm the rise of the vineyards, but also explain how things differed geograhically. Girona was less dependent on the vine due to the different uses of the soil, farmers with a greater bargaining power and the existence of other emphyteutic contracts. In Vallès Occidental a symbiosis between industrial development (Sabadell and Terrassa towns) and wine-growing development occurred and a new group of farmers ploughed new lands. These farmers were the founders of the so-called *pobles de carrer* ('street villages').

This book also shows us how the Spanish liberal state did very little to promote the sector. Josep Colomé Ferrer describes the social fight of the *rabassaires* against a minority of landowners who controlled most of the land. These landowners used the *rabassa morta* contracts to assure themselves new rents and took clear advantage after the phylloxera plague. This fight continued until the Spanish Civil War (1936–39). Whereas the yeomen's collective capital was the driving force of the first agrarian revolution in England between 1650 and 1750, in Catalonia it appeared as a defensive reaction at the beginning of the twentieth century. In this respect, Jordi Planas Montserrat Cucurella, Josep M. Vallès and Raimon Soler Becerro describe the successful and unsuccessful experiences of the new wine cooperatives. Although in some cases they managed to reduce costs and improve the production process they did not have enough resources or government support to improve quality, to bottle, distil and above all, to sell (unlike the French case and despite the Mancomunitat Catalana). All this was achieved from 1942 during Franco's regime (Francisco J. Medina-Albaladejo) and especially since 1980 (Miquel Àngel Bové Sans), a period which saw the third wine-growing wave and a revolution in quality.

However, there are some issues pending. It is difficult to understand where we are without framing the sector in the context of economy as a whole. It lacks an introduction about the evolution of the vine since the Black Death. 'International market integration' is mentioned, but what was the market share? How did the international and domestic prices develop? If demand was a decisive force, the role of the population is not clear enough: was it the cause or the consequence? A Catalan wine-growing area has been left out: El Maresme, where the population had a different history. I also wonder if the theory of the relative prices should be applied to lands that are ill-suited to growing cereals. The cash-crop character of the vine as well as income expectations could be also be considered. Given the high degree of dependence of the farmers, it could be claimed that the expansion of wine production was almost colonial or extractive. Neither the expansion of wine (which cannot be eaten) nor the supposed lack of productivity guaranteed a greater urban demand or a change of the agrarian labour force to other activities so, did

the vine expansion slow down the Catalan industrial development? What do we know about productivity, rents, wages and long-term elasticities? If in two hundred years the yield of the land did not grow, the expansion was simply extensive. If it happened this way, could it not depend on the climatic conditions? Until the nineteenth century, Catalonia suffered a little ice age and the 'Maldá Anomaly' – a significant increase in weather variability (droughts, floods and unusual frosts) and a more humid and unstable environment – factors which could have favoured all kinds of fungal plagues. Finally, brandy and wine are mentioned in the book, but, as Llorenç Ferrer Alòs questions, how were they made? Who made them? How did the market go from brandy to wine given the grape used for the former was of worse quality? Definitely, such questions can only arise in a high-quality book like this, a book that will be essential reading for anyone interested in learning more about the evolution of Mediterranean agriculture.

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DENISE PHILLIPS and SHARON KINGSLAND (eds), *New perspectives on the history of life sciences and agriculture* (Springer International Publishing, 2015). 509 pp., 6 illus. €176.79 (£153).

It is difficult to imagine today's agricultural industry operating without modern varieties of crops and grasses, pesticides or veterinary medicines, all derived directly or indirectly from the results of scientific research. Farmers also use technologies such as global positioning systems (GPS) that were developed for other purposes. Working the other way, statistical techniques now in general use were developed at Rothamsted agricultural research station, and methods of assisted conception in humans originated in the science used in developing artificial insemination, semen storage, and embryo transplants for farm animals. For over 50 years from 1931 the UK's Agricultural Research Council spent millions of pounds on basic and applied agricultural science, and today over a quarter of the UK Biotechnology and Biological Sciences Research Council's budget is devoted to projects relating to agriculture and food security. Since the Royal Agricultural Society of England was founded in 1838 with the motto 'Practice with Science', there is clearly nothing new in this. Yet in the last 30 years this *Review* has published fewer than ten articles directly concerned with the relationship between science and agriculture, and the most recent survey of the subject published in the UK – Blaxter and Robertson's *From dearth to plenty. The modern revolution in food production* – is now more than 20 years old and was written by scientists and not historians.

How can we account for this? According to Denise Phillips and Sharon Kingsland it is not something confined to the UK. Introducing their book, they point out that science historians, or historians of biology, tend to neglect agriculture to the same degree that agricultural historians ignore science. There are some notable exceptions, although they are often found in history of science departments and publish in science history journals. From their work several common themes have emerged, such as the use of science to promote agricultural growth, and the interactions and relationships between science and government, experts and practitioners, and between science and technology. Agricultural issues have had an impact on the development of the life sciences, especially genetics and ecology, and agriculture provides some interesting case studies of the ways in which ideas and methods travel around the world.

Many of these topics are covered in this book. Roughly half of its 23 chapters are concerned with the twentieth century, with the some of the remainder going back as far as the middle of the eighteenth century. More than half of the authors are working in, or have some connection with, the USA, although several of them write about events in other countries such as Germany, Japan, France or China. Only three of the chapters – Matz on nutrition science in late nineteenth-century Germany, Derry on chicken breeding and Onaga on Japanese silkworm breeding, both in the twentieth century – are specifically concerned with animals. The pre-twentieth-century chapters cover a variety of topics, from the emergence of plant geography in Germany and France, and Napoleon's interest in cotton growing, to the rise of scientific forestry and applied entomology in Russia, the impact of microbiology on the Japanese brewing industry, and the establishment of a botanical garden in Java. This last chapter, together with the following two on the emergence of ecology in the USA, raise some interesting questions about the emergence of scientific disciplines and sub-disciplines and their relationship with agriculture. Otherwise, most of the twentieth-century chapters are concerned with breeding and genetics, and the complexities of the relationships between their practitioners. As Margaret Derry points out, it was the lack of detailed understanding of poultry breeding practices that initially limited the influence of geneticists, who in any case were more interested in general biological problems. What changed, and increased the influence of the scientists, was not the science, but the organization of the poultry industry.

This brief survey of the contents cannot do justice to the variety and richness of the book. I had not thought about the influence of vegetarians, naturopaths, nudists and anti-vaccinationists on the emergence of organic farming in Germany, or the use of whale oil to combat the depredations of the brown planthopper on the Japanese rice crop, before reading this book. I was aware that plant breeders had used X-rays to induce mutations and thus attempt to produce useful variations in commercial crops, but its extent and the excitement it generated in the inter-war period eluded me until I read Helen Anne Curry's fascinating chapter. There is no single unifying theme running through the book, but the editors end their introduction with the hope that this varied collection will stimulate further research. And so it should.

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IAN MILLER, *Water: A global history* (Reaktion Books, Edible series). 141 pp. 48 illustrations. 2015, £10.99.

For those who have not encountered it already, the Edible series consists of small, pocket-sized hardbacks in ochre covers, which deal with 'the rich history of cuisine', not simply from a historical but from a cultural point of view. The idea is clever, the production standards high and the books may be recommended as a sort of *amuse-bouche*. (I imagine that a book on the *amuse-bouche* is forthcoming.) They make good Christmas presents and nicely fill the *longueurs* of Boxing Day morning (if the reader can stand the thought of food, that is).

The series has now reached some 56 volumes covering staples like the potato and rice, meats (beef, lamb, pork – and offal), cantering through styles of cooking (barbecue, hot dog, pizza), fruits (apple, lemon, orange) to drinks (beer, gin, whiskey [sic] and wine). Water sits a little uncomfortably in this company, as it is not, in the way that most of the subjects are, a foodstuff. Instead it is the most basic of staples. As the author says, 'The history of drinking water is one of convincing the public why they should drink water and making it seem interesting' (p. 114). Much of the book is concerned with the adulteration of water, as may be seen at the end when the author provides recipes for a range of flavoured waters. The book ends with an appendix of mineral waters, which, oddly for an academic based in Ireland, omits Ballygowan.

Miller starts by reflecting on the essential need of human society for water and the struggle to provide safe and potable water, but then discusses the reluctance of people to drink water without flavouring. This we might call the paradox of water: we go to a great deal of trouble to make it pure, then add impurities to it to make it interesting enough to drink. His fourth chapter discusses the preference for water with alcohol in it, which leads into a discussion of temperance and, of all things, the drinking fountain. Miller then turns to the strategies employed to market drinking water and has a chapter on 'Making water interesting' (whether by carbonation or adding ice). He draws to a close with a discussion of how safe water supplies have been made available in developed countries but how great a distance there remains to make them available throughout the world. The focus is on the Global North, but there are nods to the very different conditions of the Global South.

There is much here that is interesting, even amusing. I never knew that there was a Dr Schweppe who founded a mineral water company. Nor did I know the adage that 'in wine there is wisdom, in beer there is strength, in water there is bacteria', here attributed to David Auerbach: but I am glad that I do now. I can sign up to that. It had never occurred to me to spell Evian backwards (all on pp. 74–5). And that is characteristic of the book: a sharp eye for the telling anecdote. The selection is eclectic though. There is no consideration of water as the medium in which food is boiled, or water-based meals like soup. The potato would never have caught on if it could not be boiled. The politics of water are not really covered: the 'theft' of water by urban societies from rural ones, whether the diversion of water from northern to southern California, from the river Jordan to Israel and nearer home from Wales to Liverpool and Birmingham or, of course, Manchester's dependence on the Lake District for its water. Some comments on the ownership of the water utilities would have been welcome. The infrastructure of water is passed over, but coming from a district where reservoirs were two-a-penny, I grew up well aware of the shaping of the landscape to supply the most essential of commodities. The history of the soda stream is covered in a couple of paragraphs, but there is much more to be said about 'pop' especially at a time when there is some public debate (and the promise of government action) about excessively sweetened drinks.

I do not blame Miller for the omissions, confronted as he doubtless was with a tight word length on a subject that perhaps does not quite fit in the series. A book twice the length would, I am sure, have been easier to write. What I do complain about though are the illustrations. The book is brightly and well illustrated, but the illustrations are never mentioned in the text, and, I would imagine, are the work of

an uncredited picture editor tasked with finding illustrations to match a text already in the hand. On p. 65 is a nice picture of the Royal Crescent at Bath: I have no idea why. A discussion of the Goldfields Water Supply System in Australia has a full-page picture (on p. 110) of a pipeline stretching into the distance with the caption 'Goldfields water supply pipeline, western Australia': as nice a picture of a large-diameter pipe as you will ever find, but completely unrewarding for the reader. The pictures do not add to the text so much as have a life of their own.

This is in large measure an account of the valued-added ways in which water can be presented but which has less to say than it might about the bulk commodity that comes through our taps. There is a bibliography which might easily be twice the length, but, alas, no references, so the text has to be taken on trust.

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Conference Report
The Society's Spring Conference, 2016

by Catherine Glover

The Society held its 2016 Spring Conference at Wortley Hall, the stately home in South Yorkshire rebuilt by Sir Edward Wortley-Montagu in the 1740s and '50s and the seat of the Earls of Wharncliffe until the Second World War, after which it was bought by a cooperative of trade union activists as an educational and holiday centre. It made a pleasant change for conference delegates to be able to eat, sleep, socialize and attend conference sessions all under the same roof, and not have to brave the early spring weather when moving from one activity to another. Some of the bedrooms were extremely commodious and delegates could speculate as to which illustrious trade unionists had formerly slept in them.

After the Society's 64th AGM, in recognition of the trade union connection, Nick Mansfield, of the University of Central Lancashire, opened the proceedings with an illustrated talk on 'Sites of rural labour: places, buildings and people, 1830–1930'. These included Owenite colonies, including the one at Queenswood, Hants, which bankrupted Owen; Chartist communities and the caves at Llangynidr in South Wales, where they were supposed to have made and stored pikes; non-conformist wayside Bethels; village Friendly Society halls and reading rooms; holiday camps and convalescent homes of the trades unions and the cooperative societies; the clubhouses of the Clarion movement; and the sites associated with the Tolpuddle Martyrs.

Unfortunately, what might have been an opportunity for past-president of the Society, David Hey, to welcome delegates to his home turf became a memorial meeting for David, who had, sadly, died a few weeks earlier. A regular at these conferences for many years, Professor Hey was greatly missed. In place of his scheduled talk on the Wortleys of Wortley Hall, on Monday evening Richard Hoyle stepped in, keeping us entertained while some of us were digesting a very heavy pudding, with a paper about a local man called Robin Hood, dispelling the myth about him robbing the rich to feed the poor and suggesting that the fourteenth-century stories were an attempt to answer the question 'Who was Robin Hood?' about a man who only ever existed in the imagination.

The New Researchers session started with a fascinating account by Christoph Otte of the University of Edinburgh on 'The early medieval settlement landscape of Dumfriesshire – A case study of the parish of Lochmaben, c.600–1000 AD'. This work-in-progress paper introduced a methodological approach to studying the relation between settlement patterns and land use. The challenge of this county lies in the scarcity of contemporary written evidence, such as saints' lives and chronicles, and even more so in the lack of sources pertaining to agricultural arrangements, such as charters and other estate accounts. Therefore, the methodology employed a number of different disciplines, such as place-name studies, archaeology, agricultural population and land-use estimates, early modern estate maps and GIS spatial analysis.

The parish of Lochmaben was used as an exemplary case study due to its central role in the medieval lordship of Annandale. It was argued that the parish boundaries were particularly suited for creating comparable case studies within the county due to their possible connection with early medieval territorial boundaries or estates, as suggested by Glanville R. J. Jones and other scholars of the 'multiple estate' model.

The focus of the presentation was the question of how the hierarchy of a given settlement landscape, in the sense of possible estate centres and dependent settlements, could be explored without the availability of written evidence. The methodology involved three steps. Firstly, a detailed analysis of the place-name evidence was used to identify potentially early medieval settlements and farms within the parish. In a second step, eighteenth-century maps and estate plans were

used to reconstruct the agricultural landscape and land potential of the parish into a rough dichotomy of pastoral and arable lands. The population estimates of Marcel Mazoyer and Laurence Roudart were then applied to these soil capabilities to gauge the relative number of people who could be supported by each settlement based on its surrounding land. This agricultural dimension of settlement hierarchy was complemented in a third step, which explored the role of military and social, rather than agricultural, factors for the location and status of settlements. It was argued that a higher density of late prehistoric and early medieval fortifications in a given area reflected upon the investments which societies were prepared to make in that particular landscape, in terms of large-scale labour and cooperation. Since this paper presented work in progress, no final conclusions could be drawn, but within the parish of Lochmaben both the agricultural potential and the fortification density point to the focal settlements being on the eastern boundary, along the River Annan.

The other paper in the session, given by Joshua Rhodes of the University of Exeter, was on 'The development of agrarian capitalism in England from the seventeenth to the nineteenth centuries'. The debate on this topic has shifted in recent years from a focus on calculating farm sizes to measuring the extent to which English agrarian society had been proletarianized. Leigh Shaw-Taylor has provided a valuable contribution to the literature through his analysis of the ratio of farmers to wage labourers as a proxy with which to measure agrarian capitalism. Given this new focus on wage labour as a measure of agrarian capitalism we need to know more about what determined the employment of wage labour on farms. Above a certain size all farms needed wage labour but on 'smaller' farms the ratio between family and wage labour was more changeable. The paper considered some of the problems with using wage labour as an indication of agrarian capitalism through an analysis of some 1851 census data.

Rhodes demonstrated that the size of a farmer's family might determine the number of wage labourers he or she needed to employ. He did so by comparing the number of labourers employed on farms with the number of family members able to work on the farm. He found that farmers with larger families employed fewer labourers than small families did on farms of the same size. He suggested that the ratio of family to wage labourers on a farm was determined by a range of factors, only one of which might have been the number of children able to work on the farm. Other factors may have included the social status of the family and the availability of off-farm work. Furthermore, the recourse to hiring wage labourers may have changed over the course of the family's life cycle. Rhodes argued that more research on farmers' decisions to employ wage labourers is needed.

After coffee, Sarah Carter from the University of Alberta broadened our horizons in her exposition of 'British Women Homesteaders, Farmers and Ranchers on the Canadian Prairies, 1880s–1920s'. In the late nineteenth century, British proponents of agriculture for women, emigration associations, colonial training schools, and imperially minded journalists advocated farming for 'gentlewomen' in the colonies, particularly Canada. A number of factors and causes intersected and overlapped to create modest momentum for this initiative, including alarm about the 'surplus' women of Britain, the opposition to women farmers or horticulturalists in the 'mother country,' and the fact that there had to be better options than housework to tempt British women to cross the Atlantic.

A significant number of British women farmed the Canadian prairies. The best known was Georgina Binnie-Clark of Fort Qu'Appelle Saskatchewan, who grew wheat, published two books about her experiences, and lectured widely in Canada and England about the opportunities for women agriculturalists to contribute to the 'spade-work of Empire'. But there were many other farmers and ranchers, including the famous (although short-lived) Isobel 'Jack' May, notorious for dressing in 'male attire'. The majority had to purchase land because single and married women were denied the free homestead grant of 160 acres available to any male. Widows with children were entitled to the homestead grant and there were many British widows who acquired and farmed large acreages. Single women obtained farms through purchasing South African scrip that entitled the owner to 320 acres of land (the 'scrip' was issued to veterans of the Boer war, as specified by the Volunteer Bounty Land Act), such as Lizzie Hillis, from Ireland. Lady Ernestine Hunt was an Alberta horse rancher, and Jean Laidlaw was a cattle rancher on land acquired from the Piikani First Nation.

But Canada proved an uncongenial environment for many of these farmers. The land laws discriminated against women, and British women spearheaded an unsuccessful and troubled campaign for the extension of the homestead grant exclusively to British women. There was persistent opposition to women as farmers and other obstacles and constraints. In prairie Canada, crafted as a colony of the British Empire, British women were to be exemplars of an idealized white femininity and were not to toil and sweat in the fields.

In the afternoon, we again assembled in the comfortable Library of Wortley Hall for a session dedicated to the memory of David Hey. Henry French recalled David's 'Myddle Years', during which he was seduced away from his own locality to writing a social and topographical history of the Shropshire parish recorded in the detailed account of its eighteenth-century resident, Richard Gough. Peter Edwards then brought us back to the West Riding and Wortley Hall via the connection between two men noted for horsemanship and horse breeding, William Cavendish, first duke of Newcastle (1592–1676) and Sir Francis Wortley (second baronet, *c*.1615–1665). A number of those present reminisced about David and discussed what made him such an individual historian.

Delegates spent the rest of the afternoon taking the air in the grounds of Wortley Hall, although we were disappointed that we never penetrated its secret garden, as staff failed to find the right key. The Annual Dinner was a pleasant affair, the pudding weighing not quite so heavily as it had the day before.

On the Wednesday morning, Jordan Claridge of the London School of Economics gave a paper on 'Entrepreneurialization and commercialization in the medieval English dairy industry, 1250–1450', which explored the emerging entrepreneurialization of the dairy industry in medieval England against a backdrop of changing economic conditions between the thirteenth and fifteenth centuries. The expansion of pastoral agriculture, of which the dairy industry was a significant component, was a major catalyst for economic growth in England and across Europe. Beginning in the fourteenth century, the pastoral sector underwent long-term expansion and intensification, to the point where it accounted for 50 per cent of agricultural production by 1850, about double that of 1300. The paper examined the shift of dairy production from the seigneurial sector, where dairy herds were owned and managed by landlords as part of mixed demesne farming, to something more entrepreneurial, where dairy operations were leased to independent farmers. An examination of dairy leases from 1250 to 1450 reveals that leasing rates remained relatively static over a period of almost one hundred years despite dramatic year-on-year variations in the price of inputs like fodder and pasture, but also changes in the prices farmers could fetch at market for dairy products. Dairy leases, therefore, seem to have provided a steady income to lords at a rate palatable to peasants. Claridge found little evidence of increasing specialization or 'up-scaling' of dairy operations after the shift from seignieurial to entrepreneurial dairying. The sizes of most dairy herds tended to be about 20 cows on seignieurial farms and remained the same when herds were leased. These small herd sizes may be indicative of limited capital investment in the industry which left most risk in the hands of the lord.

This was followed a paper by Paul Warde of the University of Cambridge, on 'Soil, sustainability, and the fate of empires, *c*.1750–1450'. His paper traced the emergence of the belief that society could be undermined by poor management of the soil, and discussed the application of these ideas to history in the nineteenth century. Warde presented an argument that such ideas only really became current with the development of new theories of the soil from the mid-eighteenth century, that they contained a 'vital', life-giving element, and the incorporation of this idea into circulatory theories of plant nutrition that required recycling, especially through manure. Even when agricultural chemistry was transformed – especially by Liebig and Boussingault – from the 1830s, these ideas were retained and increasingly used as an explanation for the fall of the Roman Empire and the apparent decline into sterility of other regions. The paper concluded by examining how these arguments moved across the Atlantic by the middle of the century to become part of debates about tariffs, westward colonization, and the over-taxing of the soil through supplying urban centres and exports; and hence led some to argue that American 'empire' too rested on care for the soil.

The proceedings were brought to a close with a paper by Anne Meredith on 'Women gardeners and the First World War'. This paper explored how the First World War impacted on a small number of middle-class women, complementing recent work by Bonnie White and Nicola Verdon on women and the Women's Land Army. These women had obtained a professional training in horticulture by attending one of the horticultural colleges or gardening schools established around the turn of the century. Like their sisters on the Prairies, they found opportunities were restricted, with, for example, employment in large private gardens being closed to them. However the war meant that experienced male gardeners were in short supply and so the trained woman gardener was reluctantly employed. Large private gardens employed trained women gardeners to replace head gardeners and journeymen with for example the gardens at Windsor Castle employing women from January 1916. Kew Gardens also employed women, with over 20 posts being filled by them. Nurseries and market gardens

also employed women, though the paper demonstrated that the evidence for this was fragmentary with it being difficult to identify the trained woman gardener as opposed to unskilled female labour. The final section of the paper looked at war work ranging from providing fruit and vegetables to a Red Cross hospital to service in the Women's Army Auxiliary Corps (WAAC). The gardeners serving in the WAAC tended war cemeteries in France and the paper drew on oral evidence and college magazines to explore this area. The end of the war saw the pre-war employment status quo restored. Women were 'let go' and the early 1920s were to be difficult years for the women gardener. However a few women were able to expand their expertise and so take advantage of the restricted employment opportunities open to them. The women working in horticulture and agriculture had demonstrated that they could replace men and when war loomed again, by August 1939, 30,000 women had already been enrolled in the Women's Land Army.

Delegates thanked Nicola Verdon for once again organizing a very satisfying and enjoyable conference.

THE AGRICULTURAL HISTORY REVIEW

edited by
R. W. Hoyle, H. R. French *and* B. McDonagh

Volume 64
2016



PUBLISHED BY
THE BRITISH AGRICULTURAL HISTORY SOCIETY

Published by the British Agricultural History Society, Department of History,
The University of Exeter, Amory Building, Rennes Drive, Exeter, EX4 4RJ
Typeset by Carnegie Book Production, Lancaster
Printed and bound by Short Run Press, Exeter
ISSN 0002–1490

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